AGRO-ALLIED INDUSTRIES AND THEIR IMPACT ON THE ENVIRONMENT

(A CASE STUDY OF MINNA).

POST GRADUATE DILOPMA IN ENVIROMENTAL MANAGEMENT.

BY

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TABLE OF CONTENT

CONTENT **PAGE**

TITLE ----------i

CERTIFICATION ----------ii

DEDICATION ----------iii

ACKNOWLEDGEMENT ----------iv

LIST OF MAPS ----------v

LIST OF PLATES ----------vi

CHAPTER ONE

1.0 INTRODUCTION:.....2

1.1 HISTORICAL ENVIRONMENT OF INDUSTRY ----------2

1.2 INDUSTRIAL PROGRESS IN NIGERIA ----------4

1.3 MAJOR CONSTRANTS IN INDUSTRIAL DEVELOPMENT IN NIGERIA ----------5

1.4 PREVIEW OF AGRO-ALLIED INDUSTRY ----------6

1.5 STATEMENT OF PROBLES ----------6

1.6 AIMS AND OBJECTIVES ----------7

1.7 SCOPE OF THE STUDY AREA ----------8

1.8 STRUCTURE OF THE PROJECT (THESIS) ----------8

CHAPTER TWO

2.0 GEOLOGICAL OR PHYSICAL NATURE OF THE AREA ----------11

2.1 CLIMATE OF THE STUDY AREA ----------11

2.2 TEMPERATURE ----------12

2.3 RAINFALL ----------13

2.4 RELATIVE HUMIDITY ----------13

2.5 EVAPORATION ----------14

2.6 LAND USE OF THE STUDY AREA ----------16

CHAPTER THREE

3.0 LITERATURE REVIEW ----------17

CHAPTER FOUR

4.0 DATA COLLECTION ----------18

4.1 DATA ANALYSIS ----------18

CHAPTER FIVE

5.0 DISCUSION OF RESULT ----------19

5.1 YEAR OF ESTABLISHMENT ----------19

CHAPTER SIX

RECOMMENDATION AND CONCLUSION

6.0 LOCATION OF AGRO-ALLIED INDUTRIES ----------37

6.1 SPACE REQUIREMENTS ----------37

6.2 RECREATIONAL FACILITIES ----------38

6.3 REFUSE DISPOSAL ----------38

6.4 PARKING ----------38

6.5 LOADING AND OFF-LOADING ----------39

6.6 COMMON FACILITIES ----------39

6.7 LANDSCAPING AND AESTHETIC----------39

6.8 GROUPING OF INDUSTRIAL ESTABLISHME----------39

6.9 CIRCULATION ----------40

6.1.0 SOURCE OF POWER SUPPLY ----------40

6.1.1 MANAGEMENT AND FINANCING----------41

6.1.2 FINANCIAL MECHANISM ----------41

6.1.3 LEGAL MECHANISM ----------42

6.1.4 IMPLEMETATION AGENCIES ----------42

6.1.5 PUBLIC PARTICIPATION ----------42

6.1.6 ADMINISTRATION ----------43

6.1.7 IMPLEMENTATION STRATEGY ----------43

6.1.8 CONCLUSION ---------- 44

REFERENCE ----------45

APPENDIX----------46

5.2 INDUSTRIAL EST. BY PRODUCT MANUFACTURED, CURRENT OUTPUT AND MARKET FOR FINISHED GOODS ----------20

5.3 INDUSTRIAL LAND AREA ----------22

5.4 INDUSTRIAL EMPLOMENT ----------22

5.5 CLASSIFICATION OF INDUSTRY ----------23

5.6 RANKING OF INDUSTRIES ----------24

5.7 DISTANCE FROM TO INDUSTRIES ----------26

5.8 MODE OF TRANPORT FOR WORKERS ----------27

5.9 INDUSTRIAL WASTE ----------27

5.1.0 FIRE FIGHTING EQUIPMENT ----------29

5.1.1 TELEPHONE SERVICES ----------30

5.1.2 STORAGE FACILITIES FOR FINISHED PRODUCTS ----------31

5.1.3 FACILITIES IN THE INDUSTRY ----------31

5.1.4 PARKING FACILITIES ----------32

5.1.5 FINANCIAL SUPPORT ----------33

5.1.6 INDUSTRIAL INFRASTRUCTURES ----------33

5.1.7 INDUSTRIAL POLLUTION ----------34

DEDICATION

This project work is dedicated to my parent and my family as a whole.

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My special thanks are due to my entire classmate who helped me in the collection and collation of the data used in this report. I am indebted to my family who gave me the necessary assistance and support required.

