NATIONAL OPEN UNIVERSITY OF NIGERIA

SCHOOL OF AGRICULTURAL SCIENCE

COURSE CODE: SED 412

COURSE TITLE: NIGERIAN INDUSTRIES AND INDUSTRIALISATION

COURSE GUIDE

SED 412
NIGERIAN INDUSTRIES AND INDUSTRIALISATION

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INTRODUCTION

Nigerian industries and industrialisation is a two-credit course. It is a core course for all those offering Bachelor Degree in Integrated Science Education B. Sc (Ed). This course will prepare you and change your outlook to what you should experience outside your field of specialisation. It will help you to begin to think and act like a professional. The course involves aspects of Industries and Industrialisation with reference to Nigeria. The course includes: Science, Technology and Industrial Development, Requirements for industrial development, classification of industries, the Nigerian industrial growth model. Classification of locally manufactured industrial products, industrial wastes and associated ecological problems the Nigerian experience and Field trips to selected industries.

WHAT YOU WILL LEARN IN THIS COURSE

The overall aim of the course in Nigerian Industries and Industrialisation is to keep you abreast with development outside Integrated Science Education. The course is developed on the premise that science education is not limited to four walls of classroom or science laboratory but also benefits from other specialisations where, may be or not scientific and technological principles are adopted. This course will further expose you to better understanding of your job as a seasoned Integrated Science teacher especially on how to conduct a meaningful field trip to a selected place so as to make the teaching and learning of Integrated Science an enjoyable and meaningful enterprise.

COURSE AIMS

This course aims at providing meaningful guidelines on the need for science and technology in industrial development, Industrial waste and its effects. Management of industrial waste and familiarisation with some issues that concern industries and industrialisation in Nigeria.

COURSE OBJECTIVES

To achieve the aims set out above, the course sets over all objectives. In addition, each unit also has specific objectives. The unit objectives are always included at the beginning of a unit; you should endeavour to read them before you start reading through the unit. You may as well want to refer to them during your study of the unit to check on your progress. You should always look at the unit objectives after completing a unit. In this way, you can be sure that you have done what was required of you by the unit. The wider objectives of the course as a whole are stated below. For you to say you have achieved these objectives, you should

have successfully achieved the aims of the course. On successful completion of this course, you should be able to:

- define science
- define technology
- state similarities between science and technology
- distinguish between science and technology
- identify criteria for measuring a Technological Backward nation
- list and explain causes of technological backwardness in Nigeria
- suggest remedies for technological backwardness in Nigeria
- give historical background of technological/industrial development in Nigeria
- sate importance of technological development to educational sectors and the need for technology development in Nigeria
- discuss level of technological and industrial development at independence
- explain trend in the area of industrial development
- discuss the development technology and industrialisation since 1960
- state reasons for low level of technological and industrial development
- discuss Nigeria's crisis of development
- state general requirements for industrial development
- list locational requirements for industrial development
- define industry
- classify industries into Sector
- distinguish between Industry Classification Benchmark (ICB) and Global Industry Classification Standard (GICS)
- classify industries by product Define location of industry
- list factors influencing the location of an industry
- state reasons for government participation in the location of industries in Nigeria.
- put Standard Industrial Classification (Sic) into its groups
- list and discuss types of information industry
- state reasons why information industry is important
- list reasons for the concentration of industries in urban centres
- mention advantages of locating industries in the urban area
- state disadvantages locating industries in the urban area
- give Reasons for sitting industries in rural areas in Nigeria
- state advantages of locating industries in the rural areas
- list disadvantages of locating industries in rural areas
- define industrialisation
- discuss roles of industrialisation in economic development of a nation

- discuss problems of industrialisation or industrial growth in West Africa
- suggest solution to the problem of industrial development in West Africa
- discuss how West African countries can promote indigenous industries
- discuss industrialisation in Nigeria-The journey so far
- list and discuss ways or methods by which government can encourage industrialisation in Nigeria
- discuss Strategies of industrialisation
- mention Advantages and disadvantages of industrialisation
- list basic roles of governments in industrialisation
- state reasons for control over the location of private industry
- identify ways by which government intervenes in the location of industry
- mention what hinders industrial development?
- suggest Materials needed by the students for the trip
- identify materials needed by the instructors
- list steps in conducting the trip
- highlight activities that will occur during the field trip
- discuss post-field trip activities
- evaluate field trip
- state importance/benefits of field trip.

MAIN COURSE

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MODULE 1 SCIENCE, TECHNOLOGY AND INDUSTRIAL DEVELOPMENT

UNIT 1 CONCEPT OF SCIENCE AND TECHNOLOGY

CONTENTS

1.0 INTRODUCTION

When you hear the term science, it is typically associated with the term technology; especially when the two are talked about as subjects in school. Although these two terms are often interchanged, there is actually a sparse difference between the two and of course, some similarities. Perhaps the best way to differentiate science and technology is to have a quick definition of each term.

2.0 OBJECTIVES

At the end of this unit, you should be able to:

- dfine science
- define technology
- state similarities between science and technology
- distinguish between science and technology

3.0 MAIN CONTENT

3.1 WHAT IS SCIENCE?

Science is a very broad concept that attracts different definitions. Let us examine some of them.

- Science is a systematic knowledge base, where a series of steps is followed in order to reliably predict the type of outcome.

- Science refers to a system of acquiring knowledge. This system uses observation and experimentation to describe and explain natural phenomena.

- The term science refers to the organised body of knowledge people have gained using that system.
- Science is a systematic enterprise that builds and organises knowledge in the form of testable explanations and predictions about the universe.

- Science is the study of forces and interactions between different "things", both animate and inanimate.

3.2 What is Technology?

A specific definition for the word "technology" is difficult to determine, because "technology" can refer to material objects of use to humanity, such as machines, hardware or utensils, but can also encompass broader themes, including systems, methods of organisation, and techniques. The term can also either be applied generally or to specific areas: examples include "construction technology", "medical technology", or "state-of-the-art technology". Nonetheless, technology can be defined as:

- A concept that refers to use and knowledge of tools and crafts, and how these tools and crafts affect our ability to control and adapt to the environment.

- Technology refers generally to items of use, created from "Applied Science".

- Technology can be referred to as things which we make, but were developed by applying scientific law, knowing what such "things" are capable of doing.

- Technology is the collection of techniques, methods or processes used in the production of goods or services or in the accomplishment of objectives, such as scientific investigation.

- Technology can be the knowledge of techniques, processes, etc. or it can be embedded in machines, computers, devices and factories, which can be operated by individuals without detailed knowledge of the workings of such things.

- Technology may refer to those aspects of culture which relate to the manipulation of the natural environment by man or "that whole collection of ways in which the members of a society provide themselves with the material tools and goods of their society.

- In an industrial society this term refers especially to "artificial things, and more particularly to modern machines: artificial things that (a) Require engineering knowledge for their design and production; and (b) perform large amounts of operations themselves." [8]

- Technology may be used to refer to inventions and processes with extensive potentialities for application, such as laser technology, chip technology, and DNA recombinant technology, and the applications of such technologies within existing or new machines and production processes.

- Technology refers to human activities in connection with the utilisation of artefacts.

- Technology implies the knowledge requisite to use technical things. "Technological 'things' are meaningless without the 'know-how' to use them, repair them, design them and make them.

- Technology may refer to a body of knowledge that is necessary to generate new rules for the design, construction, and application of technical possibilities to different types of problems (such as, for example, the control of environmental pollution).

3.3 The Similarities between Science and Technology

Here are some similarities:

i) Both involve the study of the world around us
ii) Both use facts

iii) Both require study to understand
iv) Both are used to understand the world and to help people

3.4 Comparing Science and Technology

CRITERIA	SCIENCE	TECHNOLOGY
Evaluation Methods	Analysis, generalisation and creation of theories	Technology is doing
Goals achieved through	Corresponding Scientific Processes	The search for and theorising about new processes.
Focus	Focuses on understanding natural phenomena	Activities always value-laden
Development Methods	Discovery (controlled by experimentation)	Analysis and synthesis of design
Most observed quality	Drawing correct conclusions based on good theories and accurate data	Key Technological Processes
Skills needed to excel	Experimental and logical skills	focuses on understanding the made environment
Evaluation Methods	Analysis, generalisation and creation of theories	Design, invention, production
Goals achieved through	Corresponding Scientific Processes	Taking good decisions based on incomplete data and approximate models

SELF-ASSESSMENT EXERCISE

i. What is science?
ii. Define technology
iii. State similarities between science and technology
iv. Distinguish between science and technology

4.0 CONCLUSION

Science and technology is the best thing society could ever ask for. If the Society cannot do without the industries we have today, then, the society needs science and technology.

5.0 SUMMARY

In this unit, you have learnt what Science and Technology are. You have learnt the Similarities between Science and Technology and comparing them.

6.0 TUTOR-MARKED ASSIGNMENT

How can we change, or modify the natural environment in order to satisfy perceived human wants and needs?

7.0 REFERENCES / FURTHER READING

http://www.answers.com/Q/What_are_the_similarities_between_science_and_technology.

http://www.answers.com/Q/What_is_the_difference_between_science_and_technology.

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Technology and Science. http://mickogrady.blogspot.com/2012/08/the-relationship-between-science.html.

Technology. http://en.wikipedia.org/wiki/Technology.

What are the similarities between science and technology?

What is technology? http://www.extension.org/pages/39999/what-is-technology.

What is the difference between Science and Technology?

UNIT 2 TECHNOLOGICAL/INDUSTRIAL DEVELOPMENT IN NIGERIA

CONTENTS

1.0 INTRODUCTION

Various authorities have differently defined the term technology. The Oxford Advanced Learner's Dictionary defines technology as the scientific study and use of mechanical arts and applied sciences, e.g. engineering, and its application of this to practical tasks in industry. Akaninwor (2008) sees it as a systematic application of manufacturing methods and industrial arts to enhance efficiency in human activities. He went further to say that technology can simply be described as the result of man's efforts to do things more efficiently and effectively. Drucker (2007) defines technology as ways or means of accomplishing a task. In this unit, you will see the state of science and technology in national development, especially, industrial development.

2.0 OBJECTIVES

At the end of this unit, you should be able to:

- identify criteria for measuring a Technological Backward nation
- list and explain causes of technological backwardness in Nigeria
- suggest remedies for technological backwardness in Nigeria
- give historical background of technological/industrial development in Nigeria
- state importance of technological development to educational sectors and the need for technology development in Nigeria.

3.0 MAIN CONTENT

3.1 Technological Backwardness

A country is said to be technologically backward when:

(i) It cannot produce capital goods such as tractors, lathe machines, drilling machines, cars, trains, and other earth moving equipments.
(ii) It is unable to exploit her natural resources except with the help of foreigners who will normally provide the technology and expertise to undertake the exploitation of her natural resources.
(iii) It is unable to mechanise her agriculture i.e. crude implements are still used for agricultural production activities by a large percentage of those who are involved in agricultural production.
(iv) It depends on other countries for the supply of its spare parts for industrial machinery
(v) It exports raw materials to other countries as against finished products
(vi) It is unable to produce her own military hardware with which to defend herself if the need arises.

A critical examination of Nigeria reveals that all the points itemised above are present in the country. Thus Nigeria as spelt out in the items above is a technological backward country.

3.2 Causes of Technological Backwardness in Nigeria

The reasons why Nigeria is technologically backward today are many and varied.

They include the following:

(a) Discouragement of Technological Growth by our Colonial Masters.

There are many reasons why the British came to Nigeria. One of the reasons is economic.

(Boahen 1966). The British saw Nigeria as a ready market for their sprits, dane guns, mirrors and other goods. Before the advent of colonialism Nigerians were involved in many aspects of industrial and practical arts. They made their own hoes and other implements for farming, were able to weave their own clothes, smelted bronze and were able to cast an object as intricate as the “Festac mask” that was stolen by the British, undertook tanning of hides and skin amongst others.

According to Akaninwor (2008),the colonialists discouraged further development of Nigerian technology as they reasoned it was a threat to the smooth marketing of goods imported from Europe. He went further to assert that "ogogoro" was termed illicit gin by the colonialists, and whoever was caught producing, marketing, or consuming it was persecuted.

(b) Colonial Education

Formal education is the main and proper channel for technological emancipation provided it is built on appropriate philosophy of education. The philosophy of Nigerian education during the colonial period was built on the wrong philosophy as can be confirmed by the statements of Lord Lugard and Rev. J.C. Taylor who said respectively:
"The chief function of government primary and secondary schools among primitive communities is to train the more promising boys from the village schools as teachers for those schools, as clerks for the local native courts, and as interpreters: (Lord Lugard 1921)". "I looked upon them as the commencement of our missionary work. We lost no time and began to teach them the A.B.C." (Taylor 1857). It is therefore not surprising that apart from the Yaba Higher College that was established in 1947 to produce middle level technical manpower, the colonialist only established secondary schools that were meant to produce clerks, missionaries, and interpreters. The aspect of education which emphases, skill and practical competence was however not an integral part of our colonial educational system as at that time.

(c) Industrial Policies after Independence

The major industrial policy that Nigeria embarked upon after independence was import substitution industrial policy. The major thrust of this policy was:

(i) Building of assembly plants in Nigeria.
(ii) Importation of completely knocked down (CKD) parts into Nigeria to be assembled in these plants.
(iii) The establishment of steel plants, like Delta Steel Plant and Ajaokuta Steel Plant, and associated foundries that were to produce automobile parts that would be assembled in already established assembly plants.
(iv) The establishment of machine tool companies (like Oshogbo Machine Tool Company) that were supposed to produce capital goods.

The import substitution industrial strategy did not go beyond the stage of building the assembly plants, as the technical partners know that if Nigeria stops importing CKD parts, their companies

in Europe would automatically stop production and eventually fold up. It meant that Nigeria would no longer be a market for European cars.

(d) Inability to Commercialise Research Findings

There are a good number of research institutions in Nigeria. Some of these are Product Development Agency, (PRODA) Enugu, Federal Institute of Industrial Research, (FIIRO) Oshodi, Nigerian Institute for oil Palm Research, (NIFOR) Benin, City Rubber Research Institute of Nigeria, (RRIN) Benin-City amongst others. These institutions have made a good number of findings or inventions but the lackadaisical private sector has not thought it fit to commercialise these inventions. Our universities and polytechnics have also invented different equipment, which nobody has bothered to commercialise for effective productivity. Today these Research institutions are a mere shadow of themselves, as the Nigeria factor has not helped them develop further.

(e) Refusal to Develop Military Invention made by Biafra during the Civil War

It is generally believed that necessity is the mother of invention. Under the fire power of the military government during the civil war,(1966-1970) Biafra produced a lot of fighting machines equipments, bombs and other sophisticated items using local technology trample the "Red Devil" armored personnel carriers, Ogbunigwe (mass killer), orange peel mosquito coil bombs etc. (The African Guardian July 23 1997). The Biafrans even extracted and refined their own petroleum product. But because of pride and inept leadership Nigeria has not made a positive effort to cash on this war time inventions, sit down and find out how these skills can be further improved upon for enhanced productivity because of the greed that has blind folded our visionless leaders.

(f) Government Attitude

Government attitude towards breaking the jinx of technological backwardness in Nigeria is both disgusting and appalling. Nigeria is probably the only country in the world where you can find all brands of cars without any one having been designed and made by Nigerians. Policy makers take technological decisions without consulting Nigerian engineers and technologists. And where sometimes good policies are taken, the follow up and implementation becomes an uphill problem as out implementation methodology in all facets of our Nation has never been adequately sustained.

(g) Poorly Equipped Educational Institutions

Our universities, polytechnics and technical colleges that are supposed to train proficient engineers, technologists, and technicians are now filled with obsolete and in most cases non-functional equipment. This affects the quality of products from these technological institutions. India, it is claimed, ranks third to the United States and the former USSR in scientific and technical manpower (The Nigerian Engineer, December 2003). It has over four million scientists and engineers. In 1985, Indian universities have 750,000 Engineering students registered. There were five elite institutions called India Institutes of Technology, funded and equipped to the highest standards, to provide high quality university graduates in electronics, computer science and other high technology disciplines. Their products emigrate in large number to the United States and other countries to apply their high skills where they are also valued and in demand, like the Republic of Ireland and Philippines. It is however not a surprise to see engineering graduates in our Nigerian Universities who cannot differential between a bolt from a nut.

3.3 Suggested Remedies for Technological Backwardness in Nigeria

We must appreciate the fact that no situation is totally hopeless. Nigeria, as a nation, can leave the comity of technologically backward nations to one of technologically advanced nation if the following suggestions are implemented.

(a) Copying items already in the Market

This method requires that laboratories, workshops, and other facilities be developed for component analysis and for building prototypes of items to be produced. The idea is to knock down products of interest in the workshops, study and analysis each component in the laboratories to ascertain chemical composition, physical properties and other production parameters of interest and replicate such items. Government should encourage “Igbo made” items and should assist in improving the quality of their products so as to compete favourably with the imported ones.

(b) Industrial Espionage

Highly technical and military technology is closely guarded by their proprietors. The secrets can be obtained either by direct investments or through espionage. Spies are often employed to collect top secrets and

company documents required for developing such products, which they pass on to their sponsors for a fee.

(c) Provision of Infrastructural Facilities in our Schools

The ideals of the society are supposed to be passed to the next generation by the school system. Presently, the older universities in Nigeria have obsolete tools and the newer ones cannot afford to equip their laboratories and workshops Otubanso (2005) in "Education for Underdevelopment" quoted a chemistry professor as saying that "students no longer do practical but only the theory of practical." If our students cannot do basic practical how can we aspire to a technological breakthrough? It is therefore imperative that for us to overcome the problem of technological backwardness, we (the public and private sectors) must invest monumental resources towards upgrading our educational infrastructures. We should probably recall the statement of Martin Luther King, who said: "The prosperity of a country depends not on the abundance of its revenues, nor on the strength of its fortifications, not on the beauty of its public buildings, but it consist in the number of its cultivated citizens, its men of education, and enlightenment of character."

(d) Adequate Financing of Research Institutions

A good number of research institutions in Nigeria are not adequately funded. This continues to militate against effective research undertaking. India for example invested over three billion dollars in 1985 in some 1,300 research institutes working on electronics aeronautics and space, atomic energy, etc In 1985, India spent 1.5% of her GNP on research and development compared with about 2.5% spent by the US. Nigeria's highest allocation figure was 0.43% in 1983, which went down to 0.05% in 1992 and 0.23% in 2003 (The Nigerian Engineer, Vol. 35 No. 4 December 2003): This is very sad for a sector whose responsibility is to research into areas that will enhance development in the country.

(e) Bold Energy Production and Supply

It was abundant energy supply that launched Europe into the industrial revolution. Nigeria has been flaring natural gas from oil wells for over 40 years; it has an abundant deposit of coal, yet the National Electric Power Authority (NEPA) now power Holdings company of Nigeria (PHCN) cannot supply electricity to Nigeria. Industrial transformation can only thrive on a steady and sustainable supply of electricity. Since experience has shown that anything under government control never functions properly in Nigeria, then it is imperative that for Nigeria to achieve technological breakthrough, NEPA has be privatised. The

ability for the lust privatised power Holdings company of Nigeria (PHCN) to achieve the said aim is a topic for future discussion.

(f) Engineers, Technologists, Technicians and Class Struggle

Presently there is a cold war between (engineers, technologists and technicians in Nigeria each feeling that he is superior to the other. But it is pertinent for all to know that they are all members of the same family and they need to work together to pull Nigeria out of the morass of technological backwardness. Gordian Ezekwe, one time minister of science and technology, commenting on bringing about Nigeria's technological breakthrough once said: "No one man does it. It is going to be a combined thrust of the best hands and brains, in all sectors of the society and of all and sundry in this country, including the clerks."

(g) Appropriate Technology

We need to embark on the acquisition of the technology that is appropriate and useful to us as a nation. That America has sent men to space does not mean that Nigeria must also send men to space. We need to look at our environment see what our local people do, and fabricate machines tools and equipment that will assist them to do these things more efficiently.

(h) Good Leadership

For Nigeria to be technologically developed there must be a leader who is sincere, has foresight vision and Nigeria at hearth. Not merely by saying it as common with our leaders but by doing it Koontz et al. (2002) noted that "the importance of good leadership is nowhere better dramatised than in the case of many underdeveloped countries where provision of capital or technology does not ensure development. The limiting factor in almost every case has been the lack of quality and vigour on the part of managers." This statement is particularly time for Nigerian leaders who major aim is not only on how to amass wealth for themselves but for their unborn generation.

3.4 Historical Background of Technological/Industrial Development in Nigeria

The concept of technological development in Nigeria evolved through the years after political independence in 1960; there was the concern for economic independence. The aim was that Nigeria should gradually reduce her dependence on Britain her former colonial master that dominated the production and distribution organisation in Nigeria at that time. Economic development was to progress in an orderly manner and

no dislocation to the system was to be allowed. The existing companies were to be encouraged and new ones were to be attracted to increase investment in Nigeria. The thinking of Nigeria business policy makers up to the end of the civil war in 1970 was that Nigeria had a lot of resources (land and manpower) but lacked the capital to effectively develop them. Foreign investments were therefore to be vigorously encouraged. Nigeria was to be non-aligned so as to attract capital from both East and West. This, it was thought, would gradually reduce the grip Britain had on Nigeria's economy. The Nigerian Enterprises Promotion (Indigenisa-108 V. O. UWAIFO AND P.S.O.UDDIN tion) decrees of 1972 and 1977 forced the foreign firms operating in Nigeria to sell a sizeable portion of their ownership socks to Nigerians.

After the Nigerian civil war in 1970, capital for the governments was given a big boost by favourable developments in the oil industry. The volume of oil produced in the country increased tremendously, with the development of oil fields in the Western Delta of Nigeria. The Arab/ Israel war of 1973 resulted in the Arab oil embargo on the West. This action shot the price of oil to $42.00 per barrel with consequent increase in revenue to Nigeria. For what we the lay men can see, a lot of this revenue was used to build bridges, construct high ways, build vehicle assembly plants, steel plants, aluminium smelter plants, the Kanji dam and other power generating stations, universities, polytechnics, etc. Our fraudulent and visionless leaders also lavished a sizeable part of this revenue on the then notorious "Festac 77", and the remaining stashed away in foreign banks in Switzerland and other countries. Today, even with our democratic dispensation, the status quo has not changed.

3.5 The Need for Technology Development in Nigeria

Since we all know the importance of technology we should make wide spread of it in our country so that we can have a solid background in academic. Technology helps in building a nation effectively and efficiently. We should not forget that technology helps in opening business relationship with other friendly Nation. And also helping the educational programmes of our country more productive programme more products effective. These are the importance of technological development to educational sectors:

i. Technology makes learning interesting.
ii. Technology makes learning process more suitable and effective.
iii. It helps in achieving educational pursuit in academic background.
iv. Technological equipment stimulates interest and assimilation in teaching process.
v. Technology is used for development and improvement on the educational curriculum of educational system.

The federal government should give more concern to technological advancement to our country, Nigeria. They should bring new modern technological equipment for school and trained qualified personnel who can make good use of it in impacting or using it to teach the learners effectively and efficiently. Because new technological equipment has opened up new opportunities for developing countries like Nigeria, which possess the required skills to provide expert-oriented service such as data entry, data processing and software development. Achieving all these technological equipment it will provide job opportunities for many Nigerians for the economic and social development of our nation.

SELF-ASSESSMENT EXERCISE

i. Identify criteria for measuring a Technological Backward nation.
ii. List and explain causes of technological backwardness in Nigeria.
iii. Suggest remedies for technological backwardness in Nigeria.
iv. Give historical background of technological/industrial development in Nigeria State importance of technological development to educational sectors and the need for technology development in Nigeria.

4.0 CONCLUSION

A good number of technologically backward countries are poor, unable to feed their teeming population, are debtors, have low life expectancy figures, and to a large extent have inept leaders. They are unable to exploit the natural resources within their domain on their own. All developing nations in the world should strive to quite the stage of dependency to an industrialised dependent nation. This will help the citizenry.

5.0 SUMMARY

In this unit, you have learnt:

1. Technological backwardness
2. Causes of technological backwardness in Nigeria
3. Technological backwardness in Nigeria
4. Historical background of technological/industrial development in Nigeria
5. The need for technology development in Nigeria.

6.0 TUTOR-MARKED ASSIGNMENT

In what ways can technological advancement contribute to industrial development?

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UNIT 3 SCIENCE AND TECHNOLOGY IN THE CONTEXT OF INDUSTRIAL DEVELOPMENT IN NIGERIA

CONTENTS

1.0 INTRODUCTION

Nigeria has struggled to promote development in all facets of life in the five decades of its independence. The efforts have generally yielded very modest success and the reality is that in the early 21st century Nigeria continues to face what some scholars have described as the "crisis of development". This unit examines the contribution of the development of technology and industrialisation to this development crisis. It discusses the pattern of the development of technology and industrialisation in the country in the colonial period and the influence on industrial policy after independence. The nature and changes which took place in technological and industrial development in Nigeria since 1960 as well as the factors responsible for the low level of development are also explored.

2.0 OBJECTIVES

At the end of this unit, you should be able to:

- discuss level of technological and industrial development at independence
- explain trend in the area of industrial development
- discuss the development technology and industrialisation since 1960

- state reasons for low level of technological and industrial development
- discuss Nigeria's crisis of development

3.0 MAIN CONTENT

3.1 Level of Technological and Industrial Development at Independence

At independence, the level of development of technology and industrialisation in Nigeria was very low. This was also the case in other areas such as education and health. During the nearly a century of colonial rule in Nigeria, the British paid very little attention to the development of technology and industrialisation and the result was the low level of industrial and technological development in 1960. This attitude was in line with British colonial policy. The philosophy of European colonialism in the 19th and 20th centuries was that Africa should be kept as a source of cheap raw materials to feed the industries in Europe and to serve as a market for its finished products (Oliver and Atmore, 1996:124- 130).

Embarking on intense technological and industrial development was therefore tantamount to destroying the basis of colonialism itself. The fact that the British colonial authorities strongly encouraged the cultivation of cash crops easily explains this. The development of technology and industrialisation requires conscious effort, a reasonable amount of resources and a clear aim which is to promote scientific study and research, the results of which are used to make machines and other inputs for mass production of goods and to ease the laboriousness with which services are carried out. There was a tremendous advancement in this area in Europe in the second half of the 18th century during the 19th century in what has been described as the "industrial revolution". By the early 20th century, Britain, which blazed the trail in the industrial revolution, had recorded a great leap in its economic development, and the resources from the colonies and the markets they provided played a great role in this (Goff, 1998:14). Britain did not want to disrupt this condition and her desire to maintain the status quo meant little or no attention to the development of technology and industrialisation in the colonies which included Nigeria.

However, some attention was paid to scientific research and industrialisation during the two world wars when it was difficult to import manufactured products from- 271 - Europe (Osuntokun, 1979:51-52). After the end of World War II in 1945, the British colonial authorities seriously considered the possibility of establishing an office to coordinate the development of commerce and industries in Nigeria.

This led to the establishment of the Department of Commerce and Industries in 1946. This office had as one of its major assignments the conduct of research on a small scale and the promotion of industrial development (Kilby, 1969:182-183). The activities of the Department enhanced the development of technology and industrialisation at its inchoate stage in the 1940s.

Further attention was paid to the development of technology and industrialisation in the 1950s. In September 1952, a World Bank mission came to Nigeria on the invitation of the British government to conduct a survey on the state of technology in Nigeria and ways of improving it. The mission submitted its report in 1954. It observed that research efforts had not been systematic and recommended that an institute of applied technical research be established (Ekundare, 1973:296). Following this recommendation, the British colonial authorities provided the sum of £260,000 which was used to establish the Institute of Applied Technical Research in 1956. This Institute, which later became the Federal Institute of Industrial Research, was responsible for coordinating research into new methods of production throughout Nigeria from when it was established. It continued to carry out basically the same function under its new name after independence. It carried out research in many areas, but the most prominent ones were the use of wide fibres for the making of sack, the use of local dyestuff for textile manufacture and the mechanisation of the production of gari (Kilby, 1969:185-191). Some of the research efforts had actually commenced before the establishment of the Institute of Applied Technical Research, but it continued from where they were inherited and struggled to ensure that they were completed so that the results could be put to good use.

The application of the modest achievements recorded by the Institute of Applied Technical Research and the few breakthroughs made before its establishment, which included the results of the research efforts of the West Africa Institute of Oil-PalmmResearch, constituted the level of technological development of Nigeria at independence (Ekundare, 1973:295-296). There was, of course, local technology which continued to feature prominently in the production techniques of Nigerians. However, in most instances this was rudimentary. In fact, the research efforts of the post-World War II period were basically aimed at improving on the indigenous technology which was regarded as laborious and unsophisticated.

3.2 Trend in the Area of Industrial Development

The post World War II attention to the production of some goods in Nigeria, especially those items in which raw materials were available, resulted in the establishment of many new factories in the 1950s. This

received a boost from 1955 onwards following the introduction of the Lyttleton Constitution in 1954, which transferred the responsibility for industrial development to the regional governments. The Nigerian leaders who assumed responsibility for administering the regions saw industrial development as a way of stimulating economic development. They therefore put in place policies and incentives to encourage investors. Some of these included the provision of finance in form of loans to assist private entrepreneurs. This was important since lack of capital was one of the major problems faced by industrialists, especially the indigenous ones, during the period. It was- 272 - in accordance with this objective that the Federal Government established the Federal Loans Board in 1956. In addition to this, the government at the center established the Investment Company of Nigeria in 1959 with the assistance of the Commonwealth Development Finance Company. The main objective of the Investment Company was to provide finance and technical assistance to companies engaged in manufacturing, agriculture and mineral exploitation (Arikawe, 1987:19). In addition to the provision of assistance to entrepreneurs, the government at various levels was involved in direct investments in industrial production as well. In 1959, the government of Eastern Region formed the Industrial and Agricultural Company to promote manufacturing and agricultural production. The Northern Nigeria government established the Northern Nigeria Investments Limited which carried out a similar function with the Eastern Region's Industrial and Agricultural Company. Long before this time the government of Western Nigeria had established the Western Region Development Corporation which had been involved in industrial manufacture since 1954 (Arikawe, 1987:110). Apart from this, the Western Region embarked on the development of infrastructure on a large scale which was aimed at providing a boost to industrial production. All the efforts greatly stimulated industrial development in Nigeria between 1954 and 1960. Indeed, it can be said that the little autonomy which was provided by the 1954 Constitution was exploited by Nigerian leaders to give a leap to the country's industrial development (Onyemelukwe, 1982:176).

At independence in 1960, Nigeria had a total of 389 industrial establishments (Onyemelukwe, 1982:175-177). Many of these were engaged in the production of soap, cement, tobacco, textile and brewing. At this time, the country's population was estimated at about 50 million. Products from these factories were grossly inadequate to meet the needs of the teeming population. The result was that Nigeria continued to import much of the manufactured products it needed. This was the state of industrialisation in Nigeria at independence. Taken along with the state of the development of technology described earlier, it can be concluded that the level of industrial and technological development of Nigeria at independence was very low.

3.3 The Development of Technology and Industrialisation Since 1960

In the first half of the 1960s, Nigeria continued to build on the foundations of the two previous decades in the areas of industrialisation and technological development. The Federal Institute of Industrial Research continued to bear the responsibility for carrying out studies into viable industrial activities and for assisting new manufacturing establishments by offering guidance on effective use of raw materials and machines. Thus, the study into the production of jute bags and mattress filling from coconut fibre continued after independence. The same was true of the research into the industrial production of gari and pulp for papermaking. The latter culminated in the establishment of a paper m ill at Jebba in 1963 (Kilby, 1969:190). However, following the political crisis which broke out across the country in 1966 and the civil war which began in the second half of 1967, industrial research received very little attention until 1970 (Aworawo 2002:217-218).- 273 - The process of industrialisation followed a similar pattern. There was rapid progress from 1960 to 1966, but things slowed down from 1967 and picked up again from 1970. For instance, while there were 687 manufacturing establishments in Nigeria in 1964, which increased to 776 in 1965, the number fell to 625 in 1968 as the civil war raged.

However, after the war ended in 1970, the number rose to 703 at the end of that year and jumped to 1,054 in 1972 (Arikawe, 1987:112). Thus, the Nigerian Civil War, like most wars, negatively affected the development of technology and industrialisation in Nigeria.

In 1970, the Second National Development Plan was formulated to guide the development of the country for five years. Emphasis was placed on industrial and technological development in the Plan. The same was true of the Third National Development Plan (1975 to 1980) and the one that followed from 1980 to 1985. The Third and Fourth Plans specifically committed the government to the establishment and expansion of a Research Products Development Company, an Institute of Industrial Research and industrial development centres. Accordingly, the government established the Industrial Research Council of Nigeria in 1971 which was affiliated to the Federal Ministry of Industries. The agency was established to co-ordinate industrial research activities in Nigeria and to organise for the application of the results to practical industrial activities (Njoku, 2001:227). In addition, a National Council for Science and Technology had been established in 1970, which was replaced by the National Science and Technology Development Agency (NSTDA) in 1977. This Agency became a full ministry, the Ministry of Science and Technology in 1979. This ministry became the apex body

for the coordination of research and technological development all over the country (Olaoye, 2000:36-37). Following this, all the twenty-three research and development institutes in the country came under the control of the ministry. In addition, universities of technology were established in the 1980s with the objective of expanding research in the areas of science and technology.

Some attention has undoubtedly been paid to Nigeria's technological development since 1970. In 1986, a national policy on science and technology was formally launched by the government to "promote scientific and technological manpower development" and to "encourage local research and development activities in both private and public enterprises" (Davies, 1988:148). However, up to the end of the 20th century. Nigeria remained a technologically backward country. The problem was obviously not that of poverty of policy or blueprint but commitment and provision of the enabling environment for technological advancement. For instance, the Federal Institute of Industrial Research (FIIRO) has consistently complained of inadequate funds which have made dramatic breakthroughs in industrial research impossible. The research leading to the discovery of the possibility of incorporation of up to 10 per cent of cassava to wheat composite flour for bread making remains the only known 'breakthrough' of FIIRO in as many years (Sunday Punch, 2008:29). Although this discovery is important since Nigeria has cassava in abundance and hopes to save millions of dollars from wheat importation, much more has been expected from FIIRO.

Regarding the development of industrialisation, a steady progress was recorded from 1970 to 1975 as the price of oil, which became Nigeria's major export commodity, rose steadily in the international market. The total number of manufacturing- 274 - establishments in Nigeria rose from 1,054 with 127,162 people employed in 1970, to 1,290 establishments with 244,243 people employed in 1975. The value of production also rose from about $844,638,000 to $2,611091,000 during the same period (Arikawe, 1987:112).

However, by the end of the decade, things had begun to slow down as a result of the fall in the price of oil in the international market and global economic recession. The trend continued throughout the 1980s. The economic recession which characterised the 1980s adversely affected industrial development. In 1986, the government introduced the structural adjustment programme, which was expected to turn the economy around and stimulate industrialisation. This, however, accomplished very little. As part of the reforms, the government decided to pay more attention to the development of small scale enterprises (SSEs). The National Economic Reconstruction Fund (NERFUND) was

established in 1989 to grant the SSEs loans with low interest rates. After six years of operation, only 88 projects had received some form of assistance from the agency. The People Bank of Nigeria (PBN) which was established also in 1989 had a similar experience with the NERFUND (Alli, 1997:344-345). It was established to grant loans to SSEs with low interest rates and to assist groups of artisans and traders to start or expand business by providing loans and guidance. Although it performed fairly well in the first three years of its establishment, the PBN soon became a haven for people with little or no interest in the development of SSEs. The result was that in the second half of the 1980s and throughout the 1990s, the industrial sector in Nigeria continued to perform poorly, contributing to less than ten per cent of the GDP. The sector recorded a negative growth rate of 3.6 per cent between 1981 and 1987. Capacity utilisation also reduced drastically. In 1992, the average manufacturing capacity utilisation was only 37.2 per cent (Olusoji, 1998:190).

The political crisis which engulfed the country following the annulment of the 12 June 1993 elections further adversely affected the performance of manufacturing as it did to all the other sectors of the economy. In 1993, the contribution of industrial manufacturing to the Gross Domestic Product was a paltry 7.4 per cent. This decreased to 6.9 per cent in 1994, and- 275 - further down progressively throughout the rest of the decade (Njoku, 2001:229). Only a slight improvement was recorded in the opening years of the 21st century as the new civilian government of the Fourth Republic struggled to improve the fortunes of the industrial sector, with very little success. What remains to be discussed is the reason for the low level of technological and industrial development in Nigeria since 1960 in spite of the recognition of their importance and despite all the effort of successive governments in the country.

3.4 Reasons for Low Level of Technological and Industrial Development

An examination of the process and means by which Nigeria tried to pursue its technological and industrial development since independence brings to light the reasons for the low level recorded during the period. It is important to understand these factors in order to be able to make positive recommendations on the problems. As far as technological development is concerned, a major reason for its low level is:

i) lack of commitment on the part of government and relevant agencies.

The measure of attention that is required for a country with abysmally low level of technology like Nigeria has not been given (The Guardian 2008:31).This is reflected in the amount of resources allocated to the sub-sector and government policies to regulate it.

Ernest Shonekan noted in 1990 that "there is no gainsaying that compared with many other countries worldwide, Nigeria and other African countries allocate paltry resources to research and development" (Shonekan, 1999:25). Between 1971 and 2001, allocations to the development of science and technology were an average of 0.9 per cent of the federal budget and 0.3 per cent of the Gross National Product (GNP) (Davies, 1998: 150-151). When this is compared with allocations to defense which averaged over 10 percent in the same period, the problem of technological development in Nigeria can be well appreciated. Ebun Davies argues that "this is unlike the level of funding for science and technology in the developed countries where allocations to scientific research range from 2 to 3 per cent of the GNP" (Davies, 1999:150). With inadequate attention and resources, it is hardly surprising that the level of Nigeria's technological development has remained low (The Guardian, 2008:23). Many analysts of Nigeria's technological development have wondered why government attention to the sector has been so low over about four decades. This is because successive governments have expressed their recognition of the importance of, and commitment to the sector. The efforts of different regional governments from 1954 to the early post-independence period have already been discussed. In 2006, President Olusegun Obasanjo declared 2007 as the Year of Science and Technology. It was stated that science and technology would be deployed to fight poverty, hunger and disease and promote overall development in Nigeria. Some 24 billion naira ($150 million) was to be appropriated to promote the development of science and technology (Sunday Punch, 2010:39). As part of the package, science and technology parks were to be established across the country to provide clusters for activities related to science and technology. It (The Guardian, Lagos, 12 March 2008, p.31.- 276 -) was projected that small and medium-scale enterprises would tap into the opportunities and facilities provided by the parks. Attention was also to be paid to the National Science and Technology Museum which would offer opportunities in other aspects of technological development.

Conscious of the need to enhance the country's technology of power generation, the government proposed the setting up of a Solar Panel Development and Manufacturing Pilot Plan. It was expected that solar power generation would complement power generation by the existing

power company which is mainly gas and hydro based. The government stated correctly that the solar panel development efforts were in line with contemporary practice globally where emphasis has been placed on clean and renewable energy. Government efforts to develop technological development in 2006 and 2007 also involved the proposal to promote computer-aided design and manufacturing facilities aimed at improving the quality of locally- manufactured products (The Guardian, 2008:23).

ii) Non-release of appropriated funds which were inadequate in the first place.

iii) Many aspects of the policy could not be implemented.

iv) Government representatives lack sufficient enthusiasm towards technological development: The enthusiasm that was reflected in the articulation of policy was not matched by action. A lot was done, by so much was left unattended.

v) Attitude of Nigerian industrialists to get returns on investment:

The average Nigerian industrialist is too much in a hurry to get returns on investment. He is therefore reluctant to commit resources to research and development, which makes technological advancement possible. All too often, Nigerian industrialists are content with assembling or even just packaging products which makes it possible for them to quickly secure their returns. In such an environment technological advancement could hardly take place.

vi) Shortage of equipment to carry out research

The lack of adequate commitment on the path of government and the attitude of Nigerian industrialist combine to create an acute shortage of equipment and material required for technological development. Thus, both at the Institute of Industrial Research and the different polytechnics and universities of technology, the prevailing condition is that of shortage of materials to carry out research (Daily Champion, 2010:25; The Guardian, 2009:16)). Bereft of materials to work with, the average researcher with interest and energy often ends up frustrated. A few of these manage to find their ways abroad where they have the right equipment to work with and where the enabling environment to effectively function exists. Some of these have gained popularity after making intriguing breakthroughs. Of course such feats can only benefit the countries where such Nigerians are based. Such is the experience of Nigeria's technological development.

It is for this reason that scholars of Nigeria's industrial development are agreed that rapid development of infrastructure is necessary for any substantial improvement of industrialisation in the country to take place.

The factors responsible for the low level of technological and industrial development in Nigeria are many and diverse as is evident from the above discussion.

These and other not too prominent ones would need to be addressed before there can be an improvement in the development of technology and industrialisation in Nigeria.

3.5 Nigeria's Crisis of Development

The Nigerian economy has performed far below expectation since independence in 1960. The high hopes that were raised were quickly dashed in the course of the first decade of independence and the economy entered a deep recession in the 1980s. For instance, Nigeria's per capita GNP stood at between 1000 USD and 1,100 USD between 1975 and 1980. This dropped to just about USD400 in the early 1980s and even less- 280 - sometimes during the 1990s (Obadina, 1999:8). A measure of improvement was recorded in Nigeria's economic fortunes from 2000-2010, and per capita GNP did reach $1,400 in 2009, but the overall performance could be described as low in comparative terms at the end of the first decade of the 21st century (Saba et al, 2001:287; The Africa Report, 2001:218- 219).

The low level of the development of technology and industrialisation has contributed a great deal to Nigeria's poor economic performance since independence. The economy is dominated by the exportation of crude petroleum which accounts for over 90 per cent of export earnings. As the government seemed, for the most part, content with collection of rent from oil companies, the economy has not been diversified. This has limited economic opportunities and overall economic performance has been affected by the vagaries of international oil prices. This was the case in the early 1980s, from 1998-1999 and 2008-2009. Reliance on a single primary export product as a result of low level of technological and industrial capacity has also limited the opportunities for regional economic integration. There have simply been few items that Nigeria has been able to export to neighbouring states and as a regional power from which much is expected, this deficiency has contributed to the low level of international trade in West Africa (Aworawo, 2010:1321-134). Nigeria's low level of technological and industrial development has therefore contributed a great deal to the country's economic crisis in the last five decades.

SELF-ASSESSMENT EXERCISE

i. Discuss level of technological and industrial development at independence.
ii. Explain trend in the area of industrial development.
iii. Discuss the development technology and industrialisation since 1960.
iv. State reasons for low level of technological and industrial development.
v. Discuss Nigeria's crisis of development.

4.0 CONCLUSION

This unit has revealed that Nigeria has not fared well in her quest for industrial and technological breakthrough since independence. It has remained a challenge which has not been successfully tackled over the years. The realisation that virtually all the countries that have become economically strong and stable, with a high living standard for its people, have attained substantial level of industrialisation, has made it important for the government and people of Nigeria to be concerned about the low level of industrialisation of the country. Nigeria's ability to articulate effective industrial policy, commitment to the policy, advancement in science and technology to achieve economic transformation are therefore important to the country's development in the future.

5.0 SUMMARY

In this unit, you have learnt:

1. Level of technological and industrial development at independence
2. Trend in the area of industrial development
3. The development technology and industrialisation since 1960
4. Reasons for low level of technological and industrial development
5. Nigeria's crisis of development.

6.0 TUTOR-MARKED ASSIGNMENT

Discuss importance of technological change for economic growth.

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UNIT 4 REQUIREMENTS FOR INDUSTRIAL DEVELOPMENT

CONTENTS

1.0 INTRODUCTION

There are basic requirements necessary for industrial development. Development plans will take account of these requirements while seeking to achieve wider objectives in the public interest. Let us carefully consider these requirements in under this unit.

2.0 OBJECTIVES

At the end of this unit, you should be able to:

- state general requirements for industrial development
- list locational requirements for industrial development.

3.0 MAIN CONTENT

3.1 General Requirements

1. Compliance with international environmental standards.
2. Shareholders/owners are expected to make a financial contribution.
3. The contribution of historically disadvantaged people under special circumstances may be lowered, in which case the Industrial Development Corporation (IDC) will be prepared to extend finance in excess of the owner's contribution.
4. The project/business must exhibit economic merit in terms of profitability and sustainability.
5. The IDC does not re-finance fixed assets since the aim is to expand the industrial base.
6. For grants, the project owner or operator must establish financial capability by furnishing three years' financial and operating

statements or, in the case of a new business, three years' pro forma statements and a business plan.

7. The Department may review a project at any time during the first two years. If a project has not made reasonable progress in creating jobs or has misspent funds, or if its benefiting company has closed or moved without having accomplished its commitments, the Department may require repayment of a grant or may accelerate loan repayments.
8. Pertaining to Basic Industrial Development Fund (IDF) financing and the Utility Account financing there is no local match requirement if the project is located in a country that has one of the 25 most economically distressed ranking
9. For Basic IDF financing, the participating private entity must provide a statement of commitment to create the jobs, with a timetable and parties responsible, and must state that private money has not been expended on the project and that the project has not yet begun.
10. Applications must show that IDF funding is necessary for job creation.
11. A pre-application conference is necessary to discuss a proposed IDF application.

3.2 Locational Requirements for Industrial Development

These include:

1. The demands of customers;
2. Access to raw materials and suppliers;
3. Access to power supplies and telecommunication networks;
4. Links with other businesses, particularly those providing specialist services or knowledge;
5. Water and sewerage infrastructure;
6. Links with research institutions such as universities;
7. Workforce catchments areas; and
8. Transport considerations.

SELF- ASSESSMENT EXERCISE

1. State general requirements for industrial development.
2. List locational requirements for industrial development.

4.0 CONCLUSION

The requirements for industrial development are a key factor in the preparation of development plans. Development plans will take account

of these requirements while seeking to achieve wider objectives in the public interest

5.0 SUMMARY

In this unit, you have learnt:

1. General requirements for industrial development
2. Locational requirements for industrial development

6.0 TUTOR-MARKED ASSIGNMENT

Discuss the following requirements for industrial growth:

1. Workers
2. Capital
3. Raw materials

7.0 REFERENCES/FURTHER READING

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MODULE 2 CLASSIFICATION OF INDUSTRIES

UNIT 1 CLASSIFYING INDUSTRIES

CONTENTS

1.0 INTRODUCTION

Industrial classifications organise economic activity in general, and economic organisations (companies, non-profit organisations, etc.) in particular, into categories generally called "sectors" or "industries", typically defined by the kind of product or service produced. Industries can be classified in a variety of ways.

2.0 OBJECTIVES

At the end of this unit, you should be able to:

- define industry
- classify industries into Sector
- distinguish between Industry Classification Benchmark (ICB) and Global Industry Classification Standard (GICS)
- classify industries by product
- put Standard Industrial Classification (Sic) into its groups

- list and discuss types of information industry
- state reasons why information industry is important.

3.0 MAIN CONTENT

3.1 DEFINING INDUSTRY

Industry is the production of a good or service within an economy. The production side of business activity is referred to as industry. It is a business activity, which is related to the raising, producing, processing or manufacturing of products.

3.2 Classification of Industries into Sector

Primary or extractive, secondary or manufacturing, and tertiary or services. Some authors add quaternary (knowledge) or even quinary (culture and research)sectors. They are-

Primary
These involve the extraction of resources directly from the Earth; this includes farming, mining and logging. Primary industry is concerned with production of goods with the help of nature. It is a nature-oriented industry, which requires very little human effort. They do not process the products at all. They send it off to factories to make a profit.