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LIST OF MAPS

(1) MAP OF NIGERIA SHOWING NIGER STATE:..... 1

(2) MAP OF NIGER STATE SHOWING THE STUDY AREA..... 10

(3) LAND USE MAP SHOWING AGRO-ALLIED INDUSTRIES..... 17

LIST OF PLATES

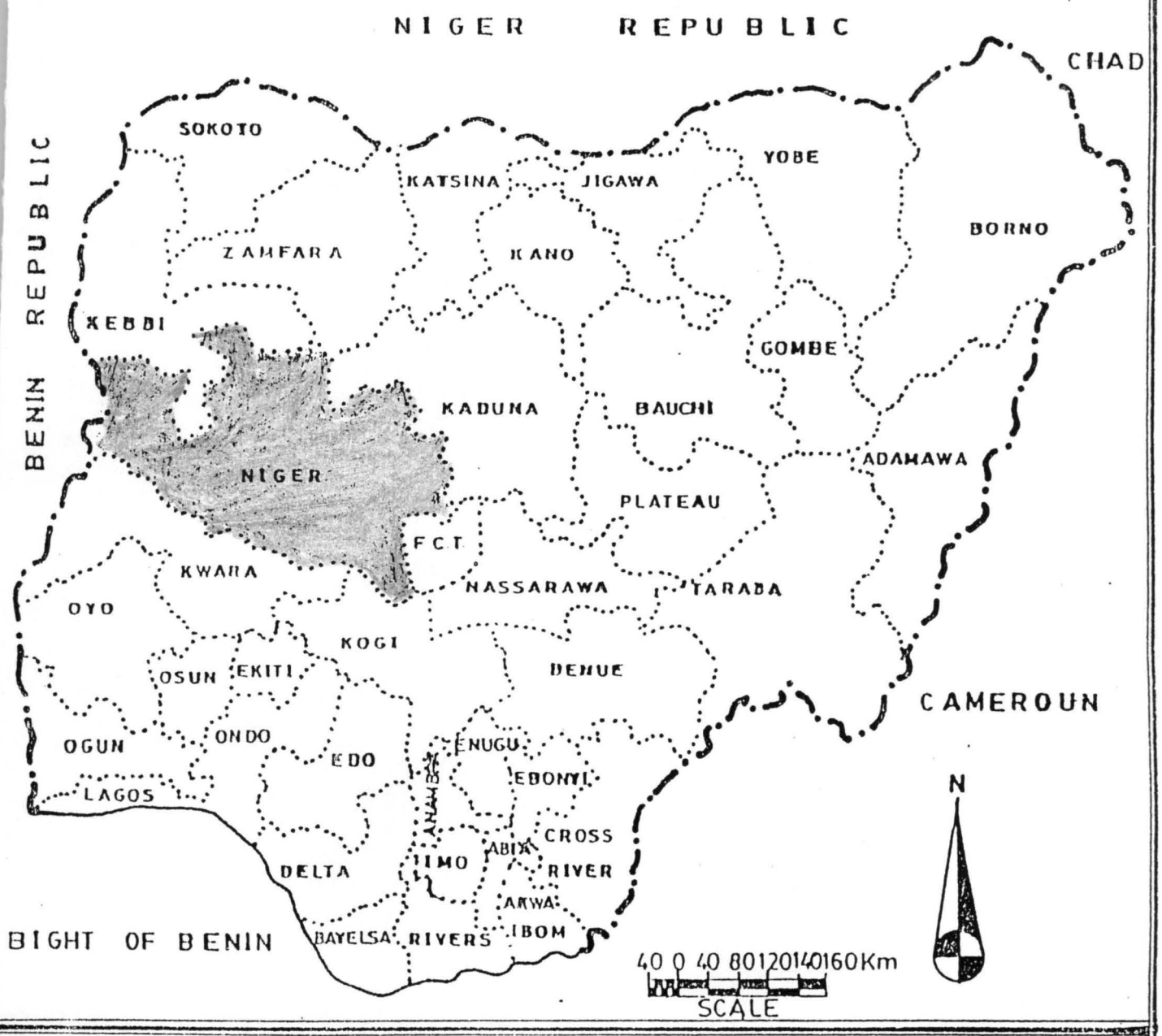
(1) PLATE 1 RICE MILL HUSK DUMPED IN THE ENVIRONMENT…28

(2) PLATE 2 SAW DUST DUMP……28

(3) PLATE 3 AIR POLLUTION PRODUCED BY BURNING OF SAW DUST……..35

(4) PLATE 4 POLLUTION PRODUCED BY BURNING OF RICE HUSK……35

MAP OF NIGERIA SHOWING NIGER STATE (THE STUDY AREA)



LEGEND

National Boundaries . . . . . —·—·—

State Boundaries . . . . . ·····

Study Area . . . . . ▬

CHAPTER ONE

1.0 INTRODUCTION:

Although the present share of industries in Minna is very small, industrial development in modern since is gradually gaining momentum.

Minna being the state capital of Niger State occupies a strategic position in the region, and location of industries create serious problems in the town.

Environmental effect caused by some industries like manufacturing industries (e.g Bakery, Rice Mills, Beverages i.e (SOBO) etc) has brought about serious problems. Drains in the town were dirty and with bad odour. Dumping of polythene bags, charcoals/ashes is an eyesore, thereby polluting the nearby residential areas.

The Existing of Industries in Minna do not conform with sub-division regulation. One could not specifically identify an area which are completely devoted to industrial activities e.g (Bakery, corn mills, Tailoring etc) and thereby missing with residential.

However there was no clear demarcation between these two uses. This situation does not create conducive atmosphere for the residents as pollution and odour from industries greatly affect the residential areas.

1.1 HISTORICAL DEVELOPMENT OF INDUSTRY

One cannot successfully review how industry came into existence without reference to the industrial revolution. The revolution could be defined as the radical changes in methods of production, economic and social organization resulting from the introduction of power driver machinery and the consequent rise of the factory system. Most industrial activities before the revolution was confined to families working in their homes. Workers owned their raw materials, their tools and building in which they toiled. The development of expensive and complicated machinery, the use of water and steam power and demand for cheap mass-produced commodities brought the creation of factories where hundreds of workers could be employed. Only a man with considerable capital could own and operate a factory.

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devoted to industrial activities e.g (Bakery, corn Mills, Tailoring etc) and thereby mixing with residential.

However there was no clear demarcation between these two uses. This situation does not create conducive atmosphere for the residential as pollution and odour from industries greatly affect the residential areas.

Infrastractural constraint - Inadequate infrastructure increase both the initials and operational costs of project thereby compromising the commercial feasibility of economically desirable projects.

1.2 INDUSTRIAL PROGRESS IN NIGERIA

Although the present share of industry in Nigeria's economy is small, industrial development in the modern sense and on factory scale is rapidly gaining momentum. In 1948, manufacturing industries were estimated to have contributed 4.0% to the gross domestic product (GDP) of the country. By 1970, this has risen to about 9.0%.

A survey of manufacturing establishments, each employing 10 or more persons in the year 1971, revealed that there were 870 industrial undertakings, employing 145,445 persons, with a gross output of 954, 16 million.

Since then the term industrialization has further increased. It could safely be assumed that an estimated 10% of the gross domestic product is at present derived from manufacturing industries.

1.3 MAJOR CONSTRAINTS IN INDUSTRIAL DEVELOPMENT IN NIGERIA

The major constraints which have hampered development in the manufacturing sectors include:-

Infrastructural constraints:- Inadequate infrastructure increases both the initial and operational cost of projects thereby composing the commercial feasibility of economically desirable projects. Both the availability and cost of water communication facilities, electricity, transport especially railway, post facilities etc pose serious problems to manufacturing enterprises.

Restrictive Industrial Policy and administrative bottlenecks have frustrated a number of worthy projects, in particular the multiplicity of authorities from when various parents, have to be assembled and the lack of stream lined procedure for getting them combined to convince the intending entrepreneur and to create the possibility of a use. Lack, of clarity on government policy on the payment of royalties, license fees, technical and managerial fess etc. have added to difficulties associated with industrial establishment.

Shortage of industrial manpower and the relative unattractiveness of manufacturing to indigenous businessmen. In a country growing as rapidly as Nigeria, trading activities normally represent the quickest means of increasing income where as manufacturing projects usually have long gestation periods.

Slow implementation of the public sector, manufacturing programmes are generally in these areas which represent the foundation for the growth of the sector s a whole. Delay in implementing the public sector programme therefore often leads to delays in the implementation of other projects.

Both the availability and cost of water, communication facilities, electricity, transport etc pose a serious problems to manufacturing enterprises. Unnecessary restrictive and administrative bottlenecks have frustrated a number of worthy projects in Minna, in particular the multiplicity of authorities from whom various parents, licenses etc, have to be assembled and lack of streamlined procedure for getting them combined to confuse the intending entrepreneur and to create the possibility of abuse. Lack of clarity on government policy on the payment of royalties, license fees, technical and managerial fees etc have added to difficulties associated with industrial establishment in Minna.

1.4 PREVIEW OF AGRO – ALLIED INDUSTRY

Agro-Allied industry is the agglomeration of Agricultural base industries, for manufacturing and processing of goods e.g (Food, beverages, Bakery, Rice/corn Mills, Tailoring etc).

From the surveys conducted on Agro-Allied industrial undertaken in Minna and its environs. Manufacturing and processing industries were located on inadequate uneven and cut-up parcels of land, in a hazard manner.

1.5 STATEMENT OF PROBLEMS

A critical analysis of physical structure of industrial location in Nigeria shows how indiscriminately they are located in a haphazard manner. In the absence or non-compliance of comprehensive master plan and detailed physical plans for areas earmarked for industries, a number of problems have arisen.

Factories are often mixed-up with residence and shops, e.g (Bakery, Corn Mill, Rice Mills, Saw Mills etc), essential infrastructure are inadequate or lacking e.g (good roads, power supply, water etc). Nuisance and hazards due to smoke, dust, noise, heat, vibration, toxic affluent etc tend to pose a serious threat to the health and well-being of the community.

Consequently, slums and shantytowns have sprung-up in the vicinity of the industrial location and the environment at large, due to lack of comprehensive and integrated planning.

Lack of utilization of raw materials and other resources leading to unemployment. This study is structured so as to provide solution to some of these problems.

1.6 AIM AND OBJECTIVE

The aim of the study is to make a comprehensive study of the existing Agro-Allied industries with a view to find the impact of their location on the environment within this broad aim, the specific objectives are:

* Find out the requirement of present agro-allied industries in the study area

- To examine socio-economic, political, physical and environmental factors which affect agro-allied industrial development.
- To make suggestions an environment conducive, to acceptable standards of health, efficiency, safety of economy in the agro-allied industrial locations and its environs.

And to suggest ways to creating employment opportunity and control rural – urban migration by locating agro-allied industries to the rural settlement

1.7 SCOPE OF THE STUDY

The study will be limited to a comprehensive study of agro-allied industrial environment in Minna, the capital of Niger State, with a view to understand their nature and structure, highlight their location, distribution and physical characteristic.

1.8 STRUCTURE OF THE PROJECT (THESIS)

Agro-allied industry is the agglomeration of agricultural base industries for both manufacturing and processing of goods, (e.g Food Beverages, Bakery, Corn/Rice Mills, Fish/meat processing etc).

This project is divided into six chapters, the fist chapter highlight, Also in chapter one are preview of agro-allied industry, statement of problems, aims

and objectives. The scope and structure of the project are also contained in chapter one.

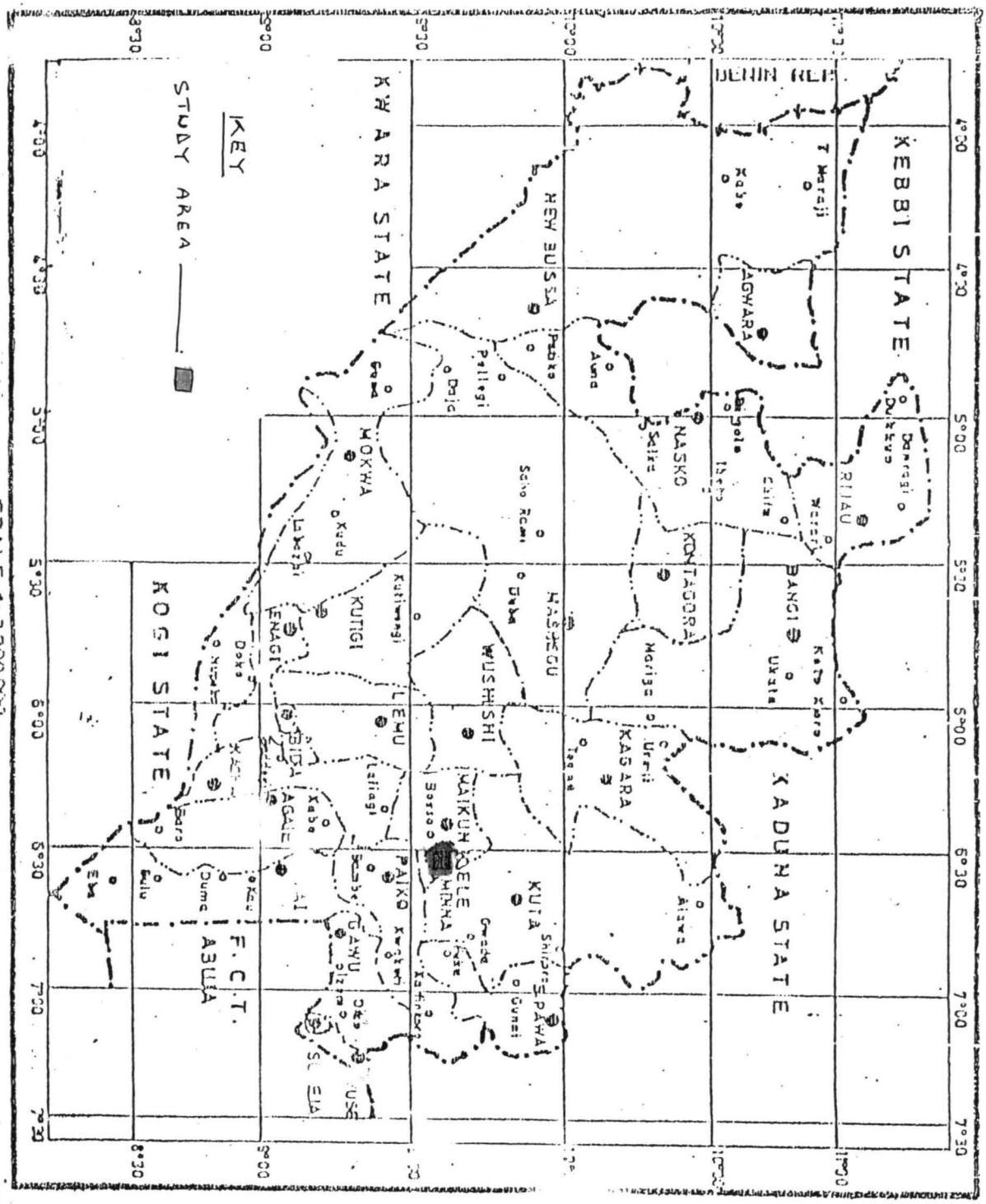
Chapter two gives a comprehensive study of the study area. Chapter two discusses the geological formation, the climate and land use pattern of the study area.