Secondary
This group is involved in the processing products from primary industries. This includes all factories—those that refine metals, produce furniture, or pack farm products such as meat.

Tertiary
This group is involved in the delivery and sale of goods. They include truck drivers and retail workers, for example.

Quaternary
This group is involved in the research of science and technology and other high level tasks. They include scientists, doctors, and lawyers.

Quinary Sector
Some consider there to be a branch of the quaternary sector called the quinary sector, which includes the highest levels of decision making in a society or economy. This sector would include the top executives or officials in such fields as government, science, universities, non-profit, healthcare, culture, and the media.

3.3 Market-Based Classification Systems

i) Industry Classification Benchmark (ICB)

The Industry Classification Benchmark (ICB) is a definitive system categorising over 70,000 companies and 75,000 securities worldwide, enabling the comparison of companies across four levels of classification and national boundaries (114 **subsectors** allow detailed analysis, 41 **sectors** provide a broad benchmark for investment managers, 19 **super sectors** can be used for trading and 10 **industries** help investors monitor broad industry trends). It is used to segregate markets into sectors within the macro economy. The ICB uses a system of 10 industries, partitioned into 19 super sectors, which are further divided into 41 sectors, which then contain 114 sub sectors.

The ICB is used globally (though not universally) to divide the market into increasingly specific categories, allowing investors to compare industry trends between well-defined subsectors.

The ICB system is supported by the ICB Database, an unrivalled data source for global sector analysis.

The ICB Difference

Investor focused - ICB offers increased clarity, better structure and universality to meet the needs of the investment industry.

Comprehensive coverage - ICB covers virtually any equity-related security an investment professional will encounter. A rigorous and transparent rules-based methodology enables accurate and relevant classification, ensuring low inter-sector correlation in any stage of the economic cycle.

Versatility - ICB provides a standardised basis for analysis, stock selection and performance measurement. It aligns with investment research and analysis, numerous exchange-traded products, and services developed by analytical data vendors. It can also be used to drive a search engine or enhance existing data sources.

Global reach - ICB is adopted by stock exchanges representing over 65% of the world's market capitalisation, including London Stock Exchange, Singapore Stock Exchange, Athens Exchange, Cyprus Stock Exchange and Kuwait Stock Exchange, etc.

Relevant to investors - The industry and super sector tiers are designed to reflect and facilitate sector-based investment strategies.

Representative - Independent management combined with input from research teams based in each major region allows ICB to reflect the global industrial landscape and provides the reassurance of accurate representation and continued growth and monitoring of the market.

Accurate and timely - The accuracy, quality and timeliness of the data make it a very reliable reference source for validation, compliance and other reporting processes.

Efficient and effective - ICB is a single data source, removing the need for users to maintain individual databases or undertake costly and time-consuming sector research.

ii) Global Industry Classification Standard (GICS)

It has been specifically designed to classify companies globally – in both developed and developing economies. The GICS
classification system currently consists of 10 sectors, 24 industry groups, 68 industries and 154 sub-industries. The GICS sectors are:

- Consumer Discretionary
- Consumer Staples
- Energy
- Financials
- Health Care
- Industrials
- Information Technology
- Materials
- Telecommunication Services
- Utilities

GICS was designed to classify a company according to its principal business activity. GICS is a four-tiered, hierarchical industry classification system:

- 10 Sectors
- 24 Industry Groups
- 68 Industries
- 154 Sub-Industries

The full GICS classification for each company is an 8-digit code with text description. The hierarchical design of the 8-digit coding system allows for easy transition between GICS tiers.

Examples:

Sector: Consumer Discretionary (GICS code: 25)
Industry Group: Consumer Services (GICS code: 2530)
Industry: Hotels, Restaurants & Leisure (GICS code: 253010)
Sub-industry: Casinos & Gaming (GICS code: 25301010)
Sector: Financials (GICS code: 40)
Industry Group: Diversified Financials (GICS code: 4020)
Industry: Capital Markets (GICS code: 402030)
Sub-industry: Investment Banking & Brokerage (GICS code: 40203020)
Standard & Poor's: Global Industry Classification Standard (GICS).

3.4 Classification of Industries by Product

Industries can also be identified by product, such as:

- Chemical Industry
- Petroleum Industry
- Automotive Industry
- Electronic Industry
- Meat Packing Industry
- Hospitality Industry
- Food Industry
- Fish Industry
- Software Industry
- Paper Industry
- Entertainment Industry
- Semiconductor Industry
- Cultural Industry And
- Poverty Industry, Etc.

3.5 Standard Industrial Classification (Sic)

The Standard Industrial Classification (SIC) is a system for classifying industries by a four-digit code. Established in the United States in 1937, it is used by government agencies to classify industry areas. The SIC system is also used by agencies in other countries. The SIC codes can be grouped into progressively broader industry classifications:

- Industry group,
- Major group and
- Division.

The first 3 digits of the SIC code indicate the industry group, and the

first two digits indicate the major group. Each division encompasses a range of SIC codes.

- From 0100 till 0999 is the division Agriculture, Forestry and Fishing,
- from 1000 till 1499 is the division Mining,
- from 1500 till 1799 is Construction, (1800 to 1999 is not used),
- from 2000 till 3999 is the division Manufacturing,
- from 4000 till 4999 is the division Transportation, Communications, Electric, Gas and Sanitary service, from 5000 till 5199 is the division Wholesale Trade,
- from 5200 till 5999 is the division Retail Trade,
- from 6000 till 6799 is the division Finance, Insurance and Real Estate,
- from 7000 till 8999 is the division Services and
- from 9100 till 9729 is the division Public Administration.

The codes that start with 99 are Non classifiable. To look at a particular example of the hierarchy, SIC code 2024 (ice cream and frozen desserts) belongs to industry group 202 (dairy products), which is part of major group 20 (food and kindred products), which belongs to the division of manufacturing.

The following table allows searching for companies by SIC code in its database of filings.

SIC Code	Industry
0100	Agricultural Production-Crops
0200	Agricultural Prod-Livestock & Animal Specialties
0700	Agricultural Services
0800	Forestry
0900	Fishing, Hunting and Trapping
1000	Metal Mining
1040	Gold and Silver Ores
1090	Miscellaneous Metal Ores
1220	Bituminous Coal & Lignite Mining
1221	Bituminous Coal & Lignite Surface Mining
1311	Crude Petroleum & Natural Gas
1381	Drilling Oil & Gas Wells
1382	Oil & Gas Field Exploration Services

SIC Code	Industry
1389	Oil & Gas Field Services, NEC
1400	Mining & Quarrying of Nonmetallic Minerals (No Fuels)
1520	General Bldg Contractors - Residential Bldgs
1531	Operative Builders
1540	General Bldg Contractors - Nonresidential Bldgs
1600	Heavy Construction Other Than Bldg Const - Contractors
1623	Water, Sewer, Pipeline, Comm & Power Line Construction
1700	Construction - Special Trade Contractors
1731	Electrical Work
2000	Food and Kindred Products
2011	Meat Packing Plants
2013	Sausages & Other Prepared Meat Products
2015	Poultry Slaughtering and Processing
2020	Dairy Products
2024	Ice Cream & Frozen Desserts

3.6 Information Industry

The information industry or information industries are industries that are information intensive in one way or the other. Industries producing information goods and services are called information industries.
There are many different kinds of information industries, and many different ways to classify them.

i) Companies which Produce and Sell Information

There are companies which produce and sell information in the form of goods or services. Media products such as television programmes and movies, published books and periodicals would constitute probably among the most accepted part of what information goods can be. Some information is provided not as a tangible commodity but as a service. Consulting is among the least controversial of this kind. However, even for this category, disagreements can occur due to the vagueness of the term "information." For some, information is knowledge about a subject, something one can use to improve the performance of other activities—it does not include arts and entertainments. For others, information is something that is mentally processed and consumed, either to improve other activities (such as production) or for personal enjoyment; it would include artists and architects. For yet others, information may include

anything that has to do with sensation, and therefore information industries may include even such things as restaurant, amusement parks, and prostitution to the extent that food, park ride, and sexual intercourse have to do with senses.

ii) Information Processing Services.

There are information processing services. Some services, such as legal services, banking, insurance, computer programming, data processing, testing, and market research, require intensive and intellectual processing of information. Although those services do not necessarily provide information, they often offer expertise in making decisions on behalf of clients. These kinds of service industries can be regarded as an information-intensive part of various industries that is externalised and specialised.

iii) Industries that are concerned with the Dissemination of the Information Goods

There are industries that are vital to the dissemination of the information goods mentioned above. For example, telephone, broadcasting and book retail industries do not produce much information, but their core business is to disseminate information others produced. These industries handle predominantly information and can be distinguished from wholesale or retail industries in general.

iv) Manufacturers of Information-Processing Devices

There are manufacturers of information-processing devices that require research and sophisticated decision-making. These products are vital to information-processing activities of above mentioned industries. The products include computers of various levels and many other microelectronic devices, as well as software programmes. Printing and copying machines, measurement and recording devices of various kinds, electronic or otherwise, are also in this category. The roles of these tools are to automate certain information-processing activities. The use of some of these tools may be very simple (as in the case of some printing), and the processing done by the tools may be very simple (as in copying and some calculations) rather than intellectual and sophisticated. In other words, the specialisation of these industries in an economy is neither production of information nor sophisticated decision-making. Instead, this segment serves as an infrastructure for those activities, making production of information and decision-making services will be a lot less efficient. In addition, these industries tend to be "high-tech" or research intensive - trying to find more efficient ways to boost efficiency of information production and sophisticated decision-making.

v) Research-Intensive Industries

There are very research-intensive industries that do not serve as infrastructure to information-production or sophisticated decision-making. Pharmaceutical, food-processing, some apparel design, and some other "high-tech" industries belong to this type. These products are not exclusively for information production or sophisticated decision-making, although many are helpful. Some services, such as medical examination are in this category as well. One can say these industries involve a great deal of sophisticated decision-making, although that part is combined with manufacturing or "non-informational" activities.

vi) Industries that Serve as Infrastructure for Information Production and Sophisticated Decision-Making

There are industries that are not research intensive, but serve as infrastructure for information production and sophisticated decision-making. Manufacturing of office furniture would be a good example, although it sometimes involves research in ergonomics and development of new materials.

3.7 Reasons Information Industry is Important

a) Information industries are a rapidly growing part of economy.

The demand for information goods and services from consumers is increasing. In case of consumers, media including music and motion picture, personal computers, video game-related industries, are among the information industries. In case of businesses, information industries include computer programming, system design, so-called FIRE (finance, insurance, and real estate) industries, telecommunications, and others. When demand for these industries are growing nationally or internationally, that creates an opportunity for an urban, regional, or national economy to grow rapidly by specialising on these sectors.

b) Information industries are considered to boost innovation and productivity of other industries.

An economy with a strong information industry might be a more competitive one than others, other factors being equal.

c) Some believe that the effect of the changing economic structure (or composition of industries within an economy) is related to the broader social change.

As information becomes the central part of our economic activities we evolve into an "information society", with an increased role of mass media, digital technologies, and other mediated information in our daily life, leisure activities, social life, work, politics, education, art, and many other aspects of society.

3.8 Classification of Locally Manufactured Industrial Products in Nigeria

1. Food, Beverages and Tobacco
2. Chemical and Pharmaceuticals
3. Domestic and Industrial Plastic and Rubber
4. Basic Metal, Iron and Steel, and Fabricated Metal Products
5. Pulp, Paper and paper Products, Printing and Publishing
6. Electrical and Electronics
7. Textile, Wearing Apparel and Leather
8. Wood and Wood Products including furniture
9. Non-Metallic Mineral Products
10. Motor Vehicle and Miscellaneous Assembly

4.0 CONCLUSION

Industries are considered important for several reasons. Even among the experts who think industries are important, disagreements may exist regarding which reason to accept and which to reject in grouping the industries.

SELF-ASSESSMENT EXERCISE

i. Define industry.
ii. Classify industries into Sector.
iii. Distinguish between Industry Classification Benchmark (ICB) and Global Industry Classification Standard (GICS).
iv. Classify industries by product.
v. Put Standard Industrial Classification (Sic) into its groups.
vi. List and discuss types of information industry.
vii. State reasons information industry is important.

4.0 CONCLUSION

Industrial classifications organise economic activity in general, and economic organisations (companies, non-profit organisations, etc.) in particular, into categories generally called "sectors" or "industries", typically defined by the kind of product or service produced.

5.0 SUMMARY

In this unit, you have learnt:

1. Definition of industry
2. Classification of industries into sector
3. Market-based classification systems
4. Classification of industries by product
5. Standard Industrial Classification (Sic)
6. Information industry
7. Reasons why information industry is important

6.0 TUTOR-MARKED ASSIGNMENT

Write short note on 'North American Industry Classification System'.

7.0 REFERENCES/FURTHER READING

A comprehensive structure for company classification. http://www.icbenchmark.com/Site/ICB_Structure.

Category: Industrial classifications. http://en.wikipedia.org/wiki/Category:Industrial_classifications

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Industry Classification Benchmark. http://en.wikipedia.org/wiki/Industry_Classification_Benchmark.

Information Industry. http://en.wikipedia.org/wiki/Information_industry.

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UNIT 2 LOCATION OF INDUSTRY

CONTENTS

1.0 INTRODUCTION

Generally, location of industries is influenced by economic considerations though certain non-economic considerations also might influence the location of some industries. Maximisation of profit which also implies cost minimisation is the most important goal in their choice of particular places for the location of industries. There are several factors which pull the industry to a particular place. In this unit, you will learn more about such factors and also learn about reasons for government participation in the location of industries in Nigeria.

2.0 OBJECTIVES

At the end of this unit, you should be able to:

- define location of industry
- list factors influencing the location of an industry
- state reasons for government participation in the location of industries in Nigeria.

3.0 MAIN CONTENT

3.1 Defining Location of Industry

Location of industry may be defined simply as the establishment of a firm or industry in a particular place. An industry may be established either by individuals or government, either for economic or political reasons. In locating an industry in a particular area one must bear in mind that the cost of production must be at the lowest level in order to ensure the continued existence of such an industry.

3.2 Factors Influencing the Location of an Industry

Many factors are considered before an industry is located in area. These factors include:

1. Proximity of source of raw materials

    i. Cement producing industries should be located close to sources of raw materials to reduce cost of transportation.
    ii. Perishable goods like fruits, palm oil industries etc. should be located near their raw materials.

2. Nearness to Market

    i. There should be ready market for the products of any industry to be sited in a place.
    ii. Fragile products like glass, bulky goods like cement and other perishable goods should be located near the market
    iii. Nearness to market reduces the cost of transportation and meets high demand by consumer.
    iv. Such industries located or directed towards the market are called market-oriented industries.

3. Availability of Capital

    i. There should be enough capital to purchase industrial input before and after setting up industries.
    ii. Entrepreneurs should have access to loans.
    iii. Fixed capital should also be easily acquired.
    iv. Industries which use heavy machines or which require large capital for their operations are called capital-intensive industries.

4. Nearness to source of power

    i. There should be ready and dependable source of power.
    ii. Source of power could be electricity, coal, thermal, petroleum products etc.

5. Availability of Labour

    i. There should be high quality skilled labour
    ii. There should also e enough unskilled labour.
    iii. Industry which requires large labour force for their operations are called labour intensive industries.

6. Adequate transport system

   i. Transport is required essentially to move raw materials to industrial sites.
   ii. Transport is also required to convey finished goods to the market or areas of consumption and use.
   iii. Transport could be by road (cars, lorries, buses, trucks etc) by sea (boats, ships) or by air (aeroplane).

7. Political Stability

   i. A stable government encourages industrial growth.
   ii. Political stability also attracts foreign investors.
   iii. Communal wars and conflicts do not favour industrial growth.

8. Favourable Growth

   i. There should be favourable climatic conditions for industries to grow.
   ii. A favourable climate is also required for some agricultural firms to thrive.

9. External economics or the location of other firms

   i. Firms are often set up near others in order to take advantage of external economies.

10. Government Policies

    Government can encourage the location of industries through certain policies like:

    (a) Direct participation in setting up industries.
    (b) Creation of industrial zones in the country.
    (c) Provision of infrastructures like electricity, pipe borne water, roads, telecommunications etc.
    (d) Granting credit facilities to industrialists.
    (e) Granting of tax incentives or holidays to potential industrialists or industrial set ups.

11. Site and Services

Existence of public utility services, cheapness of the value of the site, amenities attached to a particular site like level of ground, the nature of vegetation and location of allied activities influence the location of an

industry to a certain extent. The government has classified some areas as backward areas where the entrepreneurs would be granted various incentives like subsidies, or provision of finance at concessional rate, or supply of power a cheaper rates and provision of education and training facilities. Some entrepreneurs induced by such incentives may come forward to locate their units in such areas.

12. Natural and Climatic Considerations

Natural and climatic considerations include the level of ground, topography of a region, water facilities, drainage facilities, disposal of waste products, etc. These factors sometimes influence the location of industries. For instance, in the case of cotton textile industry, humid climate provides an added advantage since the frequency of yarn breakage is low. The humid climate of Bombay in India and Manchester in Britain offered great scope for the development of cotton textile industry in those centres.

13. Personal Factors

In deciding location of industrial units, sometimes an entrepreneur may have personal preferences and prejudices against certain localities. For instance, Mr. Ford started to manufacture motor cars in Detroit simply because it was his home-town. In such cases, personal factor dominates other considerations. However, this kind of domination is rare.

14. Strategic Considerations

In modern times, strategic considerations are playing a vital role in determining industrial location. During war-time a safe location is assuming special significance. This is because in times of war the main targets of air attacks would be armament and ammunition factories and industries supplying other commodities which are required for war. The Russian experience during the Second World War provides and interesting example.

15. External Economies

External economies also exert considerable influence on the location of industries. External economies arise due to the growth of specialised subsidiary activities when a particular industry is mainly localised at a particular centre with port and shipping facilities. External economies could also be enjoyed when a large number of industrial units in the same industry were located in close proximity to one another.

16. Miscellaneous Factors

Historical incidents also play a dominating role in determining the location of industries in certain cases. The development of cotton-textile industry in Lancashire provides an interesting example for this. Further, the size of and industrial unit would also have much influence in choosing location. This is because the size of industrial units depends upon the radius of the circle within which they can profitably distribute their goods and upon the density of population living within the circle.

3.3 Reasons for Government Participation in the Location of Industries in Nigeria

1. To raise the standard of living: This is one of the reasons government participates in the location of industries. When such industries are located, goods are made available and the people get employment and earn income hence their standard of living will be raised or improved.
2. Provision of standard goods: Industries so located are capable of producing standard goods thereby preventing the proliferation of low quality goods.
3. Equitable spread of development: Government tries to locate industries in different parts of the country to ensure even development.
4. Provision of employment opportunities: Government also participates in the location of industries in order to generate employment opportunities for the people where such industries are located.
5. Political consideration: Government can also influence the location of certain industries for political reasons, especially for the purpose of winning the election.
6. To check rural-urban migration: Industries are located in rural areas by the government in order to check the movement of people from rural to urban centres.
7. For economic development: Industries which are equitably distributed round the country do ensure rapid economic development.
8. For strategic reasons: Government can also influence the location of certain industries for strategic reasons, e.g industries that manufacture arms and ammunition must be protected from competition.

SELF-ASSESSMENT EXERCISE

i. Define location of industry
ii. List factors influencing the location of an industry
iii. State reasons government participation in the location of industries in Nigeria.

4.0 CONCLUSION

Many factors influence the location of industry. Nowadays, the change from heavy industry to light industry has meant that industries can locate anywhere and so other factors, such as communications links and government policy, become far more important.

5.0 SUMMARY

In this unit, you have learnt:

1. Definition of location of industry
2. Factors influencing the location of an industry
3. Reasons for government participation in the location of industries in Nigeria.

6.0 TUTOR-MARKED ASSIGNMENT

Discuss socio-economic factors which influence location of industry.

7.0 REFERENCES/FURTHER READING

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UNIT 3 LOCALISATION OF INDUSTRY

CONTENTS

1.0 INTRODUCTION

This unit introduces you to why an industry been located in a place tries to remain there. This is nothing but because of favourable atmosphere of the place (i.e. advantages of localisation). It also discusses factors that favour localisation of industries.

2.0 OBJECTIVES

At the end of this unit, you should be able to:

- explain localisation of industries
- list and discuss factors that favour localisation of industries
- state advantages of localisation of industries
- highlight disadvantages of localisation of industries.

1.0 MAIN CONTENT

3.1 Localisation of Industries

Localisation of industries refers to the concentration of firms or industries producing similar products in an area. In other words, it is the establishment of many related industries or firms which produce similar goods in a particular location, e.g. many cement manufacturing firms could be located in the same area because all of them produce goods-which are cement.

3.2 Factors that Favour Localisation of Industries

1. Access to raw materials: This factor is important if the industry is raw material oriented. An industry is raw-material oriented when the raw materials are bulky with a high cost in transportation. Many firms that use the same type of raw materials could come together resulting in localisation.
2. Availability of marketing facilities: The concentration of industries in a particular area could be a way by which their products can easily be marketed.
3. Joint research and training centres: Research and training centres can easily be jointly established since all the industries involved are producing similar products. The cost of such projects will be minimal when it is jointly financed.
4. Government policy: Government can play a specific role towards the localisation of industries either for economic, geographical, political or strategic reasons.
5. Availability of labour: The large pool of labour encourages firms to come together resulting in localisation. The availability of such labour promotes industrial growth.
6. Presence of technical economies: The concentration of firms that use the same type of spare parts or components in production may be located near industries which produce such spare parts.
7. Availability of Infrastructural facilities: The availability of infrastructural facilities like road, telephone water, electricity etc. could encourage the concentration of firms in a particular area.

3.3 Advantages of Localisation of Industries

1. It encourages development: The growth of industries leads to an increase in production of good and service.
2. Emergence of subsidiary firms: As major firms concentrate in one area, other subsidiary service firms that assist those major firms in the production of goods usually emerge.
3. Generation of employment: The concentration of many industries in an area leads to the creation of many job opportunities.
4. Emergence of organised market: Localisation of industries assists in the emergence of organised market for the products.
5. Creation of Competition: The existence of many industries leads to a healthy competition among them in order to excel or outsell one another. This has indirectly resulted in high quality products.
6. Emergence of a pool skilled labour: A large pool of skilled labour does emerge because such labour is easily attracted to industrial zones.

7. Attraction of more people: A highly concentrated industrial estate attracts different shades of people to such area for one reason or the other.
8. Provision of social amenities: An industrial zone is always provided with social amenities like pipe borne water, electricity, good roads, communication facilities etc.
9. External economies: The concentration of industries in an area encourages production of goods at the lowest cost thus making such goods cheap and affordable.
10. Emergence of inter-dependence among firms: The concentration of many industries in an area of leads to industries deriving mutual benefits from one another.
11. Encouragement of division of labour and specialisation: Localisation of industries leads to the emergence of division of labour and specialisation resulting in increased production.
12. It ensures co-operation among firms: Localisation of industries leads to co-operation among firms, possibly for a joint purchase of raw materials, joint research and training etc.

3.4 Disadvantages of Localisation of Industries

1. It leads to congestion: The concentration of industries leads to human, housing and traffic congestion.
2. Pressure on social amenities: As a result of high population in industrial estates, there is always pressure on available social amenities like pipe borne water, electricity etc.
3. It results in uneven development: The concentration of industries in one area leads to uneven development as other areas are left undeveloped.
4. It causes structural unemployment: When the industries suffer setbacks, there will be structural unemployment.
5. Increase in crime rate: As a result of increase in population in the industrial estate, there is usually an increase in crime rates such as armed robbery, car snatching, hired assassination etc.
6. It causes environmental pollution: As a result of high concentration of industries, it leads to noise, air, and water and land pollution.
7. Targets for enemy attack: During wars, industrial estates are usually the target for enemy attack.
8. It encourages rural-urban migration: Industrial estates encourage people to migrate from rural to urban centres.