A comprehensive review of relevant literature is carried out in chapter three. This review is done in sections.

The method of data collection, data analysis and computational schemes are contained in chapter four.

Chapter five deals with discussion of results. The summary of the study, findings conclusions and recommendations are contained in the last chapter i.e chapter six

MAP OF NIGER STATE SHOWING THE STUDY AREA



CHAPTER TWO

2.0 GEOLOGICAL OR PHYSICAL NATURE OF THE AREA

Minna being surrounded with hills, to the north and east, steeply sloping rock outcrops form the physical constraint on the east side, a major drainage valley flows from the center of the town south – west wards with many minor drainage channels feeding into it with storm water run-off from the hills to the east. In places these streams from large areas of flood land. There are large but isolated rock and crops in this landscape and also some areas of scattered rock. In other words land beyond the presently developed strip is suitable for development but needs careful planning to kept engineering cost of culventing, bridges, embankments and drainage works.

To the North, over the hills, there is some developable land but intermingled with poor land.

To the South the land offers reasonable development possibilities but is curtailed by the Chanchanga River.

2.1 CLIMATE OF THE STUDY AREA

Minna is the capital of Niger State and it lies at latitude $9^{0}37^{1}$ north of longitude $6^{0}33^{1}$ east on a basement complex rocks. It is located at the hinterland of Nigeria between the tropical continental North and the Sub-equatorial South climate regions. If therefore falls under the tropical continental wet and dry (AW) climate region based on the Koppen classification scheme. That is, it has a distinct cool dry season and a hot we season every year. This however has a great influence on it's weather and climate conditions.

The following tables – 1 – 4 gives a summary of the temperature, rainfall, evaporation and Relative Humidity of Minna for the periods 1996, 1997 and 1998 for the analysis of it's weather condition.

2.2 TEMPERATURE

TABLE 1: THE MEAN MONTHLY TEMPERATURE OF MINNA 1996 – 1998

FIGURES IN (^{0}C)	MONTHS												
YEARS	J	F	M	A	M	J	J	A	S	O	N	D	MEAN
1996	27,7	30.3	31.6	31.3	28.1	26.0	25.3	24,7	25.5	25.9	23.3	26.7	27.4
1997	28.2	28.4	31.0	29.8	27.5	26.6	25.8	21.3	26.2	26.8	27.2	26.9	27.1
1998	27.4	31.2	32.3	32.4	29.0	27.1	26.1	25.4	26.0	27.0	27.8	28,0	28.3

TABLE1 above shows that temperature of Minna varies with months and years. Temperature is relatively higher generally in the area but the highest figures occur between February to May just before the on-set of the rain or wet season.

The lowest temperatures occur in August due to the moderating effect of rainfall which is at it's peak in this month. Annual range is between 6^0c to 7^0c.

2.3 RAINFALL

TABLE 2: THE MONTHLY RAINFALL TOTAL FOR 1996 – 1998
Figures in (mm)

MONTHS

YEARS	J	F	M	A	M	J	A	S	O	N	D	TOTAL
1996	0	0	0	48.6	164.7	225.0	257.0	191.1	127.9	0	0	1274.0
1997	0	0	0	3.6	80.6	233.0	172.4	192.7	203.3	115.0	0	1245.1
1998	0	0	0	82,5	121.0	155.1	243.0	201.9	212.6	0	0	1237.3

Table 2 above shows that the rainfall received is seasonal with the amount of varying with months in the year. Generally rain begins in April and the highest amount occurs from June to September with August as the peak. Rain normally stops in November. The length of rain season varies from 7 month in 1996 and 1998 to 8 months in 1997. the winter or dry season commences as from November to March, with no amount of rain fall received over the period under study.

2.4 RELATIVE HUMIDITY

TABLE 3: THE MEAN RELATIVE HUMIDITY (Figures in) (%)

MONTHS

YEARS	J	F	M	A	M	J	J	A	S	O	N	D
1996	46	35.5	44.5	50	64	74.5	79	82	78	67	29.5	28.5
1997	26	16.5	38	53.5	69.5	74	78	77	75	71.5	37	26
1998	32	28	25	61	76	80	86	87	83	77	47	36

Table 3 above shows the mean Relative humidity of the area for every month of the years under study. The highest figures are normally obtained between April to October when Minna is in wet or rain season, which also coincide with the period of low temperature as well as evaporation (Tables 1, 2, and 4). It is also seen from table 3 that the relative humidity between April to October ranges from 50% to 87% or above and this determine the rainfall. During the dry season, the Relative humidity fall below 50% from November to March and rainfall also seizes since the air is less moist and temperature is relatively higher inspite of the high evaporation rate (Table 1, 2 and 4).

2.5 EVAPORATION

TABLE 4: THE MEAN MONTHLY EVAPORATION 1996 - 1998

***Figures in (cu.mm)**

	MONTHS												
YEARS	J	F	M	A	M	J	J	A	S	O	N	D	MEAN
1996	11.8	11.8	10.6	8.8	4.7	2.6	1.9	1/6	2.2	3.1	7.8	9.5	6.4
1997	12.9	13.3	12.1	7.8	3.3	2.4	2.0	2.1	2.4	2.4	4.7	8.0	6.6
1998	11.7	14.1	16.3	9.0	4.1	2.8	2.5	2.1	2.9	3.0	3.5	3.9	6.3

Evaporation depends on the temperature, which is also dependent on the season and winds. Table 4 above shows that the rate of evaporation is higher in the winter or dry season up to the on set of rains. With the on set of rains, evaporation rate falls due to the fall in temperature. Caused by rainfall. The lowest figures are obtained between July and August.

The mean cloud cover is generally between 7.0 to 7.1 over eighths of the sky covered. The amount of the clouds is however explained by the proximity of Minna to the sub-equatorial rain climate region of the south as well as the tropical continental climate of the far North. $^{8}/_{8}$-cloud cover is obtained when rain is about to fall or when it is falling.

CONCLUSION

From the foregoing analysis therefore, it is seen that the weather and climate of Minna is to a great extent influenced by its central location in the country relative to the sub-equatorial south climate having high annual temperature of about 27^{0}C with very small range of between 1^{0}c and 3^{0}c and high amount of and well distributed rainfall of between 1500mm to over 2000mm per annum. To the North of Minna however, is the tropical continental climate with higher temperature of about 32^{0}c and wider range of more than 70^{0}c and lower rainfall of <1000mm per annum.

Tables 1, 2, 3, and 4 shows that there is great variation in temperature, rainfall, humidity and evaporation in Minna with respect to season due to its location as well as the apparent movement of the over head sun north and south of the country over the year.

Thus, the mean annual temperature for 1996 - 1998 is about 27.6^{0}c with an annual range of about 7^{0}c. the annual rainfall total for the years 1996 – 1998 also varies but the mean is about 1252.13 mm per annum. The relative humidity, which varies with the season, has a mean of about 56%. Annual

evaporation also varies with the season but the mean is about 6.5 cu.mm. the mean cloud cover is 7.1/8 and the atmospheric pressure mean is about 929.1mb. This summed up the weather condition of Minna as the tropical continental wet and dry (AW) climate accosting to W.Koppen classification scheme. It has high temperature, moderate rainfall as well as distinct rain season as well as dry season.

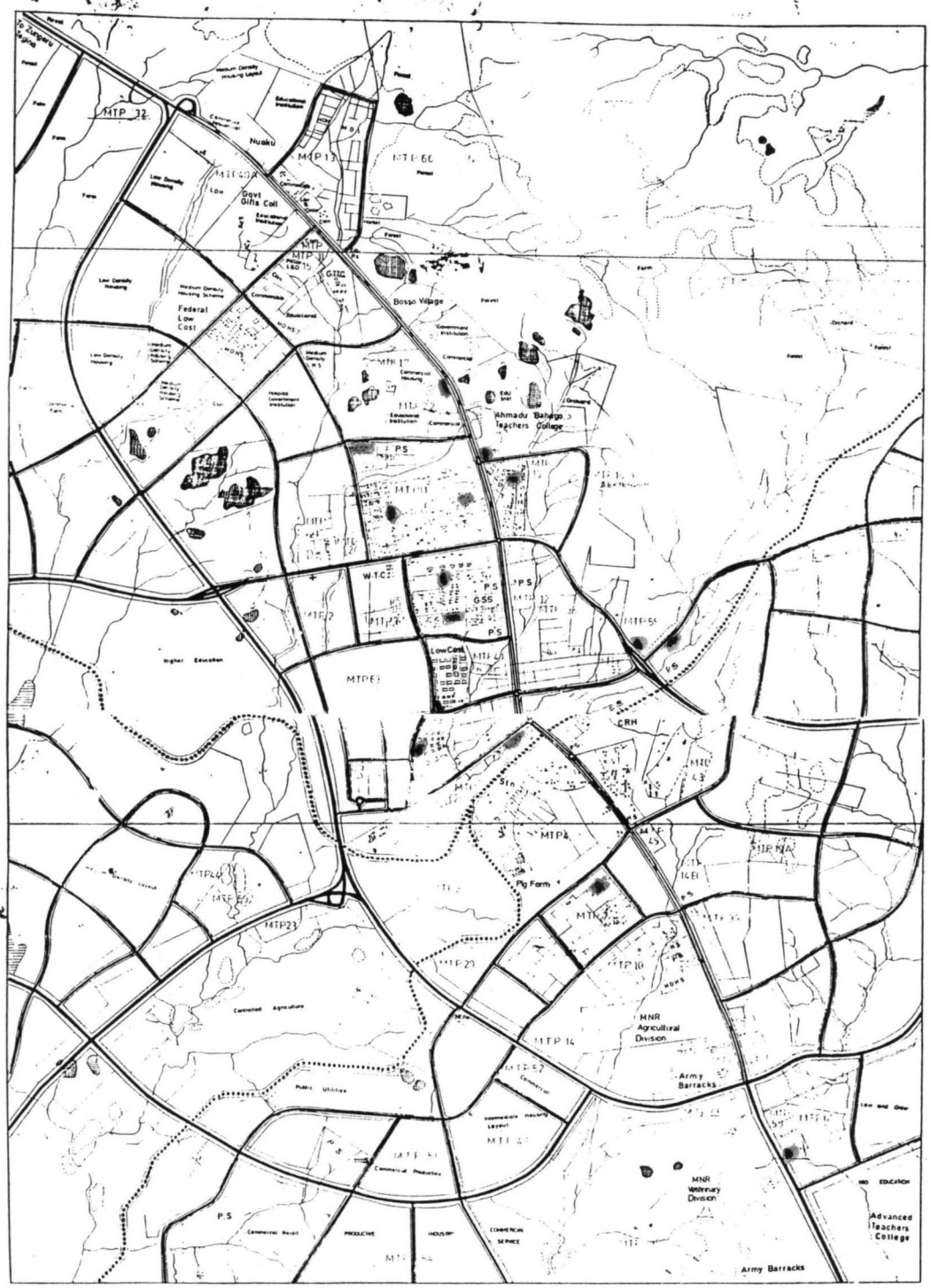
2.6 LAND USE OF THE STUDY AREA.

Minna today covers some 885 hectares of different land use that can be divided into the following land use categories i.e Residential, Government Institutions, educational, commercial and Industrial to mentioned just a few.

There is of-course, a variety of uses of the general urban area but in a town like Minna the residential aspect dominates, while the uses being intermingled.

Excessive land devoted to open spaces, and agricultural practices. Industrial land uses in Minna do not conformed with subdivision, regulation. One could not specifically identify an area that is ear marked for industrial activities, they are mixed up with residential and commercial area.