SELF-ASSESSMENT EXERCISE

i. Explain localisation of industries
ii. List and discuss factors that favour localisation of industries

iii. State advantages of localisation of industries
iv. Highlight disadvantages of localisation of industries

4.0 CONCLUSION

There are several benefits which an industry derives from becoming localised in a particular place. We have considered factors that favour localisation of industries and why an industry, having been localised in a particular place, tends to persist there. This is due to the advantages of localisation.

5.0 SUMMARY

In this unit, you have learnt:

1. Localisation of industries
2. Factors that favour localisation of industries
3. Advantages of localisation of industries
4. Disadvantages of localisation of industries

6.0 TUTOR-MARKED ASSIGNMENT

Write briefly on geographical or territorial division of labour (i.e. specialisation by areas or regions)

7.0 REFERENCES/FURTHER READING

Advantages and Disadvantages of Localisation of Industries. http://www.economicsdiscussion.net/articles/advantages-and-disadvantages-of-localisation-of-industries/1535

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UNIT 4 LOCATION OF INDUSTRIES IN URBAN OR RURAL AREAS

CONTENTS

1.0 INTRODUCTION

Very often, government deliberately interferes with the location of industries for various reasons. Government may, for instance, in addition to locating its major industries in the urban area, decide to encourage private businessmen build their industries in the rural areas. Such a policy has some advantages and disadvantages. In this unit, you will learn reasons, advantages and disadvantages of locating industries in rural and urban areas.

2.0 OBJECTIVES

At the end of this unit, you should be able to:

- list reasons for the concentration of industries in urban centres
- mention advantages of locating industries in the urban area
- state disadvantages locating industries in the urban area
- give reasons for sitting industries in rural areas in Nigeria
- state advantages of locating industries in the rural areas
- list disadvantages of locating industries in rural areas

3.0 MAIN CONTENT

3.1 Reasons for the Concentration of Industries in Urban Centres

Reasons why many industries are located or concentrated in urban centres (cities or towns) include:

1. Large market: The presence of high population in urban centres provided a wide market for industrial products.
2. Availability of labour: The high population also provides both skilled and unskilled labour for the industries.
3. Good transportation network: Urban centres are provided with well developed transport network like roads, railways, airport etc.
4. Nearness to seaport and airports: This also contributes to the sitting of industries in urban centres.
5. Availability of finance: Easy access to loans from banks located in cities also contributes to the concentration of industries in the cities.
6. Presence of infrastructural facilities: The presence of electricity, pipe borne water, telephone etc. also contributes to the concentration of industries in urban centres.

3.2 Advantages of Locating Industries in the Urban Area

i. Availability of infrastructure such as water, electricity and good transport system.
ii. Availability of a pool of skilled labour from which the new industries can recruit.
iii. Nearness to the Market: The industries will be producing close to the consumers, since more affluent people live in towns than in villages.
iv. Availability of suitable staff houses. The industries do not need to start immediately to bother about building staff houses. They could rent from available private houses thereby avoiding trying down of capital unnecessarily.
v. Nearness to source of capital. Most banks and other financial institutions are located in urban areas. Industries located in cities can take advantage of their presence.
vi. External economies. An industry that is located in an urban area is likely to find other industries that have previously been established there. It may benefit from technical and other forms of cooperation.

3.3 Disadvantages of Locating Industries in the Urban Area

i. Location of industries in urban areas may build up costs. Such higher factor costs include higher rent, higher wages and higher interest rates.
ii. As a result of various statutory regulations, the location may not be the best location. Suitable land may not be available. It may be very costly to rehabilitate available land such as swampy areas.
iii. Land in urban areas is not only expensive but scarce. This may impose considerable limits on expansion programmes and therefore reduce the technical efficiency of operation.
iv. Location of industries in urban areas and close to residential areas can lead to environmental pollution and all its attendant health hazards.
v. Over concentration of industries in urban areas can lead to over-growth of cities and urban sprawls.

3.4 Reasons for Locating Industries in Rural Areas in Nigeria

1. Development of rural areas: The sitting of industries will lead to the development of rural areas.
2. To discourage rural-urban migration: When industries are located in rural areas, it will go a long way in discouraging the movement of people from rural areas to urban centres.
3. Provision of employment: Industries so established in rural areas will provide employment for skilled and unskilled labour in rural areas.
4. Increase production of goods: Industries that are located in rural areas will increase the availability of goods to the rural populace.
5. Increased earnings for rural people: The rural people so employed in industries are able to earn more salaries from their places of work.
6. Encourage urban-rural migration: The sitting of industries in rural areas will also attract he movement of people from the cities to the rural areas, thereby decongesting the cities.

3.5 Advantages of Locating Industries in the Rural Areas

i. Such a policy tends to decongest the urban areas.
ii. It checks or discourages excessive movement of young people from the rural to urban areas.
iii. It encourages an even or balanced development between urban and rural areas.
iv. Labour is likely to be cheap in the rural areas.

v. Rural areas provide a more peaceful industrial atmosphere, free to slums and traffic congestion.
vi. Locating industries in rural areas may tap local resources and skills rural
vii. The impact of industries in the rural areas as a socialising factor is great e.g through sports and employment.

3.6 Disadvantages of Locating Industries in Rural Areas

i. The rural areas may lack all or most of the basic infrastructure such as good network of roads, water and regular electricity supply. The provision of these by the industry itself will mean a very expansive capital investment.
ii. Required skilled labour may be lacking. Many skilled workers from the urban areas may be reluctant to work in the rural areas, unless compensated with substantial incentives.
iii. Suitable houses, which could be rented and used as staff quarters and offices, may not be available. In the absence of such houses, the industry has to provide the staff houses on its own. This is often too exorbitant for medium and small scale industries suitable for rural areas.
iv. Problem of relocation. There is also the problem of relocation. If an industry located in a rural area is hit by economic decline and may have to fold up, the consequences of such a situation on the workers, in terms of finding alternative employment is great. It will also significantly depress the economy of the area as a whole.

SELF-ASSESSMENT EXERCISE

i. List reasons for the concentration of industries in urban centres
ii. Mention advantages of locating industries in the urban area
iii. State disadvantages locating industries in the urban area
iv. Give Reasons for siting industries in rural areas in Nigeria
v. State advantages of locating industries in the rural areas
vi. List disadvantages of locating industries in rural areas

4.0 CONCLUSION

Why would a company locate its business in a small town, far from the economic activity of large cities? Such a decision doesn't make sense for every company. But for some it makes perfect sense. Therefore, whether urban or rural location, it all depends on company choice based on the decision, products or services it intends to provide.

5.0 SUMMARY

In this unit, you have learnt:

- Reasons for the concentration of industries in urban centres
- Advantages of locating industries in the urban area
- Disadvantages locating industries in the urban area
- Reasons for siting industries in rural areas in Nigeria
- Advantages of locating industries in the rural areas
- Disadvantages of locating industries in rural areas

6.0 TUTOR-MARKED ASSIGNMENT

Do you prefer your industry located in rural or urban areas? Give reasons for your answer.

7.0 REFERENCES/FURTHER READING

Factors influencing Industrial Location.

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MODULE 3 INDUSTRIALISATION

UNIT 1 INDUSTRIALISATION IN WEST AFRICA

CONTENTS

1.0 INTRODUCTION

The development of science and technology has resulted in the growth and spread of Heavy Industries. Human progress now-a-days is measured in terms of industrial potentialities and prosperity. But it is unfortunate that we have not yet realized the evils of industrialization due to unplanned growth in our time. Man must learn to accept industry not as an end in itself but as a means to the end of social, economic and spiritual well-being and up-lifting.

2.0 OBJECTIVES

At the end of this unit, you should be able to:

- define industrialisation
- discuss roles of industrialisation in economic development of a nation

- discuss problems of industrialisation or industrial growth in West Africa
- suggest solution to the problem of industrial development in West Africa
- discuss how West African countries can promote indigenous industries

3.0 MAIN CONTENT

3.1 The Meaning of Industrialisation

Industrialisation can simply be defined as the process of transforming an economy based on extractive activities into one based on manufacturing. In other words, industrialisation refers to the process by which an economy based on agriculture, fishing, lumbering, mining etc is transformed into one based on industries. Industrialisation requires the establishment of many firms which are capable of producing goods and services.

3.2 Roles of Industrialisation in Economic Development of a Nation

Industrialisation or Industrial sector contributes greatly to the economic development of nations in the following ways:

1. Increase in gross national product (GNP): The industrial sector, through its operations like payment of taxes, increases the earnings accruable to the nation.
2. Employment Opportunities: Industries provide employment (jobs) for many people.
3 International trade – improves trade balance: Most of the products manufacturing industries like machinery are usually imported from Western nations. This forms the basis for international trade and improves trade balance between countries.
4. Stimulation of other sectors: The industrial sector stimulates the growth of other sectors like agriculture, mining, lumbering etc.
5. Control of inflation dues to mass production: With modern technology, products like car, machinery etc can be mass produced. This can help to reduce inflation.
6. Technological development: Industrialisation can also lead to the development of technology in the country.
7. Infrastructural development: The establishment of an industry in a place stimulates the development of infrastructural facilities like roads, telephone, electricity, pipe borne water etc.

8. Diversification of the economy: The industrial sector helps different countries to prevent over-dependence on only one product, like Nigeria's present over-dependence on crude oil. If Nigeria can invest in the industrial sector, her economy will in time be diversified.
9. Training and Development of skilled manpower: Many of people are trained in different technical areas in order to acquire special skills to manage different aspects or machines in an industry. Owing to industrial development, many people are given such skill training.
10. Funding of education and research: The industrial sector provides capital for the funding of education and research work in all nations e.g. the Education Tax Fund (ETF) in Nigeria.
11. Conservation of foreign exchange: Industrialisation has led to the conservation of foreign exchange which would have been used for importing goods now produced locally.
12. Improving standard of living: Industrialisation also leads to the improvement or raising of the standard of living of the people through production of goods that are cheap and affordable.

3.3 Problems of Industrialisation or Industrial Growth in West Africa

The following factors hinder, limit or are responsible for the relatively low level of industrial growth and development in West Africa.

1. Shortage of raw materials: Lack of sufficient raw materials available to industries hinder large scale production.
2. Insufficient Capital: Access to finance or loan is very difficult and this tends to limit industrial development.
3. High degree of foreign dependence: Most products made in West Africa are of low quality when compared with those in developed countries. Hence, people prefer or depend on foreign goods.
4. Poor quality of industrial labour: West Africa has a large pool of illiterate population that provides the personnel for our industries. This affects efficiency and quality of product.
5. Low purchasing power of the populace: Large scale poverty in West African countries makes people to have low purchasing power.
6. Inadequate power supply: There are frequent disruptions of power supply in industrial areas and many areas do not even have power supply.
7. Competition with foreign goods: Because of the high quality of foreign goods, goods produced by our local industries are usually not patronized.

8. Shortage of entrepreneurs: Owing to lack of capital, loan facilities and other factors, reliable investors are not common.
9. Poor management: Corruption, embezzlement and negligence of duty are very common in West African countries and these are indicators of poor management.
10. Political Instability: Frequent changes in government and incessant civil wars in West African countries discourage foreign investors.
11. Inadequate transport and communication facilities: Transportation network like roads, railways etc and communication facilities are grossly inadequate in West Africa.
12. Small market for industrial goods: West African countries do not have large enough markets that can accommodate industrial goods produced.
13. Inadequate skilled man-power: Skilled man-power required for high industrial growth is grossly inadequate in development countries.
14. Bad government policies: Certain government policies towards industrialisation are bad and do not encourage industrial growth.

3.4 Solution to The Problem of Industrial Development in West Africa

1. Acquisition of skill: Skills required for industrial operations should be acquired by people through regular training.
2. Good government policies: There should be good government policies to encourage and protect local industries.
3. Active government participation: There should be active government participation in industrial development, i.e . Co-ownership of industries.
4. Incentives to local industries: There should be incentives to local industries e.g tax holiday, interest free loans, subsidies etc.
5. Provision of transport and communication facilities: There should be provided to ensure easy distribution of goods produced.
6. Creation of Industrial zone: This will also provide a conducive environment with all the infrastructural facilities for the industries.
7. Establishment of industrial banks: Industrial and other development banks should be set-up to provide loans to industrialist.
8. Stable government: There should be stable government in order to attract foreign investors.
9. Local sourcing of raw materials: There should be exploitation of raw materials locally for industries.
10. Organisation of management courses: Management courses should be organised on regular basis for workers.

11. Building and maintenance of infrastructural facilities: Infrastructural facilities such as roads, telephones, water, electricity etc should be built and maintain regularly.
12. Establishment of more power plants: Plants such as thermal or hydroelectricity plants should be established to boost power supply to industries.

3.5 How West African Countries can Promote Indigenous Industries

West African Countries can Promote Indigenous Industries by:

1. Greater reliance on domestic raw: West African countries should have a greater reliance in sourcing domestic raw materials for their industries.
2. Research and application of research: They should also embark on intensive search works and the result should be applied for industrial growth.
3. Availability of finance: Finance or Capital should be made available for indigenous industrial promoters.
4. Development of skills: There should be more development of entrepreneurial and management skills for efficient industrial development.
5. Political stability: There should be relative political stability to ensure continuous growth of industries.
6. Better work attitude: Labour or workers should put on a better work attitude aimed at achieving better results.
7. Development and expansion of market: There should be proper development and expansion of market locally made products.
8. High level of productivity: There should be a high level of productivity that will lead to higher level of savings and greater capital formation.
9. Improved social and economic infrastructures: There should be improved social and economic infrastructures e.g electricity, seaport, airport, telecommunications etc, such that can boost industrial growth.
10. An enabling environment: A legal, social and cultural environment that not only enables but also motivates indigenous industries must be put in place.

SELF- ASSESSMENT EXERCISE

i. Define industrialisation
ii. Discuss roles of industrialisation in economic development of a nation

iii. Discuss problems of industrialisation or industrial growth in West Africa
iv. Suggest solution to the problem of industrial development in West Africa
v. Discuss how West African countries can promote indigenous industries

4.0 CONCLUSION

Industrialisation increases the productivity of social labor and the rate of growth of production in all sectors of the economy and expands the productive forces of society.

5.0 SUMMARY

In this unit, you have learnt:

- Definition of industrialisation
- Roles of industrialisation in economic development of a nation
- Problems of industrialisation or industrial growth in West Africa
- Solution to the problem of industrial development in West Africa
- How West African countries can promote indigenous industries

6.0 TUTOR-MARKED ASSIGNMENT

Explain industrial revolution.

7.0 REFERENCES/FURTHER READING

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UNIT 2 INDUSTRIALISATION IN NIGERIA

CONTENTS

1.0 INTRODUCTION

Nigeria, like England and other nations, started as agrarian country. In addition to agriculture, Nigeria was involved in artisanship and craftsmanship in the processing/manufacturing (secondary) industry and exchange or trading in the tertiary industry along these, making three industries in operation in Nigeria long before colonisation.

2.0 OBJECTIVES

At the end of this unit, you should be able to:

- discuss industrialisation in Nigeria-The journey so far
- list and discuss ways or methods by which government can encourage industrialisation in Nigeria
- discuss Strategies of industrialisation
- mention Advantages and disadvantages of industrialisation.

3.0 MAIN CONTENT

3.1 Industrialisation in Nigeria-The Journey So Far

In 1471, the Portuguese arrived at the West African coast and extended their movement to the Niger Delta in Nigeria. They came on slave trade and other trades in Nigeria dealing in pepper and ivory for which they gave items such as coral beads, textile materials, tools weapons, brass and bronze bracelets.

Other European countries including Denmark, Sweden and Britain later came and competed with Portugal, with Britain emerging dominant in the 18th century.

When slave trade was abolished in Nigeria, Britain expanded its other trade activities, especially in agricultural produce with massive exportation of agricultural products, from Nigeria and some other African countries to Europe.

With time, specifically in 1861, the coastal enclave of Lagos was turned to a British colony by the Britons for the expansion of their trade, missions and political control.

Between 1879 and 1900, the Royal Niger Company took control of the interior with the use of disciplined troops with weapons and signed protection treaties with the local rulers. This marked the beginning of colonisation.
The area controlled by this company was later ceded to the British government in 1900 and the Southern region was merged with the Niger coast protectorates to become Southern Nigeria Protectorate.

In 1914, both the two parts of Nigeria were merged together from a single British colony. It was the origin of Nigeria as a single geographical entity which exists today.

In that era, there was no conscious effort by the colonial master to put up any industrialisation or development plan for the country until 1946 when a colonial development plan was put in place by the colonial masters to stimulate economic development in Nigeria. This had the element of industrialisation directly or indirectly, as some economic activities took place as a result of the plan. For this plan, a fund called, Colonial Development and Welfare Fund was established under the Colonial Development and Welfare Act of 1940.

This was to fund infrastructural development and public work programmes to increase wealth creation and social welfare provision for the colonies to contain anti-colonial resistance in the form of riots which the colonial masters were facing from some of their other colonies especially in India.

In Nigeria, a ten-year plan called the Ten-year Plan of Development and Welfare 1946-56 was put in place by the British colonial master with an estimated expenditure of S55million with S23million coming from the Colonial Development and Welfare Fund. This, to some extent impacted on industrialisation in Nigeria.

The plan was followed by another one, covering 1956-1962, which was an extension of the initial Plan of 1946-56. It was not exclusively meant for development but to prepare for transition to independence in Nigeria. Nigeria became independent on October 1, 1960 and, thereafter, made its first indigenous development plan called the National Development Plan 1960-1968.

The plan was aimed at increasing economic growth, raising the annual per capital consumption by about 1 percent, attaining self-sustenance growth, modernisation of the economy, increasing standard of living among people and creating jobs in non-agricultural sector.

In that era, some social industrial project and infrastructural facility such as Kanji Dam building, Naija Bridge, Lagos Bridge, Some highways and refinery were put in place among others, but administrative control regarding expenditure was weak. This is a very serious problem in an economy particularly, and in governance generally, as it paves ways for noncompliance or disobedience and corrupt practices.

Another national development plan geared more towards industrialisation was later promulgated for 1970-1974. It was established to make Nigeria a united, strong and Self-reliant control; to form a dynamic and expanding economy; to make Nigeria a just and egalitarian society; to make a land of opportunity and full employment and make it a free and democratic nation giving recognition to all the cultural values of all ethnic groups in the country.

The plan made provision for increase in agricultural productivity and rural development, ear marking resources for manufacturing and light engineering to reduce importation of manufactured goods, which was then having a negative effect on the foreign research of Nigeria. The plan also provided for the creation of a solid industrial base to challenge under exporters, for reduction of unemployment and creation of profitable export-based job for Nigerians. It also made provision for larger participation of Nigerians in industrialisation and business ownership, so that Nigerians too could benefit from the growth of the economy via establishment of legal and institutional frameworks.

This second post-independence national plan went further to strengthen the industrialisation move of the country, even as industrial laws were made.

The Enterprise Promotion Decree (1972) and the capital issues Decree (1973) were promulgated with the establishment of the Nigerian Bank for Commerce and Industry in 1973 which was meant to form the

needed financial structure to cope with the massive funds coming up in the Nigerian economy as a result of that time.

The third national development plan spanning 1975 to 1980 emerge later. It was structure to increase productivity as well as create strong economy and social infrastructure from excess funds expected from oil groom of the late 1960s and early 1970s which resulted from the activities of the Organisation of Petroleum Exporting Countries (OPEC) in the world oil market.

There was expectation then that the expected excess funds would be used to finance infrastructural development which would help industrialisation and economic development of Nigerian. Later, due to one reason or the other, the plan was restructured and the priority changed from economic infrastructure development to housing, water supply, health services provision and agriculture, which were not as productive as the planned infrastructural project in the original 1975-1980 development plan.

This priority change and subsequent fall in price of petroleum in the world coupled with foreign exchange problems affected the rate of industrial development in Nigeria over the period of the plan.

As the expiration of 1975-1980 plan, the fourth National Plan covering 1980 to 1985 was put in place. This was well-structured to aid industrialisation, as the main strategy of the plan was to fully apply the expected resources from oil to expand the production sector. But this became impossible because of gross mismanagement of resources, corrupt practices in government and, to some extent, the reduction in oil revenue that resulted from drop in price that follow oil glut in the international oil market at that time. This cause reduction in industrialisation productivity or output, promoted war international and local linkages, and poor export performance among others, it affected the Nigerian economy negatively and caused setbacks for industrial development then.

This made Nigerian to be left with the problem of how to get back on tract in term of what to do industrially and economically.

It was consequently decided by Nigerian developmental planners to bring an urgent economic reform to help Nigeria out of this economic problems.

As a result of this, in 1986, an economic programme was put on ground to rescue Nigeria from its weak economic and industrial position by the government.

The government was identified as Structural Adjustment Programme (SAP). The key industrial objectives of the programme were to:

1. Encourage acceleration of development
2. Encourage the use of local raw material for production and consumption.
3. Discourage importation
4. Encourage the development and use of local technology.
5. Promote the growth of manufacturing activities.
6. Promote export-based industries.

7. Generate employment by encouraging private sector's small and medium-level enterprises.
8. Remove bottleneck and hindrances preventing industrial development especially in the area of infrastructural needs, manpower development and administrative weaknesses.
9. Liberalise control to aid indigenous and foreign investment in Nigeria.
10. Encourage and promote non-inflationary economic growth.

The Federal Government put up some policies which it eventually worked on. Some of the policies were the establishment of the National Directorate of Employment (NDE), Urban Mass Transit Programme (UMTP) People and Community Bank, Directorate of Food, Roads and Rural Infrastructure (DFFRI), and Better Life and Rural Dwellers Programme.

The programme, which encouraged huge borrowing, exacted a great toll on the citizens of Nigeria. It failed eventually and increased the poverty and suffering of the Nigerian masses.

SAP aggravated the economic problems of the country. These are some causes of the failure of the SAP as a reforming strategy:

1. Refusal of the government to have adequate consultation with all stakeholders before formulating and implementing the programme and rejection of the contributions of few ones who participated prior to formulation and implementation of the programme strategies.
2. Corruption in the system and rent (undue benefits) creation, which served the purpose of few privilege ones.
3. Ineffectiveness of governance
4. Continuous changing of government policy.
5. Poor implementation of policies.

   SAP failed to achieve its goals as expected. The Pre-SAP exchange rate of ₦0.89 to S1 rose to about ₦160 to the same S1,

making imported raw materials very expensive to the manufactures in Nigeria, thereby increasing the prices of manufactured goods in Nigeria. Due to this, the product became less competitive in the world market. It also limited exportation of local products.

This SAP and its associated industrial policies continued in their weak form until the government that emerged in about mid 1999, realising the extent of social, political and economic decay in Nigeria and the resultant suffering of Nigerians prior to its takeover, developed a domestic reform programme called National Economic Empowerment and Development Strategy (NEEDS) in early 2000s.

The main goals of NEEDS are:

- Wealth Creation
- Employment generation
- Poverty reduction; and
- Value re-orientation.

The strategy was put in place with people empowering, private enterprise promotion and changing of the way the government its affairs as it major macro economic framework that was arranged in structures and sub-structures.

All these were directed basically at meeting the present citizens needs, building the nation for the generation to come and mobilising available resources in the country to overcome the past national failures based on the premise that Nigeria has the resources (Human and Material) to build the strongest economy in African and one of the leading economies in the world in due course.

Unlike the Structural Adjustment Programme (SAP) put in place in Nigeria 1986, National Economic Empowerment and Development Strategies (NEEDS) was generally accepted following due and elaborate consultations with stakeholders.

NEEDS was an excellent strategy for industrial development which actually brought some great, but could have brought much more, industrial development into Nigeria, but for the sabotage and common African infrastructural deficiencies that confronted it.