LAND USE MAP SHOWING AGRO-ALLIED INDUSTRIES



CHAPTER THREE

3.0 LITERATURE REVIEW

The United Nation Economic and Social Commission for Western Area in a publication entitled management of Industrial and Hazardous waste, dated December 1985. emphasized the need to carry out inventory on agro-allied industries in various regions. Nine papers presented at a D-34 "mini: - symposium" in Colorado springs, 8 and 9 may 1985, entitled "ASTM Environmental Test Method Development " are also contained in this volume. These papers concern the work of committee – D-34 in developing test methods and specifications for environmental monitoring and agro-allied industries.

These are to stimulate research and provide a forum for the exchange of new information and ideas on the management of hazardous and industrial waste.

The environment, in recent times, has been the focus of many concerned researchers. The most important aspect of the environment being the various ways of protecting it. Not much has been done on Agro- allied industry and their impact on the environment, especially on the study area. Infact, not a single work had been carried out. This makes this work very unique.

CHAPTRE FOUR

4.0 DATA COLLECTION

Data for this study were collected through various sources. A set of map showing the study area were collected from the Ministry of Lands, Survey and Town Planning, Minna. These maps were used to divide the study area into various categories of industrial layout. The maps were also use to identity the positions of various agro-allied industries that exist in the study area.

Climatic data for the study area were obtained from climatic change center Minna, for the year under study i.e (1998 - 1999). These data were used to discuss the atmospheric condition of the study area.

A ground – through survey of the study area were carried out, this was used to supplement those areas identified in the maps etc. Material/information were obtained from library, and from other sources such as interview of people etc.

Questionnaires were also used to extract information on agro-allied industries for the study area.

4.1 DATA ANALYSIS:

This study will use various statistical techniques for the analysis, e.g graphic, charts, tables, figures, photographs etc.

CHAPTER FIVE

5.0 DISCUSSION OF RESULT

Whenever, a problem is identified, it can only be solved after giving through some a research and research conducted through some approaches and analysis of the a study on the Agro-Allied industries and their impact on the environment was chosen, there was a visit for reconnaissance survey.

A land use map of Minna was obtained from Ministry of lands & Town Planning Minna Niger State. This was to enable me find out the areas earmarked for industrial development.

It was also discovered during the surveys that some vital utilities needed for industrial development such as power, water and roads access were not available near the site.

Data was collected on major manufacturing and processing industries through field surveys. And some other information was collected through library research and personal observation.

5.1 YEAR OF ESTABLISHMENT

A survey of Agro-allied industrial undertaking in Minna in 1999/2000 year revealed that one third of the total number of 15 industrial units are established between the year 1975 - 1990. By then farming was the major activity in the

area; three quarter of the population were farmers. Food crops farming was the major practice in the area. (i.e Yam Maize, Guinea corn).

TABLE 1: ANALYSIS BY YEAR OF ESTABLISHMENT

YEAR OF ESTAB.	ESTAB. NO.	PERCENTAGE (%)
1975 – 1980	1	6.7
1985 – 1990	5	33.3
1995 – 2000	9	60
TOTAL	15	100

Source: Field Survey 1999/2000

5.2 INDUSTRIAL ESTABLISHMENT BY PRODUCT MANUFACTURED CURRENT OUTPUT AND MARKET FOR FINISHED GOODS

The various products manufactured or processed by the agro-allied industries surveyed. The current output and market for finished products for each of the industries are presented in Table 2.

Only one industry of the total number of 15 industries do sales its products out of the State. The product of this industry re fertilizer. The remaining industries have their market within the state. See Table II below.

TABLE II: ANALYSIS BY PRODUCT MANUFACTURING, CURRENT OUTPUT AND MARKET FOR FINISHED GOODS.

No.	TYPE OF INDUSTRY	YEAR OF ESTAB	EMPLOYEES	PRODUCT MANUFACTURED OR PROCESSED	CURRENT OUTPUT PER ANNUM	MARKET
1.	CHUK-FURNITURE MINNA	1985	20	FURNITURE	20,000 – 30,000 CUSHION	MINNA
2.	JOLLOY BAKERY MAKERA MINNA	1982	50	BREAD	25,500 CARTONS	MINNA/OTHER LOCAL GOVT. AREA
3.	MORRIS FERT. COY NIG. LTD, MINNA	1987	1,000	FERTILIZER	OVER 500,000 TONS	MINNA & OTHER STATES
4.	RICE MILLS KPAKUNGU	1992	5	RICE PRCOESSING	30 TONS	MINNA & LOCAL MARKETS
5.	CORN MILLS MINNA	1989	8	CORN PROCESSING	14 TONS	MINNA
6.	BAGONI BAKERY S/GARI MINNA	1991	40	BREAD	15,000 CARTONS	MINNA
7.	MAITUMBI SAW MILLS	1980	15	TIMBER	15,000 – 30000 KG	MINNA
8.	NASSI TAILORING MINNA	1998	8	CLOTHS	80 – 100 KG	MINNA
9.	JAMIA'A BLOCK IND. MINNA	1997	10	BLOCKS	1000 BLOCKS.MONTH	MINNA
10.	LIMAINA CLOTH DYING	1988	5	CLOTH DYING	400 – 1000 CLOTHS	MINNA
11.	RICE MILLS KWANGILA	1992	4	RICE PROCESSING	10 TONS/MONTHS	MINNA
12.	EL-AMIN BAKERY	1980	50	BREAD & CONFECTIONARY	250,000 – 300,000 LOOVES	MINNA & LOCAL GOVT. AREAS
13	SOBO INDUSTRY	1998	3	SOBO DRINKS	5000 – 10,000	MINNA
14.	DOMINION MILIK INDU. MINNA	1999	15	YORG HURT DRINKING	10000 – 20,000 CARTONS	MINNA & L.G.A.S
15.	ABU-TURAB POULTRY MINNA	1997	35	EGGS & CHICKENS	5,000 – 10,000 CHICKENS	MINNA & WITHIN

SOURCE: FIELD SURVEYS 1999/2000

5.3 INDUSTRIAL LAND AREA:

A survey analysis of Minna agro-allied industrial establishments, it was found that 60% of the industries have plot sizes between 0.001 – 0.005 hectares, 30% between 0.02 – 0.05 hectares, and 10% between o.10 – 1.2% hectares. When these figures are compared with spatial standards for the design of industrial layout, one could conclude that the existing industrial site areas in Minna are not adequate. See Table III below.

RECOMMENDED INDUSTRIAL PLOT SIZES

TYPE OF INDUSTRY	PLOT SIZE	IN HECTARES
	MINIMUM	DESIRABLE
LIGHT	0.2	0.4 - 0.8
MEDIUM	0.4	0.8 - 1.2
HEAVY	0.8	1.2 - 2.0

SOURCES: Industrial Environment of Nigeria city, by vagale, L.R. and Adekoya O. Certon, 1974

5.4 INDUSTRIAL EMPLOYMENT

The number of person engaged in the different industrial establishment i.e both manufacturing and processing industries in Minna is given in Table 4. Two important conclusions could be drawn from these employment figures. One the

basis of these figures, the industries could be classified into different categories with reference to existing spatial standards.

The second all – important conclusion that could be deduced from the data is the rate of growth of industrial employees P/A. by type of industry. This is useful for projecting future employment requirements for different categories of industries. See table IV below.

INDUSTRIAL EMPLOYMENT

	TYPE OF APPOINTMENT	NO. OF EMPLOYEE	QUALIFICATION
1.	Permanent Appointment	2	W.A.S.C
2.	Temp. Appointment	8	Adult Education
3.	Daily Paid	5	Illiterate
	TOTAL	15	

SOURCE: FIELD SURVEY 1999/2000

5.5 CLASSIFICATION OF INDUSTRY

For the purpose of stipulating spatial standards for industrial development, it is necessary to classify industries into different categories. On the basis of the empirical data collected from the survey of industrial development in Minna and result of the detailed study of the available factual information on industries in Nigeria, I have come out with 3 categories of industrial using such parameter as

industrial area, employment, function, performance and market. The 3 categories of industry identified are as following:-

Light Industries:- These are assumed to have 150 or less industrial employees with a site area of 0.5 – 0.8 hectares. They have market for finished products of local level.

Medium Industries - Employing 200 – 500 persons, with site area of 1.0 - 1.8 hectares. Market for finished products are usually at local and national levels.

Heavy Industries - Employing 550 and above people with a site area of 2.0 - 3.0 hectares. Markets for finished products are usually at local and national levels. See table 5 below.

TABLE V: PARAMETERS FOR INDUSTRIAL CLASSIFICATION

CATEGORY OF INDUSTRIES	EMPLOYMENT	SITE AREA (HA)	MARKET
Light	150 or less	0.5 – 0.8	Local
Medium	200 – 500	1.0 – 1.8	Local & National
Heavy	500 and above	2.0 - 3.0	Local & National

Source: Industrial Environment of A Nigeria City. By – Vagale, L. R. and Adekoya O. C. 1974

5.6 RANKING OF INDUSTRIES

The 15 industries surveyed in Minna into light, medium and heavy. The analysis shows that 12 industries falls into light, and 2 falls under medium, while only 1 industry falls into heavy. The ranking was based on the parameters derived from industrial classification. See table 6 below.

TABLE VI:- RANKING OF INDUSTRIES

S/NO.	TYPES OF INDUSTRIES	CATEGORY
1.	CHUKS – FURNITURES TUNGA MINNA	LIGHT
2.	JOLLOY BAKERY MAKERA, MINNA	LIGHT
3.	MORRIS FERTILIZER COMPY MINNA	HEAVY
4.	RICE PROCESSING MILLS KPAKUNGU MINNA	LIGHT
5.	CORN MILLS MINNA	LIGHT
6.	BAGONI BAKERY , SABON GARI MINNA	LIGHT
7.	MAITUNBI SAW MIL, MINNA	LIGHT
8.	NASSI TAILORING SERVICES MINNA	LIGHT
9.	LIMAIWA CLOTH DYING, MINA	LIGHT
10.	JAMA'A BLOCK IND. MINNA	LIGHT
11.	RICE MILL PROCESSING, MINNA	LIGHT
12.	EL-AMIN CONFECTIONARY MINNA	MEDIUM
13.	SOBO IND. MINNA	LIGHT
14.	MILIC YORG-HURT IND. MINNA	LIGHT
15.	ABU-TURAB POULTRY MINNA	MEDIUM

Source: Field Survey 1999/2000

5.7 DISTANCE FROM HOME TO INDUSTRIES

The survey revealed that there seems to be no rational relationship between places of living and places of industrial activity. The trip to and from work consumed time, money and energy. Due to enormous deficiencies in housing both quantitative and qualitative terms, the industrial workers do not have much choice in housing. It may be noticed that only 20.8% workers live at a distance less than 1km from place to work to home. While 45.8% of the total number of employees live at a distance ranging between 1 – 2 km. And 25.0% live between 3 and above km. Long distance, to and from work are neither easy nor comfortable, on account to the unfully deficient public transportation system. See Table 7 below.

TABLE 7 - DISTANCE FROM HOME TO PLACE OF WORK

DISTANCE (KM)	NO. OF EMPLOYEES	PERCENTAGE (%)
Less than 1	5	20.8
1 – 2	11	45.8
2 – 3	2	8.3
3 and above	6	25.0
TOTAL	**24**	**100**

Source: Field survey 1999/2000

5.8 MODE OF TRANSPORT FOR WORKERS

Journey to work is an important aspect of planning industrial area. Majority of industrial workers cannot afford to have their own vehicles for commuting from home to work and back, nor can they afford the time and money for commuting over long distance by public transportation system. From the survey revealed that 29.2% of the workers use public transportation system. From the survey public transports s their mode of transport.

While 12.5% use their private cars as the mode of transport. Only 4.2% take factory bus as their mode of transport. See Table 8 below:-

MODE OF TRANSPORTATION	NO. OF WORKERS	PERCENTAGE (%)
Private cars	3	12.5
Public Transport	7	29.2
Factory Bus	1	4.2
Motor Cycles	2	8.3
Bicycles	5	20.8
Font & other	6	25
TOTAL	**24**	**100**

Source: Field Survey 1999/2000

5.9 INDUSTRIAL WASTE

Over three quarters of the number of industrial establishments produce solid wastes in one form or the other, such as saw dust, waste paper etc. Most industrial concerns, with the exception of a few large ones, do not have any