This strategy was the latest strategy effort in Nigerian industrial development until another programme tagged National Industrial Revolution Plan (NIRP) was in inaugurated in 2012 by the Federal Ministry of Industry, trade and investment. The NIRP had their aims of creating wealth, reducing poverty and generating government

employment. It also aimed to increase productivity and contribute to the level of Gross Domestic Product (GDP) of the country and to develop Nigeria economically as to make Nigeria an investment hub in Africa particularly and the world in of balance of payment general. It was also expected to address the problems of balance of payment of the country and to remove barriers to industrialisation.

This new plan, which ones believes would, of necessity be streamlined with NEEDS, is not bad, but for it to work well and meet its objectives; there is the need for social change to check sabotage and fraudulent practices that assailed previous industrial plans.

However, going by similar case studies across the world, this social change cannot come except by application of discipline that would enforce compliance, and both discipline and compliance would not be effective except appropriate laws are effectively enforced, by punishing crime.

3.2 Ways or Methods by which Government can Encourage Industrialisation in Nigeria

The federal government has adopted the following ways or methods of encouraging industrialisation in Nigeria.

1. Tax concessions to pioneer industries: The federal government gives tax concession to pioneer industries for a specified number of years during which the industry will not pay tax.
2. Protection of infant industries: The government protects infant industries through high import duties, outright ban or placement of quotas on imported commodities which compete with those of home industries.
3. Development of infrastructural facilities: Government has also embarked on the construction of better road networks especially the express roads, efficient telecommunications, electricity and water supply system.
4. Establishment of industrial estates: The government should also establish industrial estates and thus reduce the problem of locating industries in urban areas.
5. Establishment of Nigerian Enterprises Promotion Decree: The Nigerian Enterprise Promotion Decree of 1972 was set up by the Federal Military in an attempt to transfer part of the profits generated in Nigeria to the local people.
6. Establishment of financial institution: The government has established financial institutions to aid private enterprises e.g Nigerian Bank for Commerce and Industry and Nigerian Industrial Bank.

7. Establishment of higher institutions: The government has also established universities and colleges of technology with the aim of developing human resources.
8. Relaxation of industrial laws: Government should also contribute towards industrialisation by relaxing some industrial laws such as the indigenisation policy.
9. Formulation of development plans: Nigeria also undertakes development plans aimed at controlling resource allocation.
10. Relaxation of import materials: There is also the relaxation of import control by the government e.g the importation of machinery and raw materials.
11. Increased industrial loans: An increase in industrial loan will enable more business men to obtain loans and establish more industries.
12. Initiation of industrial policies: Government can equally initiate certain industry policies such as privatisation and commercialisation to boost industrial development.
13. Improvement in agriculture: Government has also ensured that there is improvement in agriculture to increase the supply of food and raw materials for industries.

3.3 Strategies of Industrialisation

Some institutional framework is necessary for the successful carrying out of industrialisation. In the development of this framework, the troublesome question has been how to maintain a balance between the establishment of industries and the expansion agriculture. Several strategies have been used to promote industrialisation in most African countries. Some of these include:

Many strategies have been adopted by the government aimed at achieving industrial development in Nigeria.

1. Import-substitution strategy: The import-substitution strategy involves deliberate attempt by government aimed at encouraging the growth of industries within the country which produce goods and services which would otherwise have been import.

Advantages of Import Substitution

i. It helps to save a lot of scarce foreign exchange that would have otherwise been spent on imports. It therefore helps to keep the balance of payment in check.
ii. It promotes the objective of expanding employment opportunities outside of agriculture.

iii. Since demand for industrial import in most less developed countries is always exceeds what can be imported, import substitution helps to supplement those industrial products which cannot be imported.
iv. Development of technological know-how. By training necessary indigenous manpower for the final assembling process, import substitution industrialisation facilitates the ultimate production of intermediate products and capital goods.

2. **Export promotion strategy:** Export promotion strategy is also a deliberate government policy aimed at encouraging the production of commodities for export. Government can do this through the granting of tax concessions, reducing export duty, finding a realistic exchange rate, providing assistance on export costing and pricing, organisation of trade fairs to expose home-made goods to other countries etc.

Advantages of Industrialisation through Export Promotion

i. It increases the earning of foreign exchange by government.
ii. It helps to solve balance of payment problems.
iii. It helps to provide modern employment opportunities for the rapidly increasing labour force.
iv. It facilitates the transfer of technical know-how.
v. It increases the rate of growth of the economy compared with agriculture.

3. **Small scale and large scale development strategy:** Government can also encourage the development of small and large scale industries with the aim of developing the industrial sector of the economy. The small scale industries under the "small scale industrial scheme" encourage the establishment of such industries in rural areas in order to provide employment to the rural people and prevent rural-urban migration.

3.4 Advantages and Disadvantages of Industrialisation

Advantages

The advantages of industrialisation are given below:

1 The growth of industries has resulted in large scale production of goods which are available to the consumer at much cheaper rates.
2 There is saving of time and labour.

3 Industrialisation has resulted in a considerable rise in the standard of living of the people.
4 A number of substitutes in consumer goods are available. The customer gets wide variety of choices.
5 There are means to control and check the colossal wastage of human energy that can be used otherwise.
6 Industrialisation creates new job opportunities, leading to the removal of poverty to a great extent.
7 Industrialisation has also resulted in the development of new modes of transport making quick export and import possible. The world has become a small place.

Disadvantages

The disadvantages of Industrialisation are discussed below:

1 The immediate result is in the gradual disappearance of many natural resources, the pollution of land, water and air.
2 The increase in vehicular traffic, launching of space ships and rockets by competing nations, the incessant working of machines in factories have brought in noise-pollution and dust and smoke.
3 The general dirty and unhealthy conditions in and around the industrial sites have affected human health and happiness. Diseases, unheard of before, are spreading far and wide.
4 There have been instances of child labour in factories.
5 The exploitation of the poor by the rich has increased the crime-rate, isolation and sense of loneliness.
6 The gradual displacement of manpower in industries is ultimately leading to unemployment.
7 There has been a steady decline in spiritual values and well-being of man consequent upon the growth of an artificial, mechanical and materialistic civilisation brought about by industrialisation.
8 Capitalistic ethics with a craving for more and more money seem to dominate and influence millions of people. The grave uncertainties in the money-market sometimes bring misfortunes for the common people.
9 Inflation sets in, the value of money goes down and the poor working class becomes poorer. Class conflicts, strike, dharnas, gheraos and bandhs and then lockouts cause hardship and unrest. Society faces their impact in various ways.
10 Large scale heavy industries lead to a sharp fall in the number of cottage industries and their gradual disappearance. Regional and local artisans and workers of various trades and professions suffer a great deal.

SELF-ASSESSMENT EXERCISE

i. Discuss industrialisation in Nigeria-The journey so far
ii. List and discuss ways or methods by which government can encourage industrialisation in Nigeria
iii. Discuss Strategies of industrialisation
iv. Mention Advantages and disadvantages of industrialisation

4.0 CONCLUSION

It is time that emphasis is put on a planned and balanced industrialisation keeping in view the preservation of environment. Man should be less dependent on the machine, which once a slave, tends to become the master. Excessive dependence on the machine makes man unfit for many things and renders him a helpless creature. Heavy industries and cottage industries must be complementary to each other, so that sustained development would be possible. It would be a move in the right direction. It will employ local and regional manpower and utilise the local and regional resources.

5.0 SUMMARY

In this unit, you have learnt:

1 Industrialisation in Nigeria-The journey so far
2 Ways or methods by which government can encourage industrialisation in Nigeria
3 Strategies of industrialisation
4 Advantages and disadvantages of industrialisation

6.0 TUTOR-MARKED ASSIGNMENT

Discuss in detail the role of industrialisation in national development.

7.0 REFERENCES / FURTHER READING

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UNIT 3 GOVERNMENT IN INDUSTRIALISATION

CONTENTS

1.0 INTRODUCTION

The government is concerned with the location of industry in two ways. It has to decide where to set up public enterprise and secondly, it has to control the setting up of private industry for social reasons. The government may not always be influenced by economic reasons for setting up a state enterprise in a particular area. They may be set up in an undeveloped area or a region with high unemployment. Sometimes industrial location may be influenced by politics, that is, for the prestige of a politician or a political party.

2.0 OBJECTIVES

At the end of this unit, you should be able to:

- list basic roles of governments in industrialisation
- state reasons for control over the location of private industry
- identify ways by which government intervenes in the location of industry
- mention what hinders industrial development.

3.0 MAIN CONTENT

3.1 Basic Roles of Governments in Industrialisation

Some of the basic roles governments can play in the industrialiSation of a nation are:

1. Formulation and implementation of industrial policies and strategies especially on growth areas of the economy.
2. Making environments conducive to investments and friendly to investors.
3. Regulation of investment and related environment.
4. Invitation of investors {domestic and foreign} to establish businesses.
5. Development of investment-related infrastructure including good water, seaport, airports, dry ports, roads, railways, electricity, telecommunication.
6. Provision of basic education and promotion of industrial skills acquisition.
7. Provision of research support.
8. Establishment of industries, independently and through partnership.
9. Provisions of incentives to investors.
10. Provision of information to investors about the country and investment environments.
11. Organisation of investment conferences, summits,
12. Creation of awareness and support for investments or industrialisation at all government
13. Provision of financial aids through lending or other means for businesses establishment
14. Provision of land for industrial clusters to encourage investment in particular areas of a country
15. Provision of and upgrading relevant technical and ancillary assistance and structures.
16. Encouragement of and provision of support for small and medium scale enterprises including provision of information and distribution of relevant information resources to students, the unemployed and similar categories of people in the country.
17. Curbing sharp practices in the investment and economic environment in the country.
18. Reduction of transaction costs of business by all possible means.
19. Removal of factors that hamper industrial development.
20. Timely settlement of disputes between existing industrialists.
21. Administration of proper and quick justice in the investment environment.
22. Avoidance or prevention of cheating of industrialists by governments or government officials.
23. Timely attendance to the complaints and problems of industrialists.
24. Promotion of cooperation among the industrialists or investors.
25. Guaranteeing some domestic industrialists when necessary for purposes of investment.

26. Encouraging production of raw materials (agricultural and mineral) for use of firms.
27. Prevention of industries and market failure and collapse by timely invention.
28. Encouraging of increasing provision of investment-related services such as banking, insurance, advertisement, marketing and sales promotion and exchange.
29. Entering into business partnership especially with private sector investors when necessary to promote industrialisation and divesting at the right time upon business formation and operation commencement.
30. Establishment of free trade zones to promote investment.
31. Market correction for industrial revamping through bailout activities.

    Many other areas can still be explored by the government for the promotion of industrialisation at the central, state or local government levels. Each item would be applied individually or in any required contribution subject however, to honesty, dedication and discipline.

3.2 Reasons for Control over the Location of Private Industry

Some control is required over the location of private industry for several reasons:

(a) to avoid congestion, overcrowding and slums
(b) to prevent the drift of too many country people to industrial areas and
(c) to prevent sudden mass unemployment; when an industry is concentrated in a particular area, the livelihood of the people will be affected if there is a fall in the demand for the goods produced by that industry.

3.3 Ways by Which Government Intervenes in the Location of Industry

The government intervenes in the location of industry by:

(a) Directly prohibiting firms from locating in a congested area.
(b) Offering credit facilities, grants and tax rebates to firms if they set up their factory or offices in certain areas, and
(c) Setting up industrial estates to encourage firms to go there; these estates are provided with roads, transport and other services e.g the Ikeja industrial estate in Nigeria.

3.4 What Hinders Industrial Development

Industrial development in West Africa is slowed down by the following factors.

i) Shortage of Capital

The local small businessmen are unable to save money for expanding his enterprise. His profits are usually low and he has often to support not only his own family but other relatives as well. Raising loans is difficult because he cannot offer collateral security; say an insurance policy or a title deed to land. Because of the shortage of foreign currency, a local businessman cannot import raw materials, machinery or spare parts. Many small businessmen lack business training and experience and do not keep proper accounts.

ii) Shortage of skill

In most developing countries there is a severe shortage of skilled workers and trained managers. For instance, without skilled plasterers, bricklayers and surveyors, the building cannot grow rapidly, even if there was a big demand for new buildings.

Some governments do not favour the use of too many foreign skilled workers, while other cannot afford to employ them. Although most developing countries try to improve their educational systems and send more people for training overseas, it takes time for the supply of skilled and trained workers to increase.

iii) Poor basic services

For industries to develop rapidly, they require adequate basic services, such as water, electricity, transport, postal and telecommunications services. Very few areas of West African countries have sufficient supplies of these basic services.

It takes time to build railways, ports,piwwer statins or dams and secondly they are very expensive. The Votal River Project, for instance took five years to build and cost E70 million. It provides electricity to a part of Ghana but the problem remains for other areas.

iv) Lack of internal markets

The level on investment depends on the market, i.e the total demand for goods and services. The total demand depends on the size of the population and people’s incomes. Except in Nigeria, Ghana, Senegal

and the Ivory Coast, West Africans countries have small populations. The income per head of population is low for all of West Africa. Thus, the total effective demand is low, leading to low investments.

One solution for this might be for the countries to get together for economic purposes; on the lines of the European Common Market. This will increase the market and boost investment.

v) Fear of taking risk

Most businessmen in West African countries prefer to invest in trade, transport or in property because they involve less risk than, say the manufacturing industry.

vi) Lack of financial institutions

Most banks and building societies are situated in cities. People in rural areas, therefore cannot invest their savings. If available, these savings could be invested in new industries.
In West Africa, only Lagos and Accra have stock exchanges. A stock exchange promotes share-holding in companies and the sale of government securities. It is important for raising capital for industrial development.

vii) Lack of research organisations

Research involves study and carrying out of experiments. For example, research has to be done on a new raw material; to find out its uses, dangers and by-products. In West Africa, there are very few research organisations which could help to increase production.

viii) Lack of storage facilities

The problem of storage is a serious one in West Africa. Raw materials often have to be kept aside for use later. Some products require storage at certain temperatures and humidity conditions.

ix) Corruption

Favouritism and corruption can hinder industrial development. If the best qualified person is not appointed to do a job, the work done will be inefficient. Officials and businessmen, at times, use moneys belonging to a firm or the government for themselves.

SELF-ASSESSMENT EXERCISE

i. List basic roles of governments in industrialisation
ii. State reasons for control over the location of private industry
iii. Identify ways by which government intervenes in the location of industry
iv. Mention what hinders industrial development?

4.0 CONCLUSION

Government of every nation, state or local council has the objective of taking care of citizens through welfare provision. This requires resources which are mainly produced by economic activities that bring income to their governments. Most of these economic activities result from industrialisation, on which governments need to be playing vital roles on continuous basis.

5.0 SUMMARY

In this unit, you have learnt:

- Basic roles of governments in industrialisation
- Reasons for control over the location of private industry
- Ways by which government intervenes in the location of industry
- what hinders industrial development?

6.0 TUTOR-MARKED ASSIGNMENT

Write comprehensive notes on industrialisation in Africa

7.0 REFERENCES/FURTHER READING

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UNIT 4 INDUSTRIALISATION CHALLENGES

CONTENTS

1.0 INTRODUCTION

Most industrialisation attempts, efforts, strategies and policies in the world have failed to achieve their aims and objectives especially in the developing countries because of some problems basic of which are set out below.

2.0 OBJECTIVES

At the end of this unit, you should be able to:

- discuss general industrialisation problems
- suggest Solutions to general industrialisation problems
- highlight problems noticed in previous industrial plans in Nigeria.
- give recommendations on problems noticed in previous industrial plans in Nigeria
- list problems gathered from manufacturers
- give recommendations on problems gathered from manufacturers.

3.0 MAIN CONTENT

3.1 General Industrialisation Problems

1. Formulation and application of wrong industrial strategies and policies.

2. Inconsistency in strategies and policies application.
3. Failure to utilise industrialisation policies and strategies as stipulated.
4. Setting aside of policies and strategies.
5. Shortage of financial, materials and other resources.
6. Shortage of skilled human labour.
7. Insincerity, selfishness or greed of some leaders and followers or lack of interest in the good and welfare of others.
8. Inadequacy of infrastructure and consequent increase in transaction costs of businesses.
9. Administrative incompetence, witness or indecisiveness of leaders.
10. Market limitation.
11. Lack of full commitment by leader.
12. System corruption, sabotage, fraud and others aided by indiscipline and lack of justice.
13. Inadequacy of research and development.
14. Non willingness to be independent or slavery syndrome among some colonised nations.
15. Inadequacy of courage.
16. Overdependence on foreign goods.
17. Placement of too much priority on consumption against investment.
18. Low level of zeal for achievement and innovation especially in developing nations.
19. Low level of creativity and unwillingness to work on inspirations.
20. Involvement or excessive involvement of government in business management and ownership.
21. Subjecting of industries to excessive levies by government, thereby reducing profit and retained earning that can be ploughed back into business for growth.
22. Absence of security and investment which discourages entrepreneurs or industrialists from investing some areas.
23. Absence of patriotism in nationals especially in the developing nations.
24. Low or inadequate entrepreneurship knowledge.
25. Corruption and lack of or inadequacy of discipline and justice.

3.2 Suggested Solutions to General Industrialisation Problems

The most difficult thing in handling problems is not to know their causes. Once the cause of a problem is known, it is near solution. What is required is to apply God-given wisdom to it. This Concept is applicable in treating the problems of industrialisation. Indeed they can be handled successfully with effective solutions.

To this end, suggested solutions are given below for the handling of the general problems facing industrialisation worldwide especially in the developing countries.

1 The first solution is for people to love others and their nations. This will motivate them to seek the good of the land and be loyal to it. It will encourage working altruistically for the good and welfare of others beside the development of nation. When you devotedly, sacrificially and passionately think of development of things and places and of the welfare of others, great ideas, zeal and power come into you to do things that are beyond imaginations. This has always been the learnt fashion of the citizen of the developed and the fast developing nations of the world, which needs to be emulated by the citizens of other developing nations. Indications of this can be seen in the previous chapter industrial regulation and development. The wish of the national of the developed nations to help human race made them to go into innovations and research that produced the industrial technologies enjoyed in the world today.

2 Level of development of the country concerned
In formulating industrial strategies and policies, consideration should be given to the level of development of the country concerned as well as the current situation of the country at the time of the exercise to avoid error. There must be correlation between developmental level, time and strategies for the nation under consideration. Relevant expert should be consulted for this. Additionally, all stakeholders should be consulted.

3. Inconsistency in policies amounts to discontinuity of policies.
This which happens mostly as a result of change in government or leadership should be avoided, especially in developing the nations. New leaders in government should not see the proceeding ones as their enemies at least for the interest of their nation or state or local council area and of the citizens. What he leaders should think of, on assumption of office, is the good the nations and their citizens would enjoy, not enmity or undue benefits that would be enjoyed by them by unnecessarily changing the industrial or other strategies established by the preceding governments.

It would be recalled that continuity is what mainly enabled the success of mechanical revolution and industrial development in England. As can be seen in the review earlier, as one innovator brought up a product, another one built on in until use of machines and technology application became world's great tool in industrialisation and other areas of life.

4. Those who implement industrial policies should not deviate from their original forms except where compelled to do so for better result in which case all stakeholders would need to be consulted for the purpose of application and adjustment. It should be noted that high level of discipline and control is needed for effective implementation of industrial policies in a nation.

5 Problem of shortage of financial, material and other resources
Problem of shortage of financial, material and other resources can be solved through various modes of Partnerships from within and outside the country.

6 Shortage of skilled human labour
Shortage of skilled human labour can be solved gradually though education and on-the-job training as well as organisation of domestic and foreign trainings for employees by employer. Also, skilled human labour can be imported by nations in need of it for the sake of industrialisation.

7 Insincerity, selfishness or grade, corruption; sabotage and fraud, failure to administer justice Insincerity, selfishness or grade, corruption; sabotage and fraud, failure to administer justice and so on are crimes against a nation which must be checked. On these crimes, punitive measure should be applied to serve as deterrent in the society in the interest of industrialisation and other reason.

8. Infrastructure inadequacy problem can be solved, if the importance of infrastructure is recognised as it relates to transaction costs, profitability, survival and growth of businesses in industrialisation. The governments and leaders of the developing nations need to recognise this in their economics, industrial and national development and consequently invest massively in infrastructure. Where resources are scare for infrastructural development, partnership between government and private sector can be harnessed with due signing of Memorandum of Understanding (MOU) under Public Private Partnership Agreement (PPA) initiatives, which can take different, form.

9. Administrative Incompetence, leadership witness and indecisiveness problems can be solved by seeking and appointing advisers or technocrats from the pool of experts in the private sector. This will help to inject private sector orientation into the public sector for efficient and effective result. The welfare of these private professional would, however, need to be well taken care of, even to the extent of covering the opportunity costs of

their living their comfort zones in the private sector for the public sector in order to retain them.

10. Market limitation problem can be solved by improving the standard of goods produce so that they can meet international standards. This can be done by importing their right machines and professionals as done in the developed nations to match technology with skills.

11. Orientation of some leader in developing nations needs to be changed towards industrialisation. The importance of industrialisation in national development needs to be appreciated by these national leaders; and they should be committed to it.

12. Development should be seen as a precondition for industrialisation; consequently, research should be made a thing of great importance and a continuous process. It is good for governments to make industrialisation a subject of daily research and education.

13. The developing nations need to see themselves as independent nations and operate with the mentality of independence, and not slavery. They should be thinking of moderate economic independence and operate as such, working assiduously on their industrialisation. The leaders and the led in the developing nations should think of becoming industrial giants. With regard to change of mentality, America got independence from Britain and other developed nations through discipline and struggle. China's industrial history is great too. We, in the developing nations, can greatly advance industrially too, if we believe this and work on the belief.

14. Our minds in the developing countries need to be strengthened and refuse to be discouraged from pursuing industrialisation. According to history, the developed nations such as America, Britain and the few others were in poverty, were ordinary and primitive before, but they gradually advanced in life with dedication and positive mental attitude. We too can do so in the industrial and other areas of life.

15. Overdependence on foreign goods can be checked by stepping the importation of goods produced abundantly at home or promote those that have close substitutes at home to reduce over-importation which encourages industrial laziness. Also, goods that can be produced at home which are being imported can be deliberately stopped from being imported, so that their production can be encouraged at home. Doing this however requires

complete avoidance or checking of sabotage that can be carried out by some criminals importing the same products being produced at home against the policies and laws of the concerned nations. It also requires stoppage of importation waivers given by government to some classes of business people.

16. Most developing nations focus on consumption at the expense of investment. This attitude needs to be adjusted, so that adequate attention could be paid to investment, and consequently, industrialisation. If a nation pays much attention to investment in its economy the citizens of the nation would follow suit and advancement in economic or industrial activities would by so doing be enhanced.

17. People need to be motivated to increase their zeal and creativity for achievement and be discouraged from laziness and draw-back attitude towards working on their thoughts and inspirations. While everyone thinks and perceives, the great achievers work and work progressively on their own thoughts, perceptions and ideas. Most developed nations' citizens do this while many do not do it in most developing nations. While advising individuals to form the attitude of converting their business or industrial ideas into practice or realisation, government can, in different ways, be encouraging people on zeal to be converting perceptions, ideas and thoughts into actualisation against laziness towards doing this. They can also be orientating the lazy ones to be converting their ideas or thoughts especially of investment into reality for the industrial development of nations. For instance, governments can be giving information, on those who have converted their business or industrial perceptions, ideas or thoughts to tangible things and have become great to their citizens. They can even be distributing books on such development to the citizens.

18. Governments, especially, in the developing nations need to check the various levies imposed on industries. Rather they should reduce levies, give and increase assistance to the industries and work on how the industries would be making more profits and have increasing retained earnings to plough back into business for growth for the sake of industrialisation.

19. Investors or industrialists would always want to invest in places safe for their lives and investments, so the governments of nations should adequately deploy their security agents in all areas of a nation to ensure the security of the lives and investments of investors or industrialists. To end this, more security personnel should be employed alongside adequate equipment.

20. Government participation in business ownership and control should be discouraged because of the inefficiency associated with government business. Since most government business die as a result of this malady, government should, as a solution, exit business running using different exit strategies to enable industrialisation to advance in the concerned nations.

21. Loyalty and love for one's nation should be promoted by government, especially among industrialists, so that they would be encouraged to establish businesses in their own countries and help on the industrialisation of their nations. Recently, Alhaji Aliko Dangote, the Chairman Dangote Group, in addition to his stream of industries, unfolded a plan to build a refinery with billions of dollars in Nigeria. This is not just a great addition to industrialisation step in Nigeria, but a solution to some of the infrastructural problems in Nigeria apart from the general economic benefits the establishment would bring to the nation. To earn more of the love and loyalty of citizens, governments can increase their welfare packages for citizens. This works so well, that even when children experience this, when they grow up, they would be thinking of how to benefit the concerned nations.

22. Let governments do everything possible to encourage entrepreneurship by providing entrepreneurship studies to create its knowledge base and infuse its orientation into the unemployed, youths, students and others. Similarly, the employed can be given entrepreneurship insight to prepare them for their post-retirement period.

This author noticed the need for this and wrote a book entitled "ENTREPRENEURSHIP: Business Establishment and Management (with strong emphasis on small scale industries)'' published in 2009. The same year of publication, it was assessed by the National Education and Research Development Council (NERDC), which, on finding it useful and leading among all other related indigenous books assessed together, recommended it to the Federal Ministry of Education in Nigeria, that subsequently approved and recommended it for use in universities and other tertiary institutions with a letter written to that effect while its general usefulness was equally supported by the ministry.

Books of this nature need to be given out and in respect of entrepreneurial studies and motivation for citizens by governments. Entrepreneurship greatly promotes governments industrialisation, since, apart from the fact that small and medium firms may grow to be large

companies through it, it would give wide coverage to industries' creation in a nation.

23. Corruption and lack of or inadequacy of discipline and justice are serious problems that challenge industrialisation in most nations, especially the developing ones. These problems can only be solved by the application of appropriate sanctions. Of course it is known that discipline can take the form of training or punishment but when economic or money issues are involved as the case is with industrialisation, people most of the time tend not mind training discipline; hence the emphasis on punitive discipline in this context. This punitive discipline which is aimed at taming economic saboteurs or criminals must start with security, operatives such as Armed Forces; the Police, Custom Service, Immigration Service and others as well as workers in courts and tribunals such as the judges and others working with them who may be found corrupt or who may fall into the trap of corruption. When these ones are successfully handled, the corrupt one outside could be well-handled; the corrupt inclined ones would desist from their ways of life knowing that if they go corrupt the security operatives and the judges and others working in positions of trust would not receive bribes to pervert justice. When this is done, those that work corruptly against the success of industrialisation as economic saboteurs or cheats in those nations would be deterred. Also, economic activities would be carried out in those nations under controlled sabotage or corruption which would pave way for industrialisation to thrive well in those nations. It should be noted that the welfare of these officials to be monitored to ensure their corrupt-free operations and discharge of justice must be adequately good and regularly ensured, while the retired ones are paid their retirement benefits regularly and adequately so that they can have it in mind that they would receive their salaries regularly and that, post-retirement, they would be receiving their retirement benefits such as pension regularly.

Some people can ask how corruption or any crime can be handled. This is not difficult but it depends on the name that the head of a nation, state or community wants to protect; whether it is the names of economic criminals or his or her own and his or her integrity. A leader does not need to go to the grassroots of a nation/state/community before he or she can control a crime what the head needs to do is just to declare a zero tolerance action to every area and everyone in the nation/state/community concerned and use some few ones as examples and follow up these actions in continuity.

If the basic solutions suggested above are properly applied, there is no doubt that problems of industrialisation would be solved to a very large extent, and industrialisation will advance in places or nations where these solutions are so applied, especially in the developing nations.

It should be noted that with indiscipline, it would be difficult for things to go on well in any nation, state or community.

Also, it should be interestingly noted that, if corruption can be controlled in the public sector, the control will spill over to the private sector of a nation automatically as general regulation of all activities directly or indirectly comes from the public sector or government in any nation.

3.3 Problems Noticed in Previous Industrial Plans in Nigeria

Basic problems noticed in the previous industrial plans, actions and inactions in Nigeria, in a chronological order are:

1. Administrative control weakness
2. Under-spending
3. Substantial or over-dependence on oil revenue by Nigerian government.
4. Abandoning of agricultural sector for oil sector
5. Paying inadequate attention to other sectors like mining
6. Imbalance of expenditure structuring between social and economic infrastructure.
7. Resources Mismanagement
8. Corruption (rent taking, stealing, sabotage, defrauding etc.)
9. Devaluation of naira in favour of foreign currencies.
10. Electricity supply inadequacy
11. Inadequacy of other infrastructure apart from electricity.

3.4 Recommendations on Problems Noticed in Previous Industrial Plans in Nigeria

1. On administrative control weakness, control in this context has to do with people; it specifically relates to directing people and their activities in preferred, usually right, ways to achieve some objectives. It is very difficult to control when people disobey with impunity (suffer no consequences for arrogations).
   Administrative control weakness is a problem otherwise known as governance control problem which featured in Nigeria in the 1960s after the colonial master left. Since then, it has been a nightmare to Nigeria and Nigerians on an increasing basis.

The solution to this is simple. What needs to be done is for the government to put on ground honest compliance structures and tools that would force people to comply with the rules and regulations.
Compliance enforcement is the main key to control. Without enforcement of compliance, control cannot be effective. In using compliance to maintain effective control, rules, regulations and laws made would be used as standards against which people's behaviour or actions would be measured, so that offences on disobediences acts would be taken as deviations from standards and would be punished accordingly.

When laws, rules and regulations are made; there is bound to be some people (the deviants) who will aside the rules, regulations and laws to do what they like, but when those people are caught and duly punished, they and potential offenders will check themselves to avoid punishment.
As noted above, disobedience to rules, regulations and laws causes weakness in control, this means that discipline is inevitable to check disobedience especially for the way disobedience, through sabotage, corruption and many other evil means have been entrenched in Nigeria since the colonial masters left with discipline and disciplinary measures.
Without discipline, compliance would continue to be a difficult thing in Nigeria and control would be advancing in weakness and right doing would continue to be a mirage. The effect is that the nation would continue to suffer as most of the areas where compliance fails most in Nigeria is the economic area which has to do with money, and when the economy is sabotaged industrial development would be difficult.

To avoid this, the highly-industrialised and industrialising nations did and still do everything necessary to tame economic sabotage and maintain economic compliance to the extent of applying capital punishment where appropriate as done in China, Indonesia, and other nations.

Things work out more in these countries not because all the citizens of the countries want things to go well and not because they love to obey the law. Far is this from the truth, as there are still, though, very few ones who do and many who intend to perpetrate criminal acts in these countries, but they are kept in check by effective enforcement of compliance law.

Where control is not effective, the leaders (government and private) are hindred from leading people well or satisfactorily, hence late sage and elder-statesman Chief Obafemi Awolowo wrote: ***"The presidency of Nigeria is not an office of pleasure"*** in his Voice of Wisdom (Selected Speeches of Chief Obafemi Awolowo). This issue of leadership is not

limited to governments, it relates to all areas of life, where there is leadership and followership.

Where control is effective leaders find it easy to lead as the followers would carry out instructions readily.

For instance, the President of the United State of America, Barrack Obama, believing in his word based on the high level of compliance and control in the country, just issued an order to capture a set of family members suspected to have bombed and shot criminally and killed at a marathon programme in Boston in the United States of America in early 2013 and within 24 hours the order was carried out effectively. This is the power of control and compliance in action.

This should be so with all countries in the world, Nigeria not being an exception, so that, in terms of industrialisation anyone who carries out any sharp practice on the industrial policies and economic strategies of the nation especially as they relate to infrastructure, importation, exportation, and so on would be punished seriously to serve as deterrents to others.

From the foregoing, Nigeria and many other developing nation needs adequate compliance and control to secure the needed social (attitudinal) change to aid their economic or industrial development to reduce poverty, create more employment and move forward.

For this social change of compliance and control to come reality, discipline must be maintained, and from experience and history, discipline would not be maintained if punishment is not applied.
This punishment should be of the types that would be serious and strong enough to stop the offenders and discourage potential law breakers from disobeying the government or other constituted authorities.

In respect of this, the following suggestions are made:

a. Setting up of a special task force, preferably not uniform wearing, to monitor all the security agencies especially the Police, Immigration, and Customs as well as the anti-graft agencies such as the Economic and Financial Crimes Commission (EFCC) and the Independent Corrupt Practices and Other Related Offences Commission (ICPC) and others such as standards Organisation of Nigeria (SON), and National Agency for Food and Drug Administration Control (NAFDAC) among others and their officials, who may want to corrupt the systems and sabotage the entire system of Nigeria by implication. This body is to report cases for adequate punishment which will range from warning to

removal from office to other sanctions as the case may be. Once these people are checked, others of their like would watch their actions, thereby bringing sanity into their system. A similar but more literarily based strategy also needs to be applied to the judges, lawyers and other judiciary workers who also would have their operations reviewed on regular basis. This is necessary particularly in the developing nations like Nigeria and generally because, if those in charge of justice dispensation and enforcement can be handled effectively to do their work well, intending offenders would check themselves.

In any nation where this is to be done, however, matters like salaries, allowances and promotion of workers and retirement benefits such as pensions of retired workers must be adequate and regularly paid so that serving officials would live above poverty level and would also be sure of the necessary provisions in future[post retirement period]. This suggests that the pensions and benefits of current retirees of the governments wishing to do this must not be delayed for whatever reason by any dubious government official even as retirement benefits of any other retiree should not be delayed for whatsoever reason.

In relation to maintenance of discipline in the Nigerian judiciary, the current chief justice of Nigeria, Aloma Miriam Muktar needs to be commended for the judicial reform she is carrying out, particularly as regards corruption in the Nigerian legal system.

a. The Nigerian police sacked not less than three police officers in Nigeria in 2013 for their involvement in bribery, to further corrupt the judicial system. This, which laudable, may be a sign that the police is starting to earn integrity for itself in Nigeria and it is encouraged to continue to do this to generally purge its system for the good and development of the country. This discipline, if continued in the judiciary, will make other judiciary workers and people who start to check themselves against corruption in the country.

b. Setting up of special courts for trying financial *and* economic corruption cases for speedy administration of justice in this area as delay in justice promotes crime and disobedience. Special courts would not admit all undue technicalities, which some judges are abusing to free corrupt offenders. Also arrangements should be further strengthened for the capturing and punishing of corrupt judges even as it is being done in the country now.

c. Using of commensurate punishment against offenders rather than giving punishments that would encourage the culprits to disobey

further and corrupt the system more or even encourage others to embark on corrupting the systems for personal benefits.

d. Abrogation of plea bargain judgment in Nigeria. To most Nigerians, plea bargaining should cancelled in Nigeria. Except for those that fear God, plea bargaining encouraged people to steal both private and public funds and other resources and steal more, if they still have the opportunity to do so, after judgment. There are reports that one of the anti-graft agencies in Nigeria and some Nigerians are pushing forward suggesting to the federal government through the national assembly to insert plea bargain in the 1999 constitution. On the other hands, suffering Nigerians see no reason for this as it is not in any good interest of the country.

Allowing this or doing this would amount to making the corrupt ones to eat their cake and have it back while mortgaging the lives of many Nigerians now and in future; it would also amount to promotion of poverty in Nigeria by advancing corrupt activities through encouragement of fraud which will further setback the development of the country.

Economy has to do with the life of people; it can take away the lives of people if not well managed. For instance, poverty that can make people starve and suffer from continuous poor health mostly results from failure of the economy caused by sharp practices or corruption. Countries like Indonesia and Chins, in defence of their economies and protection of their law-abiding citizens, apply capital punishment against corruption, sabotage and economic offences.

This point has taken so much space in this book and chapter because, once we get it right, all other good things would follow and we would get out of the lunch.

Imo State Government gives two instructive case studies of discipline enforcement in2013. It impeached a Deputy Governor who was alleged to have taken bribe of a huge sum of money from a foreign construction company to aid its getting a contract from the state government and it arranged for and succeeded in arresting a foreigner who collected a sum of over N1billion in the name of a construction company as 30percent mobilisation fund for the purchase and supply of some materials needed for a contract obtained from State Government by the company but failed to execute the contract, and attempted to escape from country. He was caught by the operatives of Interpol in Lagos and was handed over to the Imo State Police Command (The Punch of June 15, 2013. P8)

Similarly in 2013, the Federal Government sacked a Permanent Secretary for lavishing funds in a foreign land on his daughter's wedding.

Other examples are of the Government of Lagos and Plateau states who suspended a judge each on the recommendations of the National Judicial Council (NJC) also in 2013. These acts, which are highly laudable, need to continue to purge Nigeria of corruption.

2. Under-spending was a problem in Nigeria in the 1960s and did not extend beyond the period except with regards to infrastructure development.
3. Regarding over-dependence on oil revenue, it is time this stopped. Nigeria should strive diversify her economy. She needs to develop other sectors, especially the production or manufacturing sector and start to rely more on for income to be applied in government budgets. By this, we would be saving huge funds for investment in economic infrastructure and establishment of businesses under public or public and private investment initiatives. Funds save from this can also be lent to industrialists through the bank of industry for industrial development in Nigeria. The funds can further be used in many other ways to aid the industrialisation of the nation.

This is possible, because some developing nations do not have

oil, yet their economies grow faster than that of Nigeria. In doing this, Nigeria would be financially rich, and would, In due course, be lending to nations and would no longer be borrowing.

Diversification is even more important in Nigeria in view of the fact that Nigerian oil reserves face depletion in 40 years time according to experts' comments another reason is that, prices of oil falls from time to time as more countries discover oil. Yet, another is the discovery of oil substitutes in an ongoing development that can further reduce the fortune of the existing oil industry.

4. On the agricultural sector, it would be recalled that the sector used to fetch about 90 percent of Nigeria's revenue before 1970s when it was abandoned for oil. Agricultural is basic feeder unit that is required to supply raw materials to the production sector, hence its preservation and development is a necessity, if Nigeria is to get industrialised for economic development, the agricultural sector must be rebuilt to increase our exports also. With the revival of the sector, more savings would be made for industrialisation and welfare provision ads the current sum of

about $11bn spent yearly in Nigeria to import basic food items like wheat, sugar and rice would no longer be needed.

5. On other sectors like mining, Nigeria should understand that mineral sector is another great feeder unit which Nigeria has been blessed. It can boost the establishment of and feeding of industries with its numerous products, which are mineral resources such as iron, ore, gold, and diamond. Since Nigeria has many of these in commercial quantities, they should be harnessed for industrial development. Records show that Nigeria has not less than 44 solid minerals located in about 500 places in Nigeria, we should not allow these to continue to be buried in the ground while our economy is crying for industrialisation and economic development and we continue to borrow; Nigeria needs to harness these minerals resources to be on a great economic footing for the good of the country and its citizens.

Coupled with agriculture, harnessing mineral resources engenders industrialisation in no small measure in a nation, hence the need to pay special attention to it. The existence of special funds in Nigeria that were hit her to meant for the development of minerals and environments in Nigeria shows that Nigeria thought of mineral development before now in the country, but that actualisation of the thought is what required, therefore Nigeria is advised here to show more to this against all odds so that the dream of industrialisation in Nigeria can be realised for the nation's development.

It is noteworthy that, if the solids minerals in Nigeria are well harnessed, Nigeria would become a supper wealthy nation because, according to comments, Nigeria seems to the most blessed nation in terms of natural resources in the world. Orji (2008) says:"All these have been, in spite of the fact that, Nigeria is the current 6 world's largest producer of crude oil and with the greatest endowments in solid Minerals, agricultural potentials and human capital of over 120 million people".

6. On imbalance of expenditure in terms of allocations between social and economic infrastructure, it should be noted that whereas social infrastructure is very important in a country, economic infrastructure is also very important. Economic infrastructure constitutes investment that would aid investment that would in turn aid further provision of social infrastructure. Consequently, governments need to allocate the right proportion of budgets to economic infrastructure development, Britain, china and America do this a great deal and it is impacting positively on their economies industrialisation-wise.

7. On resources mismanagement, the menace has stop, the right people should be appointed to the right places and effective compliance enforcement should be put in place to check sabotage, corruption, indiscipline and policy summersault. However, people so appointed should be given reasonable pay.

8 On corruption (rent taking, stealing, sabotage, defrauding etc). Effective discipline mostly in the form punitive measures should be put in place to sanction defiants and serve as deterrent to potential offenders.

9. On devaluation of Nigeria currency, it is necessary to learn from history. Due to devaluation in 1986 naira fell unimaginably. The exchange rate of about N0.89 to S1 before the devaluation, aided by 2011 slight devaluation, is now N160 to S1, making things hard socially and economically for citizens of the nation and industries especially the manufacturing companies that import raw materials. The naira should not be devaluated again for any reason until Nigeria ranks among first class industrialised nations and even at that, devaluation should be done, if it is absolutely necessary and to the advantage of the country especially when it would help it to export large volumes of manufactured products on its achieving large scale industrialisation. There are many ways to solve economic problem without necessarily inflicting economic injuries on our nation.

10. On electricity supply inadequacy, this is a very big problem which has discouraged the establishment of businesses that use electricity in Nigeria, terminated the lives of some company and has made some companies to shift their headquarters from Nigeria to other countries like Ghana in recent times. For Nigeria to be industrialised, it needs to work on its electricity problem. The current Governor of the Central Bank of Nigeria (CBN), Sanusi Lamido Sanusi, noticing the high effects of electricity problem on our economy and industrialisation in Nigeria, has advised the Nigerian Government to concentrate only on revitalising the power sector in Nigeria.

It is advisable for the government to pay more attention to power generation by earmarking much more funds for electricity infrastructure development annually while monitoring the funds so released with application of discipline on the spending of the funds, which can be with the involvement of private sector under Public Private Partnership initiatives. The current process of privatisation of the Nigerian Power Holding Company of Nigeria (PHCN) plc, is a good move in the right direction, which should be done fast to enable the purchasing companies

to carry on the business on private basis in good time. The private sector is expected to be very efficient in its operation.

Also constitutional limitations currently existing on the ability of state in Nigeria to generate and distribute electricity should be removed, so that they can generate more electricity for their industrialisation.

In view of all this, by 2020 Nigeria should employ necessary resources to generate 120,000 megawatts which is required for the country to become industrialised at the same time, the country should work ahead to achieve the 315,113 megawatts which the Federal Government has promised against 2030. This would hasten the rate of industrialisation or economic development in Nigeria as it would reduce the transaction costs of companies operating in Nigeria, reduce prices of products and increase exportation for economic development in the country. Also many entrepreneurs would be able to remain in business while others would be encouraged to go into businesses of their choice. This would lead to increase in number and size of business, increase in employment and consequent reduction in poverty in the country.

Achieving this would propel Nigeria to become a great economic power and a development nation, ranking among the most developed ones in the world.

11. On inadequacy of other infrastructure, it is advisable for the government to pay attention to this. Other infrastructural facilities in the areas of oil and gas, transportation, water, communication, agriculture among others are also important for development. Public private partnership especially at this time that companies are eager to engage in Building Operate and Transfer (BOT) contracts on many areas of need, can equally be applied here, while private sector involvement would need to be more encouraged by government for enablement of optimal efficiency.
    Many foreign companies or investors are interested in coming to Nigeria for establishment of infrastructural facilities in the country and we need to take advantage of this, while domestic investors need to be encouraged by government to participate in the infrastructure development in Nigeria to boost the economic development of the country.

The Railway Corporation of Nigeria and like government business entities should be privatised to make their operations more efficient for the purpose of industrialisation and economic development in Nigeria. Alongside this, it is important for Nigeria to switch between 15 and 20 percent of its Gross Domestic Products (GDP) into general infrastructure development, while a sizeable proportion of this is devoted to electricity

infrastructure development annually, because it is power or energy that determines the operation of the manufacturing sector (the driver of industrialisation) in any nation.

While privatisation and other means are being used to engage the private sector in key areas of the nation, such as power, the activities of the private sector operators would need to be properly checked, as the case is in the communication industry, where the Nigerian Communications Commission (NCC) moderates the operations of the operators to prevent possible cheating of unsuspecting consumers through excessive pricing of products. In this regard, necessary organisations similar to the NCC would need to be set up in respect of each of the key and other units where the private sector investors are to function, for moderation and regulatory purposes. The Standards Organisation of Nigeria would need to tighten its join to be above the challenges to be posed by the private sector under this new development.

The recent news that the Federal Government has rolled out a 30-year infrastructure plan as National Integrated Infrastructure Master Plan (NIMP, which will requires S2.9trillion, is welcome, but the government needs to fast-track the commencement of the programme, disciplinarily monitor it and let most part of it be executed in early part of its duration ensuring that real term implementation of it is done, while a succeeding one should be made before the end of its duration.

In part funding this plan, because of the state of the economy, the Nigerian governments are advised to cut cost of governance especially as it relates to the executive and the legislative arms of Nigerian governments to make more funds available on sacrificial understanding among the to-be affected ones for the execution of the NIMP's which is basic to Nigerian industrialisation and economic development.

This will additionally help to normalise the recurring and abnormal weakness of Nigerian budget more towards recurrent expenditure.

Further to infrastructure development, rural development is of essence, therefore correct utilisation of allocation allowances by Nigerian legislators would help in the development of infrastructure in Nigeria; hence all necessary steps need to be taken to ensure that these allowances are properly applied for the provision of infrastructural facilities which they are meant for. Also the local governments in Nigeria can be fully supported in the carrying out of there functions especially in the area of infrastructure provision in towns and rural areas.

Right and adequate budget implementation, monitoring, control coupled with the application of carrot and stick reward approach will be of great importance if reasonable level of infrastructural development is to be achieved in Nigeria as these would ensure that sums budgeted for infrastructural facilities are actually and correctly applied to them.

3.5 Problems Gathered from Manufacturers

Noting that manufacturing sector is the engine of industrial growth in every nation, the problems of the manufacturing sector have been chosen for discussion.

These problems as gathered from the manufacturers through their comments and complaints are started below for due attention.

1. Poor and inadequacy of power supply
2. Inadequacy of gas supply and high cost of fuel
3. High cost of operation which results from the inadequacy and poor electricity that make their products prices high and less competitive with foreign manufacturers
4. Inadequacy of take-off incentives
5. High cost of finance and non-availability of credits (loans) on collateral basis
6. Poor information system
7. Poor access to land
8. Weak skills
9. Government policies inconsistency
10. Importation and smuggling of substandard and banned goods
    Out of these problems, electricity problem, cost of fuel and gas inadequacy, high cost of finance, and inadequacy of incentives as well as importation and smuggling of substandard and banned goods rank high.

Electricity is a major problem which needs very urgent attention because of its centrality to business operation, transaction cost, price competitiveness, profitability, survival and growth.

3.6 Recommendations on Problems Gathered from Manufacturers

1. On poor and inadequacy of power supply, this has earlier been addressed in detail under solutions to other related problems in this chapter.
2. Inadequacy of gas supply and high cost of fuel, this also has been addressed in passing under solutions to some of the other problems in this chapter, but because of the strategic role of oil

and gas sector in electricity generation in the economy of Nigeria, further recommendations are given here noting that the problem of gas supply shortage and high cost of fuel is mostly caused by vandalism, theft and other kinds of sabotage.

It should be noted that some of these problems occur domestically, while some occur internationally to satisfy undue personal interest. Pipelines vandalism, bunkering and theft mostly account for local while bunkering and theft at export terminals account for international problems in addition to cheating that some saboteurs are alleged to have been carrying out on importation in the oil and gas sector in Nigeria.

Against Vandalism which is mostly locally done to oil and gas pipelines facilities for illegal bunkering and theft in the oil sector, let Nigeria ensure application of technologies or scientific means of monitoring oil and gas pipelines and other facilities, such as installing sensors that would send signals anytime anything touches any of the petroleum or gas pipelines and other facilities especially those in bush, so that alerting signals would be traced and the purpose known in minutes so that undue touches can be subjected to necessary counter actions from relevant authorities on notice.

Further to this, the special task force on ground as instituted by government to check vandalism, bunkering and theft in the oil sector in Nigeria is a product of a good decision, but disloyalty and collaborative sabotage perceived about some personnel of the task force need to be checked to achieve positive results.

This calls for seriousness on the part of government to maintain required discipline in this regard.

In this international scene where collaborative means and cheating sabotage are used in the Nigerian oil and gas sector theft, it is honestly courageous of the European Parliament to have recently agreed and promised to stop the purchase of oil illegally bunkered from Nigerian by ensuring that crude oil to be sold in the European market would be accompanied by Certificate of Origin.

This will be very beneficial to Nigeria as it will help to save the country the huge funds which it has ever been losing to international oil and theft even as it would aid the economic development of the nation. These and other associated benefits can however be realised and in good time if the promise of the European Parliament under reference is fulfilled in real terms and soon.

With the belief that promise would be fulfilled more of such should be secured from other parts of the world by Nigeria.

In addition, Nigerian government needs to look more inward on the strength of the following questions which relate to sabotage irrespective of the nationality of those who sell the country's crude oil and gas: what happens at the point of sale of these products? Are the quantities of these products sold measured at the point of sale? What is the current system of measuring these product quantities? Are the products selling personnel honest in the discharge of their duties? Does any corrupt activity ensue between the selling personnel and the buyers of these products? What methods are being used to steal these products locally and internationally?

Other questions such as, who are the people or classes of people stealing Nigerian crude oil? Can still be further raised, but in the meantime, existing related legislations can be strengthened or additional ones made, standard scientific or modern metering devices to capture quantities of products sold can be installed and put into use, scientific selling mechanism, or that match each unit of product sold with its corresponding unit price can be used, while full records of transactions are captured with adequate reconciliation of sales proceeds with quantities sold done on timely and regular basis. This is better done by scientific means. However, it is believed that if needed discipline is applied, in the immediate time, the problem of theft in the oil sector can be tamed.

Secondly, Nigeria needs to overhaul its moribund refineries either singularly or jointly with private sector and privatise them while the functioning ones are equally privatised. However, this should be accompanied by regulation and policies under relevant government commissions as the case is with the telecommunications industry where the Nigerian communications commission (NCC) plays vital and effective roles.

The reason for recommending privatisation is that government's handling of the refineries in Nigeria has not been efficient over decades, as evidenced by the negative state of some of the Nigerian refineries and experience has shown that efficiency of industrial activities in the world has been in the hand of the private sector, a trend which is likely to continue because of the nature of the public sector.

Taking Nigeria is an example, if GSM networks in Nigeria were government-owned, they would have been liquidated or be preparing for

liquidation because of unprofessional approach and inefficiency which would destroy their operation.

Where are the Nigeria Telecommunications Limited (NITEL) and its mobile arm, Mobile Telecommunications Limited (MTEL) owned by the Nigerian government? They are both heading for liquidation. They were pushed into the condition by the swarm of destructive tendencies associated with government businesses.

For effective operation of the nation's refineries domestic and foreign investors can be involved with due incentives.

Also, more refineries should be built in Nigeria either by public-private approach using such options as Build Operate and Transfer, Joint Venture and others, by-government or as exclusive private sector project. This would bring efficiency to the oil-and-gas sector and aid industrialisation as it would check corruption and sabotage of all kinds in the sector because it would stop fuel importation which has always been pinpointed as an instrument of siphoning public funds in Nigeria.
This and other factors would lead to reduction in the prices of fuel and other petroleum products in Nigeria. Accordingly, there would be reduction in the transaction costs and increase in profitability and growth of businesses as well as emergence of more industries in the country.

It should be noted that electricity and power sectors among others were run down by sabotage and fraudulent practices over the years in Nigeria. The federal government is therefore advised to focus more on discipline enforcement in these areas.

3. High cost of operation has been addressed under another until on solutions to problems in this chapter.
4. On inadequacy of take-off incentives, government should liaise with the manufacturers through their recognised bodies which include the Manufacturers Association of Nigeria (MAN), and Chambers of Commerce and Industries to negotiate reasonable take-off incentives to encourage the manufacturers or entrepreneurs into production.
5. High cost of financing projects and non-availability of credits, constitute problems to manufacturers. Therefore, the Federal Government should make the Bank of Industry (BOI) deliver more on its mandate of "providing financial assistance for the establishment of large, medium and small projects as well as expansion, diversification and modernisation of existing enterprises and rehabilitation of ailing ones."

Similarly, there is need to create more awareness about the bank and its activities to attract more potential clients to patronise it. To reverse this, adequate public enlightenment about the bank should be undertaken. The aims and objectives of the Bank and what manufacturers and other entrepreneurs can benefit from the bank also need to be published in national dailies, flyers, through television, radio and other media from time to time to enable more entrepreneurs to benefit from the banks services and establishment business.

Hand in Hand with that, the bank will be able to function more effectively as expected by establishing its offices in all parts of the country, starting with one in every state. The offices are presently limited to Lagos Head Office, Abuja Corporate Office , Zonal Offices in Abuja Aba, Abia State, Akure, Ondo State, Asaba, Delta State, Bauchi, Bauchi State, Kaduna, Kaduna State and another one in the same building with the headquarters in Lagos. This suggests that the Bank of Industry would require more funding.

Furthermore, the bank of Industry needs to keep its interest rate at single digit to make finance securing easy for indigenous borrowers as it was done in China to aid its industrialisation and economic development the result of which we can see and hear today.

Serious emphasis is laid on Bank of Industry here because commercial banks are not friendly to business as required in Nigeria; they charge borrowers, including the manufacturers, exorbitant rates and other charges that are inimical to business in utter disregard to the directive of the Central Bank of Nigeria. This makes the cost of borrowing unbearable and business strangling to entrepreneurs and the industrialists, especially, the manufacturing businesses.

The next recommendation in this context concerns the regular facilities or loans granted by the commercial banks in Nigeria.

These banks as indicated earlier, change exercise rates and other charges and when the Central Bank of Nigeria (CBN) directives to control interest rates to reduce total cost of lending, the banks still go ahead to increase their charges through different means. In this regard, the CBN has to address the lending cost holistically.

The other charges should be considered along with the interest rate in giving the maximum lending cost limits, which shall be moderate or reasonable, so that customers, especially manufacturers, can have a good leverage to negotiate.

The borrowers should be encouraged by the CBN to report case of infringement such directive to the CBN by acting on the reports and the treating cases on anonymity bases, while applying strong punitive measures wherever and whenever applicable.

Also the CBN needs to consider the business community while determining its Minimum Rediscount Rate (MRR) or Monetary Policy Rate (MPR), the rate at which funds are lent to commercial banks by the Central Bank, in its monetary policy making. The business community, especially the manufacturing companies, makes up the heart of an economy; it needs to be given priority in this respect for businesses to make profit, survive and grow to facilitate industrialisation in Nigeria. In case of banks refusal to grant credit facilities on the basis of the collateral demand, the government can persuade commercial banks to be moderate in demanding collateral from borrowers especially the manufacturers, so that industrialisation can fostered in Nigeria.

6. On poor information system, the relates to issue of lack of adequate information and in its regard, governments and business associations like the chambers of commerce and industries, manufacturers' associations, small and medium scale enterprises' associations, business director' associations, and investors' groups are obliged to release useful information to enable business people on their businesses as to consequently operate well.
7. On access to land, the manufacturers know what they say on this and in relation to the government, some officials are known for creating difficulties for investors who need land for ventures. There are also cases of industrialists being faced with revocation of land allocated for projects. For the government to act properly towards industrialists, it must dismantle all these and other related hurdles.
8. On weak skills, this is in the areas of education and training. For basic education, many graduates are being rolled out yearly by higher institution of learning in Nigeria but few of them are actually skilled. This is why government are started giving skill impartation training to student and the unemployed. To a great extent, the problem of skills acquisition is not alien to manufacturers themselves. Indeed, officers and directors of some companies are known to travelled abroad many times in a month for official trainings and personal matters, but they find it difficult to send staff for on-the-job training. This trend has to be reversed under a genuine guest for industrialisation. This would not only help the entrepreneur and their businesses but also help the government of Nigeria to aid the country's industrialisation.

9. Policy inconsistency poses uncertainties and the associated danger to both the domestic and foreign investors. Governments have to be faithful to industrial or economic policy constantly. If there is any need to change any such policies, they would need to inform the business communities and other relevant stakeholders. Even where a new government comes on board, the leader needs not change the policies of the preceding government for flimsy reason. Where necessary, adjustments have to be made to policies, but in the best interest of industrialisation.
10. On importation and smuggling of substandard banned goods and exportation of banned products, these are other factors contributing to the destruction of the economy to deal with these, relevant bodies in Nigeria, such as the Custom Service, Immigration Service, Standard Organisation of Nigeria, and National Drug Law Enforcement Agency (NDLEA) should be strictly monitored to deliver their duties with diligence and integrity.
11. Regarding lip service paying, the facts need to be constantly remembered that the manufacturing sector is central to industrialisation; hence the government should desist from treating their complaints with levity.

SELF-ASSESSMENT EXERCISE

i. Discuss general industrialisation problems
ii. Suggest Solutions to general industrialisation problems
iii. Highlight problems noticed in previous industrial plans in Nigeria.
iv. Give recommendations on problems noticed in previous industrial plans in Nigeria.
v. List problems gathered from manufacturers
vi. Give recommendations on problems gathered from manufacturers

4.0 CONCLUSION

While industrialisation is essential to reap the benefit of modern technology and improve the level of economic statuesque, it also faces and creates some problems.

5.0 SUMMARY

In this unit, you have learnt:

1. General industrialisation problems
2. Suggested solutions to general industrialisation problems
3. Problems noticed in previous industrial plans in Nigeria

4. Recommendations on problems noticed in previous industrial plans in Nigeria
5. Problems gathered from manufacturers
6. Recommendations on problems gathered from manufacturers

6.0 TUTOR-MARKED ASSIGNMENT

Highlight industrial plans in Nigeria.

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MODULE 4 INDUSTRIAL WASTES AND ASSOCIATED PROBLEMS-THE NIGERIAN EXPERIENCE

UNIT 1 CLASSIFICATION OF WASTES

CONTENTS

1.0 INTRODUCTION

Commercial and institutional, or industrial wastes are often a significant portion of most environmental problems. These wastes come from different sources and of various categories. This unit defines waste, lists criteria for classifying waste, explains industrial waste, identifies the sources and classifies industrial waste.

2.0 OBJECTIVES

At the end of this unit, you should be able to:

- define waste
- list criteria for classifying waste
- explain industrial waste
- identify sources of industrial wastes
- classify industrial waste

3.0 MAIN CONTENT

3.1 Defining Waste

Waste can be defined as:

1. Something that is not or no longer useful and is to be thrown away or disposed of.
2. Any material lacking direct value to the producer and so must be disposed of.
3. Any substance which constitutes a scrap material or an effluent or other unwanted surplus substance from the application of any process.
4. Any substance or article which requires to be disposed of as being broken, worn-out, contaminated or otherwise spoiled.
5. Worn but functioning substances or objects which are still usable (albeit, after repair) for the purpose for which they were made are not to be considered waste.
6. Degenerated substances or objects which can be put to use only by establishments or undertaking specialising.
7. Substances which the holder does not want and which he has to pay to be taken away are waste, where the holder intends that the objects are to be discarded.

3.2 Criteria for Classifying Waste

Waste is usually classified according to:

(a) Its source: With regards to the source classification, it either comes out of the shop (market) or office – commercial waste or, out of the factory- industrial waste, or out of the home-household or domestic waste.
(b) Its harmful effect on humans and the environment.
(c) The control which are appropriate to deal with it.

3.3 Industrial Waste

Industrial waste is the waste produced by industrial activity which includes any material that is rendered useless during a manufacturing process such as that of factories, mills, and mining operations. Some examples of industrial waste are chemical solvents, paints, sandpaper, paper products, industrial by-products,

Metals and radioactive wastes. Toxic waste, chemical waste, industrial solid waste and municipal solid waste are designations of industrial waste.

3.4 Sources of Industrial Wastes

Sources of industrial wastes are generated by the following:

1. Complex Organic Chemicals Industry

A range of industries manufacture or use complex organic chemicals which include pesticides, pharmaceuticals, paints and dyes, petrochemicals, detergents, plastics, paper pollution etc. (Wikipedia, 2011). Rivers and other waters can be contaminated by feed-stock materials, by-products, product material in soluble or particulate form, solvents and added value products such as plasticisers.

2. Food Industry

Wastes come Processing of food from:

- Raw materials
- Vegetable washing
- Animal slaughter and processing
- Cooking

3. Iron and Steel Industry

The production of iron from its ore, the conversion of iron or steel into sheet, wire or rods requires complex chemical process which results into the release of harmful substances such as large volume of highly acid ferrous sulfate or ferrous chloride.

4. Mines and Quarries

The principal waste waters associated with mines and quarries are slurries of rock particles in water. These arise from rainfall washing exposed surfaces and haul roads and also from rock washing and grading processes.

5. Nuclear Industry

The waste productions from the nuclear and radio-chemicals industries are dealt with as radioactive waste. The waste from the nuclear industry contains radioactive material. It is usually the product of a nuclear process such as nuclear fusion, though industries not directly connected to the nuclear power industry may also produce radioactive waste.

3.5 Classification of Industrial Waste

Broadly, industrial waste can be classified into the following heads:

1. Chemical waste

This type of industrial waste is generated from different factories, plants, and processing centres. Comprising of different chemicals and their residues, these need to be disposed off in a careful manner. Generally, this type of waste is governed by different environmental organisations and government groups. This helps in the proper regulation of this waste type.

2. Industrial solid waste

This waste type constitutes various types of packaging material, discarded cardboard boxes and other related things. Ideally, these materials should be going to a recycling centre as these can be recycled to make various alternate things. However, these generally reach the landfill as they get mixed with other types of industrial waste. Therefore, when the recycling centre gets the entire lot, it just rejects the items that are not recycled at their end.

3. Toxic waste

This waste type basically comprises of different types of materials that can cause death or birth defects in living beings. Apart from this, it can also contaminate the rivers, lakes, and other water bodies. Not being very different from various types of hazardous waste, these wastes should be handled with care. These waste materials are generally by-products of various types of materials generated at factories, automotive garages, and hospitals. Special care should be taken for their disposal.

SELF-ASSESSMENT EXERCISE

i. Define waste.
ii. List criteria for classifying waste.
iii. Explain industrial waste.
iv. Identify sources of industrial wastes.
v. Classify industrial waste.

4.0 CONCLUSION

Waste therefore, is something which falls out of the normal commercial circle or utility.

5.0 SUMMARY

In this unit, you have learnt:

1 Definition of waste
2 Criteria for classifying waste
3 Industrial waste
4 Sources of industrial wastes
5 Classification of industrial waste

6.0 TUTOR-MARKED ASSIGNMENT

Critically discuss negative effects of science and technology on society.

7.0 REFERENCES/FURTHER READINGS

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UNIT 2 HAZARDOUS WASTE

CONTENTS

1.0 INTRODUCTION

Being a material that can harm human health as well as the environment, hazardous waste needs to be handled with care. However, many countries in the world do not follow the basic norms of handling hazardous waste as they do not know the proper classification of it.

2.0 OBJECTIVES

At the end of this unit, you should be able to:

- classify hazardous waste
- explain waste management and identify methods of managing Waste
- list harmful effects of industrial wastes

3.0 MAIN CONTENT

3.1 Classification of Hazardous Waste

Being a material that can harm human health as well as the environment, hazardous waste needs to be handled with care. However, more than 50% of the countries in the world do not follow the basic norms of handling hazardous waste as they do not know the proper classification of it.

i) Listed hazardous wastes

This type of waste has been specifically classified by different government organisations as hazardous. Materials are added into this classification every year after collating data from non-specific and

specific sources. Strictly governed by different regulations and legislations, this waste type needs to be handled properly.

ii) Characteristic hazardous wastes

Waste materials that exhibit characteristics like corrosiveness, ignitability, toxicity, and reactivity are generally classified under this waste type. Usually, materials are tested completely before being added to this category.

There are many businesses, which generate hazardous waste. Hospitals, automobile repair shops, garages, photo processing units and many similar places are the biggest generators of hazardous waste.
Both industrial and hazardous waste can be in any form. Due to their different types of emissions, their treatment and disposal procedure also needs to be different. However, a common mistake committed by several companies and industries is mixing all kinds of waste materials. When these materials reach a recycling centre, it becomes impossible for them to process each and every waste product in them; and they usually discard the material that cannot be recycled at their end. Almost all the times, these discarded materials reach the landfills, which creates a huge problem for the surrounding area.

3.2 Waste Management Methods of Managing Waste

I) **Waste Management**

It takes a lot of valuable energy and materials to create and manufacture products and the resulting industrial waste can be difficult to manage. Many cities and countries have put new laws into place to heavily tax companies that produce excess amounts of waste or create potentially harmful effects on the air and ecosystem. The extra taxes help to offset the environment damage by going toward environmental restoration, protection and spreading information to increase knowledge on these issues. People and companies need to educate themselves about the environment. Smog alerts in many cases result from not only harmful transportation emissions but also from the output of factories into the air we breathe.

Companies need to be responsible with their industrial waste management and specifically their hazardous waste. Many local governments provide counselling, consulting and recommendations to organisations on what they can do to better manage their waste and plan for a more environmentally friendly production processes. More than ever, there need to be consequences to companies that do not take waste management seriously. Part of this includes reducing harmful emissions

into the environment over a period of time and correctly disposing of waste materials.

Countries have terms and conditions about what is acceptable in terms of waste management. Today, more than ever, industries know their impact of manufacturing on smog levels and the escalating cost of managing their waste. More industrial leaders are showing their accountability for the environment. Citizens need to support companies whose business practices include environmentally conscious and responsible conditions. Using energy more efficiently, reducing the hazardous waste they output into the air and to the landfills and practicing composting and recycling are key factors in improving the way waste is managed.

Companies which have no choice but to continue creating hazardous industrial waste due to the nature of their business need to ensure that they properly dispose of that material and are upfront an honest about the contents of their vehicles, their facilities and management of the waste. Environmental protection acts encourage and reward companies who do their part to more effectively manage waste and work with environmental agencies to maximise efforts to minimise the impact on the environment. Industrial waste producers need to pay for the disposal of their materials and in particular, need to take caution in the way they dispose of hazardous materials. There have been cases documented of companies mislabelling goods and of irresponsible practices leading to contamination of local watersheds. The more that citizens and government push for reform, the more companies will realise that they are accountable for their industrial waste.

ii) **Methods of Managing Waste**

The major methods of waste management are:

1. Recycling—the recovery of materials from products after they have been used by consumers.
2. Composting—an aerobic, biological process of degradation of biodegradable organic matter.
3. Sewage treatment—a process of treating raw sewage to produce a non-toxic liquid effluent which is discharged to rivers or sea and a semi-solid sludge, which is used as a soil amendment on land, incinerated or disposed of in land fill.
4. Incineration—a process of combustion designed to recover energy and reduce the volume of waste going to disposal.
5. Landfill—the deposition of waste in a specially designated area, which in modern sites consists of a pre-constructed ‘cell’ lined

with an impermeable layer (man-made or natural) and with controls to minimise emissions.

3.3 Harmful Effects of Industrial Wastes

1. Industrial Waste and the Incidence of Cancer

Several studies have correlated the exposure to industrial waste to the incidence of cancer. A study published in the January 2011 issue of the Italian journal, "Tumori," reviewed cases of lung cancer in the male population of Prato, Italy, located close to a sewage treatment facility. The authors used the average distance from the facility as a parameter for comparison. The study found that men living within a 1.5 km radius of the plant had a significant increase in lung cancers rates.

2. Endocrine-Disrupting Compounds

Endocrine-disrupting compounds, or EDCs, are pollutants that can mimic the functions of endogenous hormones or block their intended effects. A study appearing in the March 2011 issue of "Reproduction, Fertility and Development" investigated the effects of EDCs on human health. The researchers stated that compounds, such as dioxins, polycyclic aromatic hydrocarbons, pesticides and heavy metals, have been previously identified as EDCs that are components of industrial waste. The study found that these compounds cause reproductive problems in humans, such as reduced sperm counts, miscarriages, impaired fertility and endometriosis, in which uterine cells migrate to other parts of the pelvis and continue to grow in much the same way as cancer cells.

3. Effluent from Industrial Landfills

A May 2011 article in Environmental Research investigated the toxicity of water leaching from an industrial landfill. The researchers tested the effects of the effluent on hepatoma, or liver cancer, cells. The study found toxic effects of the effluent from the landfill on the hepatoma cells and cautioned that their results showed a potential health risk to freshwater fish and mammals. The authors concluded that the effluent generated from industrial landfills inhibited cell growth at low doses and was highly toxic at high doses.

4. Industrial Air Pollution

Emissions from industrial facilities into the air also pose a threat to human and animal health. A study published in the "Journal of Environmental Science -- China" investigated the concentrations of

pollutants released from petrochemical, ceramic and metal smelting plants in the needles of pine trees. The study found that pine needles collected near industrial plants had much higher levels of heavy metals and polycyclic hydrocarbons. The authors concluded that high concentrations of contaminants in pine needles were indicative of air pollution in these industrial sites.

SELF-ASSESSMENT EXERCISE

i. Classify hazardous waste.
ii. Explain waste management and identify methods of managing Waste.
iii. List harmful effects of industrial wastes.

4.0 CONCLUSION

Hazardous waste is waste material that can cause death, injury or birth defects to living creatures. It spreads quite easily and can contaminate lakes, rivers, and the atmosphere. The term is often used interchangeably with "toxic waste", or discarded material that can pose a long-term risk to health or environment. Hazardous wastes are poisonous by-products of manufacturing, farming, city septic systems, construction, automotive garages, laboratories, hospitals and other industries. The waste may be liquid, solid, or sludge and contain chemicals, heavy metals, radiation, dangerous pathogens, or other toxins.

5.0 SUMMARY

In this unit, you have learnt:

- Classification of hazardous waste
- Waste management and identify methods of managing Waste
- Harmful effects of industrial wastes

6.0 TUTOR-MARKED ASSIGNMENT

Write notes on "Non-Hazardous Industrial Waste."

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UNIT 3 MANAGING PROBLEMS OF INDUSTRIAL WASTE IN NIGERIA

CONTENTS

1.0 INTRODUCTION

Industrial waste, no doubt, pollutes human environment, contaminates sources of drinking water and increases the level of risk for human existence. The environment; which we live consists of the surroundings where man works and enjoys leisure. It also consists of air, soil and subsurface water, habitat for man, animals and plant which also serve as source for food, water, fuel, raw materials and breathing air. It is clear and understandable that industrial activities interact freely with human environment. However, certain industrial waste breeds harmful materials that suffocate the environment against human existence and healthy living.

2.0 OBJECTIVES

At the end of this unit, you should be able to:

- discuss how we can manage problems of industrial waste in Nigeria.
- list and discuss implications of waste on health

3.0 MAIN CONTENT

3.1 How can we Manage Problems of Industrial Waste in Nigeria?

In Nigerian Society of today which is astronomically industrialising and diversifying its economy profound changes are taking place in the environment as is now evident. Some of these changes have beneficial

effect on health, safety and socio-economic well-being of our people, whilst some other aspects have demonstrable adverse effects on health. In order to ensure that possible negative impacts of development projects are predicted and addressed prior to project take-off and are environmentally sound and sustainable, an Environmental Impact Assessment (EIA) programme was adopted in December,1992.

The Goals of the Eia

The goals of the EIA include:

1. Responsible use and exploitation of natural resources
2. Sustainable productivity of ecosystems
3. Maintenance of the carrying capacity and the absorptive capacity of air, land and water
4. Prevention of the degradation of environmental quality
5. Use of appropriate technology

Like most other developing countries, Nigeria had for a long time embraced the concept of rapid industrial growth as the vehicle for overall economic development. Since the 1960s, the various National Development plans have consistently emphasised industrialisation as the means of achieving rapid increase in the nation's productive capacity as well as improving the standards of living of the citizenry. As a result of this pursuit and with the advent of the oil industry in particular, environmental degradation has been on the increase.

The process technology of some industries often results in unacceptable levels of toxic and dangerous industrial wastes, effluents and emissions. The most common problems associated with industrial facilities are: air and water pollution, the creation of solid wastes, noise and modification of traditional land use.

Assessment of industrial projects should therefore consider:

Identifying potentially harmful effects of a particular project on the environment, health and society - Ensuring that appropriate mitigating measures are incorporated into the project, and - Preventing unnecessary depletion of domestic natural resources.

Lagos State is Nigeria's most industrialised state. Reportedly, it accounts for over 60% of the federation's total industrial investment. According to the Nigerian Industrial Directory, 1994 edition, published by the manufacturers' Association of Nigeria and the report prepared for and submitted to the Lagos State Ministry of Environment and physical planning by the World Environment System (an Industrial Data Base,

1997) over 2000 industries have been identified in Lagos State. Two things would immediately strike one concerning the large quantities of industries in Lagos State. The first is that economic activities, employment opportunities etc are high. The second is that pollution from industrial discharge/waste is high as well. Indeed, pollution has bothered conservationists for decades. It is now of sufficient intensity to concern the public. Economists have turned their attention to the causes, cost, and possible cures for pollution. On the other hand, however, economists are also concerned about economic growth and environmentalists often assert that economic growth is accompanied by pollution of the air, contamination of water supplies, and destruction of wildlife habitats.

To complicate the issue, energy, which is essential to life and to the preservation of the standard of living we most desire, has become increasingly expensive.

3.2 Implications of Waste on Health

The implications of waste on health and safety include

i) Waste Creates/increases costs

- Organising and operating costs (time, supplies, equipments, power, capital costs)
- Costs borne by the people .

ii) Waste Cause Changes

- In physical, social or emotional functioning
- In resource use (inequities in allocation of resources)
- In the quality of life of people e.g. deafness, impairment of hearing

iii Waste Cause serious public health problems -Supports the growth of large population of flies (which can transmit typhoid fever, cholera, dysentery etc.)

- Encourages the proliferation of rats
- Promotes the prolific breeding of roaches and mosquitoes
- Gives rise to noxious and offensive odours
- Gives rise to smog and air pollution
- Causes flooding when dumped on water ways
- Obstructs free flow of traffic when dumped on motorways.

iv Waste Cause health impairment/death

Through land degradation which sets in motion a chain of events that lead to declining food production and increase children's malnutrition. In some parts of the country, some 20%-40% of children under age five are reported to be below 75% of the standard weight for their age.

- Through pollution of water bodies from discharge of domestic sewage and industrial waste.
- Through air pollution linked with incidence or respiratory and pulmonary diseases.
- Destruction of wildlife.

v) Waste Assaults the senses/diminishes value

- Creation of an aesthetic blight.
- Strong objectionable odour.
- From slum/blighted housing.

vi Waste Tends to increase

- Risk of road accidents
- Risk of community health from certain industrial processes e.g. fire explosion, poisoning etc.
- Impact on existing health and safety services
- Environmental hazards and deterioration of natural resources
- Exposure to local diseases e.g. malaria.

SELF- ASSESSMENT EXERCISE

i. Discuss how we can manage problems of industrial waste in Nigeria.
ii. List and discuss implications of waste on health.

4.0 CONCLUSION

The need to manage industrial waste in Nigeria cannot be overstressed. Industrial wastes restrict human uses of the environment and its resources.

5.0 SUMMARY

In this unit, you have learnt:

- How we can manage problems of industrial waste in Nigeria.
- Implications of waste on health.

6.0 TUTOR-MARKED ASSIGNMENT

Carefully select three major cities in Nigeria identify the problems of industrial waste and management procedure.

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UNIT 4 INDUSTRIAL POLLUTION

CONTENTS

1.0 INTRODUCTION

With the coming of industrial revolution, humans were able to advance further into the 21st century. Technology developed rapidly, science became advanced and the manufacturing age came into view. With all these came an important effect, industrial pollution. Let us now consider this concept as follow:

2.0 OBJECTIVES

At the end of this unit, you should be able to:

- define industrial pollution
- state causes of industrial pollution
- list effects of industrial pollution
- discuss Industrial pollution-way out

3.0 MAIN CONTENT

3.1 What is Industrial Pollution?

Industrial pollution is the contamination of the environment by businesses, particularly plants and factories that dump waste products into the air and water. Industrial pollution is pollution which can be directly linked with industry, in contrast to other pollution sources. This form of pollution is one of the leading causes of pollution worldwide; in the United States, for example, the Environmental Protective Agency estimates that up to 50% of the nation's pollution is caused by industry. Because of its size and scope, industrial pollution is a serious problem for the entire planet, especially in nations which are rapidly

industrialising (like China). Many dangerous pollutants, by-products of manufacturing, enter the air and water, risking health and lives. Common pollutants include carbon monoxide, formaldehyde, mercury and lead.

3.2 Causes of Industrial Pollution

i) Lack of policies to control pollution.
ii) Unplanned industrial growth.
iii) Use of outdated technologies.
iv) Presence of large number of small scale industries.
v) Inefficient waste disposal.

3.3 Effects of Industrial Pollution

Pollutants given off by various industries and factories are often considered to be one of the prime factors contributing to air, water and soil pollution. According to the Environmental Protection Agency (EPA), it has been estimated that industrial pollution is responsible for almost 50 percent of the pollution present in the United States. There are various wide-ranging effects, as well as serious consequences, of industrial pollution on the ecological balance of the atmosphere. Industrial pollution hurts the environment in a range of ways, and it has a negative impact on human lives and health.

The following are some of the effects of industrial pollution.

1. Killing of animals and plants.
2. Imbalance ecosystems.
3. Degrading air quality radically.
4. Damaging buildings and
5. Generally degrading quality of life.
6. Increasing the risk of various occupational hazards such as asbestosis, pneumoconiosis, among others.
7. Global Warming. The emission of various greenhouse gases such as CO2, methane (CH4), among others from various industries, increases the overall temperature of the earth, resulting in global warming.

3.4 Industrial Pollution-Way Out

1. Toxic metals should have a restriction on maximum environmental release based on relative toxicity levels and accumulation rates in ecosystems. If it is inevitable that heavy metals will be released in waste, treatment is necessary before the waste is being released into the environment. Then, biological

processing with the appropriate microbes should be used to reduce toxicity of very reactive ions (Hg, Cd, Mn).

2. Toxic organic compound emissions that are not pesticide applications should be reduced by setting a fixed standard of emissions and ecotoxicity in a cap-and-trade system which can gradually be lowered. Ideally, this would eventually lead to zero emissions, as most organic compounds can be degraded by microbes and thus treated effectively. If compounds are found to be excessively toxic, a blanket ban should be introduced.
3. Agrochemicals should be subject to a taxation system in which the ecotoxicity of the compound determines the levy. However, some dangerous pesticides such as atrazine should be incorporated in a cap-and-trade system of dangerous agrochemicals that would gradually be lowered to allow time for transition to less dangerous chemicals. Again, excessively toxic compounds will need to be removed from the market by a blanket ban.
4. Strongly polluted sites should be cleaned up through programmes such as the U.S. Superfund, though bioremediation and in-site cleanup should be the preferential treatment options.
5. Physical and chemical reductions to bioavailability will need to be secured additionally, preferably by an irreversible degradation, so that pollutants cannot be released again.
6. Once a site has been detoxified, appropriate measures should be taken to ensure that all important positions of the biome can be fulfilled.

SELF-ASSESSMENT EXERCISE

i. Define industrial pollution
ii. State causes of industrial pollution
iii. List effects of industrial pollution
iv. Discuss Industrial pollution-way out

4.0 CONCLUSION

Any form of pollution that can trace its immediate source to industrial practices is known as industrial pollution.

5.0 SUMMARY

In this unit, you have learnt:

- Definition of industrial pollution
- Causes of industrial pollution

- Effects of industrial pollution
- Industrial pollution-way out

6.0 TUTOR-MARKED ASSIGNMENT

Discuss industrial pollution control in Nigeria.

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MODULE 5 FIELD TRIP

UNIT 1 CONCEPT OF FIELD TRIP

CONTENTS

1.0 INTRODUCTION

Field trips are recognised as important moments in learning; a shared social experience that provides the opportunity for students to encounter and explore novel things in an authentic setting. This is all what you are learning in this unit.

2.0 OBJECTIVES

At the end of this unit, you should be able to:

- define field trip
- list factors to consider for trip selection
- discuss logistic planning for the trip
- highlight instructors' roles in preparing students before the trip
- mention instructors' roles in motivating students for the trip

3.0 MAIN CONTENT

3.1 What is Field Trip?

- a group excursion for the purpose of firsthand observation
- a school trip to gain firsthand knowledge away from the classroom
- an excursion by staff and students to study at first hand somethig of interest or relevance to a course.

3.2 Factors to Consider for Trip Selection

Identify the rationale, objectives and plan of evaluation for the field trip. Select the site to be visited. Contact the educational coordinator for the site and arrange the date and time. Obtain the pre-trip information package if one is available. Record addresses, directions, contact persons, phone numbers, email addresses, etc.

Conduct a pre-visit to familiarise yourself with the major features of the field trip. Purchase postcards and posters. Take digital photographs to share with students prior to the visit. Explore the exhibition(s) you plan to visit to get ideas for pre-field trip activities.

3.3 Logistic Planning for the Trip

Apply for administrative approval from departmental chairperson, curriculum administrator, or building principal
File requisition for bus transportation reservation
Make arrangements for meal or sack lunch if needed
Develop schedule for the day
Arrange for special equipment -supplies, film, video camera, digital camera
Prepare name tags for students and chaperones
Collect money for admission fees
Compose parent permission letter including

- Date and location of field trip and transportation arrangements
- Educational purpose of field trip
- Provision for special needs students
- Cost
- Clothing for the trip
- Lunch arrangements
- Money needed
- Trip schedule

- Whether a child will need prescribed medication administered
- Parent signature

Send a letter to parents or include in the class newsletter a request for help as chaperones, communicate assigned duties/responsibilities, review field trip objectives, and list activities and schedule.
Provide alternative arrangements for pupils who will not be going on the trip.

Inform the cafeteria staff if students will be away during the lunch hour.
Submit a list of students who will be attending the field trip to other teachers if their schedules will be affected.

Collect the money for the trip and deposit it in your school's account. If required, send the advanced fee to the field trip site.
Create a list of all student names and home phone numbers for use in an emergency.

3.4 Instructors' Role in Preparing Students before the Trip

Discuss the purpose of the field trip and how it relates to the current unit of study.

Introduce visual observation skills. Let students describe in detail ordinary objects, like a paper clip, paintbrush, clothespin, or comb to their classmates.

Introduce vocabulary words that will be used by docents during the tour.
Show photographs or posters of the field trip site or related to exhibits that will be viewed.

Assign students "specialists" roles in one aspect of the topic that they will be studying during the field trip. Students could be grouped in different subject areas related to the field trip topic to research (e.g., history, art, religion, science, environment, etc).

Explore the Website of the location you will be visiting.

As a class brainstorm a set of standards of conduct for the trip and discuss suggested spending money, lunch plans, appropriate clothing to wear for the trip including gear for rainy weather.

Discuss with students how to ask good questions and brainstorm a list of open-ended observation questions to gather information during the visit. Record questions on chart paper or in student field trip journals.

3.5 Instructors' Role in Motivating Students for the Trip

This phase of any field trip is perhaps the most demanding and time consuming, but is crucial to the success of the experience for everyone. Research has shown that students given pre-trip instruction learn and retain more from a field trip than those who receive no preparation.[1] The following suggestions will make a difference in your next field trip:

1. Introduce the trip as a part of a lesson

LEARN NC offers lesson plans that have been designed around a visit to a museum or to the zoo. While you may not find a lesson that exactly suits your needs, the examples in the sidebar will at least give you ideas about how to integrate your trip into the curriculum.

2. Stimulate students' interest for the trip

Use artifacts from previous trips to this site such as photos, brochures, or videos. Consider inviting students who previously participated on this field trip as guest speakers to talk about their experience. This is especially useful for overnight trips to distant places, where students will want to know what to expect.

3. Discuss your expectations for learning and behaviour

Students may have certain expectations of your trip based on previous trips taken with other teachers or organisations. Prepare them mentally for the experience by reviewing a *schedule of activities or itinerary*. Explain what and how they will learn and what tools they will use. Don't assume that students possess the observation and exploration skills necessary to conduct the activities you or someone else has designed. Campsilos.org suggests having students practice these skills in the classroom by describing common objects to one another, such as a clothespin, a paper clip, or a paintbrush. If the result of the field trip is a product such as a multimedia presentation, report, or dramatisation, considers giving students a rubric before the trip to guide their exploration. And remind students of the consequences of inappropriate behaviour during the trip.

4. Prepare students with a twenty-four hour "staging period"

Remind students to get a good night's rest and to eat a nutritious breakfast prior to departure. Ask students to mentally prepare themselves for the experience by thinking about how their behaviour at school might not be appropriate in public spaces like museums or historic sites. Remind them to dress appropriately, which mean taking into consideration the weather and the venue. Like behaviour, clothing that passes the school's dress code may not be appropriate in another location.

5. Develop a schedule of activities or itinerary

Review this with students and ask them to agree to follow this schedule. You can ask them to sign the itinerary as they would a learning contract.

6. Create a packing checklist for overnight travel

For overnight travel, create a packing checklist for boys and one for girls. Most students tend to over pack, which can be disastrous if you are travelling long distances. If students are paired to share rooms, encourage them to decide who will bring electric appliances that can be shared. (If you're planning a trip abroad, the American Council for International Studies Website provides advice for teachers and their students.)

SELF- ASSESSMENT EXERCISE

i. Define field trip
ii. List factors to consider for trip selection
iii. Discuss logistic planning for the trip
iv. Highlight instructors' roles in preparing students before the trip
v. Mention instructors' roles in motivating students for the trip

4.0 CONCLUSION

Field trips are most often done in 3 steps:

- Preparation
- Activities and
- Follow-up activity.

Preparation applies to both the student and the teacher. Teachers often take the time to learn about the destination and the subject before the trip. Activities that happen on the field trips often include: lectures, tours, worksheets, videos and demonstrations. Follow-up activities are

generally discussions that occur in the classroom once the field trip is completed.

5.0 SUMMARY

You have learnt the definition of field trip, factors to consider for trip selection of field trip, logistic planning for the trip, instructors' roles in preparing students before the trip and instructors' roles in motivating students for the trip.

6.0 TUTOR-MARKED ASSIGNMENT

Outline the disadvantages of field trip.

7.0 REFERENCES/FURTHER READING

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UNIT 2 REQUIRED MATERIALS FOR SUCCESSFUL FIELD TRIP

CONTENTS

1.0 INTRODUCTION

Field trip is a visit made by students to study something away from their school or college. It will require materials from both the instructors and the students. There are activities taking place during field trip. In addition, there are post activities. What are the benefits of field trip? These and more you will learn in this unit.

2.0 OBJECTIVES

At the end of this unit, you should be able to:

- suggest materials needed by the students for the trip
- identify materials needed by the instructors
- list steps in conducting the trip
- highlight activities that will occur during the field trip
- discuss post-field trip activities
- evaluate the trip
- state importance / benefits of field trip.

3.0 MAIN CONTENT

3.1 Suggested Materials Needed by the Students

1 Hard surface like a clipboard for note-taking or sketching
2 Container (zip-lock bag, grocery bag, etc.) for collecting artefacts
3 Recording device like pens, pencils, crayons, markers, and paper; handheld devices; laptops; cameras, video cameras or digital cameras; and a tape recorder. (For tips on how to best capture the experience through images or video, see The Elements of Digital Storytelling)
4 Students might bring some money for purchasing memorabilia to use in class presentations. You might encourage students to purchase postcards which can better capture sites of interest and allow students to focus their attention to the site itself. Carefully monitor students in museum gift shops and stores since some students may spend too much time shopping rather than exploring!
5 For young students and overnight trips, equip students with a small note card containing the lodging contact information and/or cell phone number of lead teacher/chaperone.

3.2 Materials Needed by the Instructors

i) Container for class supplies, a first-aid kit, and a container to protect student prescribed medications. For foreign travel, make sure students bring a note from their doctor or pharmacist to accompany prescribed medicines to facilitate passage through customs. For any travel, prescription medicines should be transported in their original container.

ii) A “Hot File” — a plastic, sealable file or large manila envelope to transport the following important documents:

1. Emergency contact information for your school and school system.
2. List of students who must take medication during the trip.
3. For travel out of state or foreign travel, copies of insurance documents.
4. Checklist of all students and chaperones in attendance.
5. Extra cash for emergency situations.
6. Contact information of site contact(s), i.e., name, phone number, role, and office location on site.
7. Trip itinerary.

iii) Cell phone for emergency calls and wrong turns.
iv) Student identifiers. To easily spot your students in a crowded space, think about how you will identify them with a quick glance. One teacher suggests creating tie-dye T-shirts with young students prior to the trip that they will wear on that day.[2]

3.3 Conducting the Trip

On the day of the trip:

- Pass out name tags
- Divide class into small groups and assign chaperones to groups
- Assign each student a partner
- Place a class list and student emergency forms in a folder
- Secure a cell phone if possible
- Take along an emergency kit
- Take inventory of food, specific equipment, and other supplies pertinent to the particular field trip

3.4 Activities that will occur during the Field Trip

Plan activities that allow students to work alone, in pairs or small groups. Activities might include:

- Adventure game "Journey to the World of..."
- Mystery with clues provided
- Sketch pages with partial drawings of objects found in the exhibits for students to complete the drawings based on their observations
- Peepholes in construction paper - cut different sized round holes in construction paper and have students view a part of the exhibition through the peepholes. Ask them to describe what they see, what they notice now that they missed before, and how their perspective changes with each new view
- Field notebooks for recording answers to prepared questions based on clues
- Hand drawn postcards to write near the end of the tour that will summarise the field trip visit .
  Provide time for students to observe, ask questions, and record key words, ideas and phrases as journal entries in their Field book after viewing each exhibit.
  Ask follow-up questions as students make observations and listen to presentations.
- How are these two objects different from one another?
- What clues does this artefact provide about…
- In what ways do these two objects relate to one another?

- If you could change one thing in this exhibit, what would it be?
- Pretend you are an archaeologist in the future who is observing this object. What would you be able to conclude about the culture of the past?
- Expand the title or name of this object into a detailed caption (sentence or paragraph) in your Field book.
- Describe the setting in which you might have found this object.
- Which object will be of greatest value in a hundred years? Why?
- List the objects in the exhibit order of the story they tell or usefulness.
- Which object took the most time and effort to produce?
- Pretend you are a character in this exhibit. Tell us as much as you can about your life.
- What does this object tell us about the person's attitude toward...? Schedule a particular segment of the field trip for a scavenger hunt where students look for particular objects and record them in their Field book or on an observation sheet.

Provide time for students to work in their Field Book writing questions, describing favourite displays or making sketches of artefacts, structures, scenery, etc. If they cannot complete their sketches, encourage them to label them for future completion as to colour, detail, etc.

Provide time for students to use (tape recorder, camcorder, and digital camera) for recording important resources viewed/heard.

Polling Activity: Blue Ribbon - Your Choice
After careful observation of an exhibit, ask students to discuss an exhibit and vote on an artefact, artwork that they consider to be the most valuable part of the exhibit they viewed. Then ask students to record one sentence in their Field book describing why they felt the object was of key importance.

3.5 Post-Field Trip Activities

Just as quality pre-planning is essential to the success of a field trip, planning for appropriate follow-up activities will facilitate student learning and multiply the value of hands-on experiences outside the classroom. The following activities provide a general guide when planning for post-field trip classroom experiences.

- Provide time for students to share general observations and reactions to field trip experiences
- Share specific assignments students completed while on the field trip.

- Create a classroom bulletin board displaying materials developed or collected while on the field trip.
- Develop a classroom museum that replicates and extends displays students observed on the field trip. For example, if the field trip involved an art museum, develop a classroom art museum containing student artwork.
- Link field trip activities to multiple curricular areas. For example, students can develop vocabulary lists based on field trip observations; record field trip observations in a classroom journal; complete math problems related to actual field trip budget planning; etc.
- Share and evaluate student assignments/activities from the Field Book.
- Have the class compose and send thank-you letters to the field trip site host, chaperones, school administrators and other persons that supported the field trip. Include favourite objects or special information learned during the field trip.
- Create a short news report about what happened on the field trip. Publicise the trip via an article in your local newspaper, school bulletin board, trip presentation for parent's night, or class Web page.

3.6 Evaluating the Trip

Complete a "Teacher Journal" regarding the field trip. This will provide a good reference for future field trips.

- What was of unique educational value in this field trip?
- Did the students meet the objectives/expectations?
- Was there adequate time?
- Was there adequate staff and adult supervision?
- What might be done differently to make this an even better experience in the future?
- What special points should be emphasised next time?
- What special problems should be addressed in the future?
- What would improve a visit to this site in the future?

Share the evaluation with the students, volunteers, hosts from the field trip site, and school administrators.

3.7 Importance / Benefits of Field Trip

1. Practical experience-real world knowledge about life.
2. Real examples of information discussed in the classroom.
3. Opportunities for sharing different perspectives and views on important topics.

4. Interactions from which one can discover one's strengths, limitations, abilities and skills.
5. Integration of concepts and information from various disciplines.
6. Personal exposure to people and other places and cultures.
7. Increased knowledge and broadened understanding of the world and its workings.
8. Professional experiences required by many related jobs.
9. Formation of instant learning communities.
10. First-hand observations of human interactions with the environment.
11. Places to learn and practice professional sampling and field collecting illustrations of real world complexities.
12. Application of theoretical or classroom knowledge to real situations.
13. A chance to put one's life into a realistic perspective.
14. Learn to live and work with others, supporting each other during group learning activities.
15. Time to appreciate the beauty of the world in which we are involved, etc.

SELF-ASSESSMENT EXERCISE

i. Suggest Materials needed by the students for the trip
ii. Identify materials needed by the instructors
iii. List steps in conducting the trip
iv. Highlight activities that will occur during the field trip
v. Discuss post-field trip activities
vi. Evaluate the trip
vii. State importance / benefits of field trip

4.0 CONCLUSION

Field trips expand children's learning through active hands-on experience with the rich resources of the local community. Field trips increase student knowledge and understanding of a subject and add realism to the topic of study. Good planning must precede field trips. Careful attention should be given to trip selection, pre-visit preparation, the trip itself, appropriate follow up, and evaluation.

5.0 SUMMARY

In this unit, you have learnt:

- Suggested materials needed by the students
- Materials needed by the instructors
- Conducting the trip

- Activities that will occur during the field trip
- Post-field trip activities
- Evaluating the trip
- Importance/benefits of field trip

6.0 TUTOR-MARKED ASSIGNMENT

Your tutor will organise for field trip to selected industry/industries. This is compulsory for all students. You will prepare a printed copy of the report and get it submitted to your tutor.

7.0 REFERENCES/FURTHER READING

Behrendt, M. & Franklin, T. (2014). "A Review of Research on School Field Trips and Their Value in Education". International Journal of Environmental & Science Education 9, 235-245. Doi: 10.12973/ijese.2014.213a.

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