PLATE 1 **RICE MILL HUSK DUMPED IN THE ENVIRONMENT.**

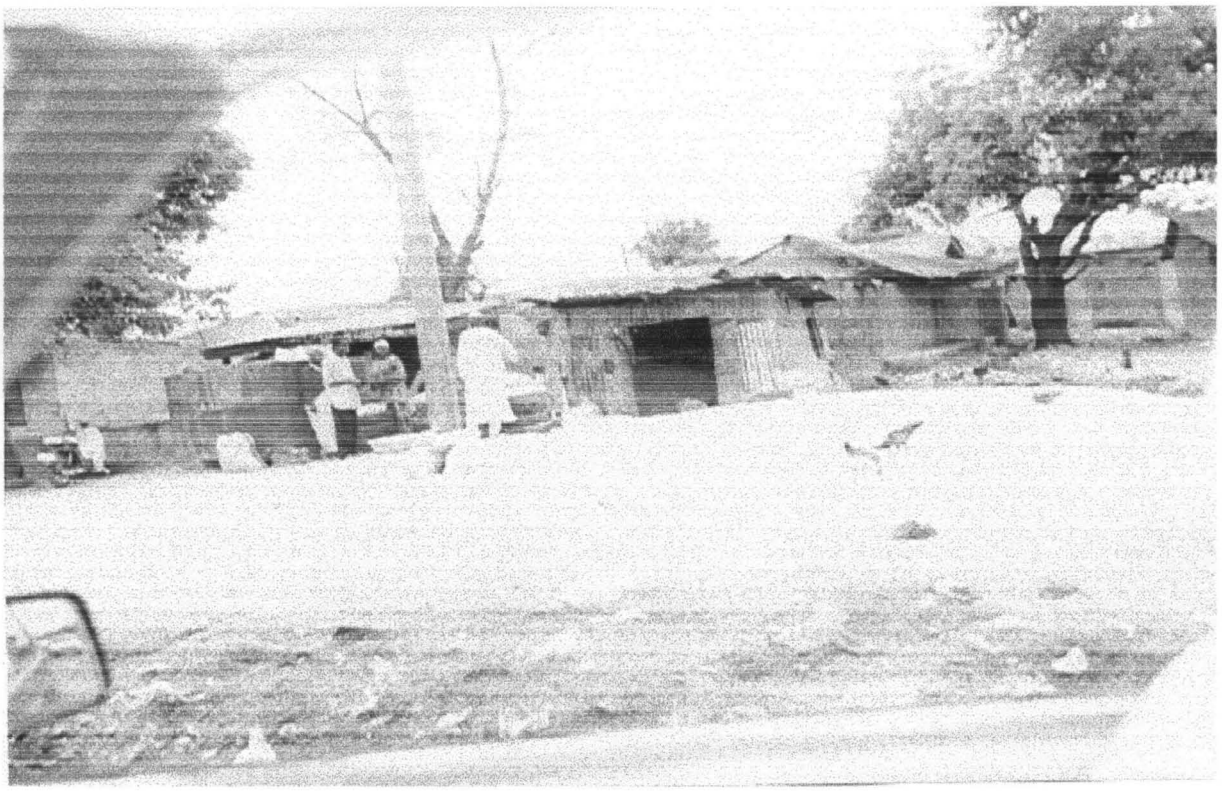
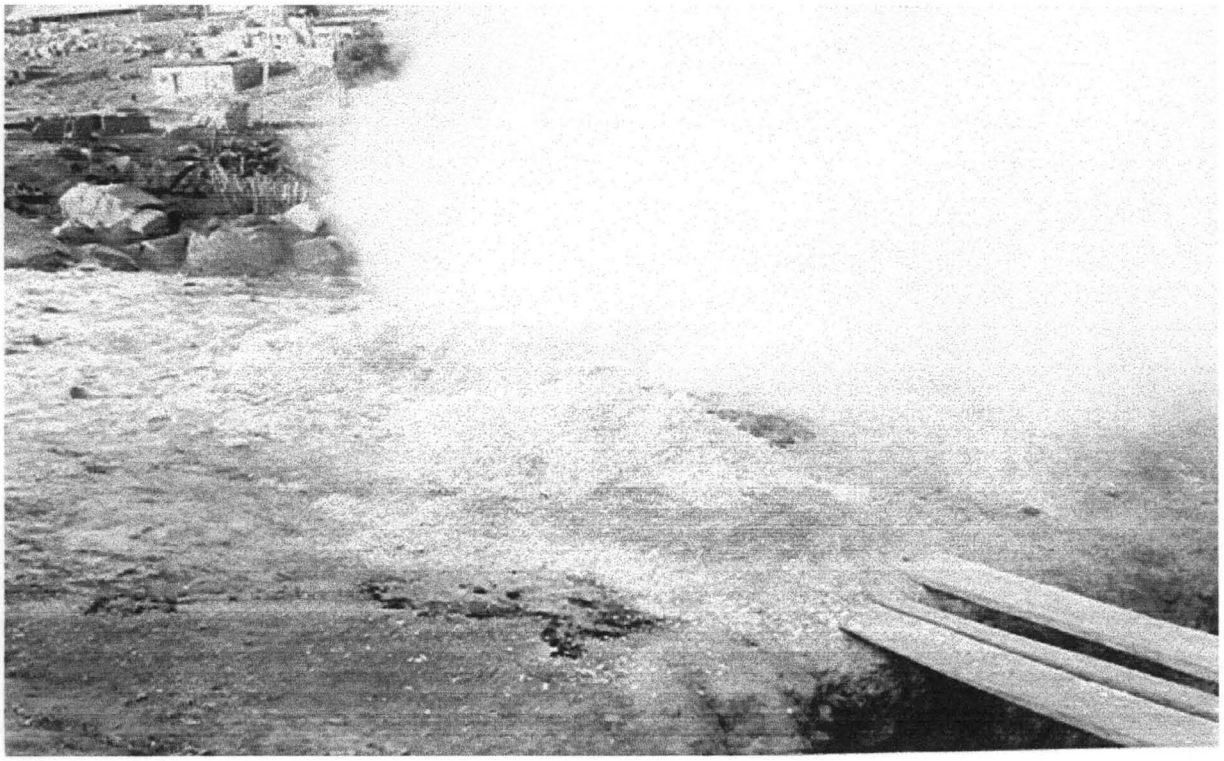


PLATE 2 **SAW DUST DUMP.**



Solid waste disposal system. They dump their wastes in public garbage receptacles, at street corners any nearby place, such un-organized collection litter the environment and hide outs for rodents and can so debase nearby environment as to devalue it.

It was revealed that about 62.5% of the total industries interviewed, disposed of their industrial waste through refuse container and burning, 29.2% burnt them to aches, while 8.3% disposed their waste through drain and refuse container. See Table a below:-

WAYS OF REFUSE DISPOSAL

METHOD OF DISPOSAL	NO. OF WASTE DISPOSED	%
Refuse container and Burnt to aches	15	62.5
Burnt to Aches	7	29.2
Through Drains and Refuse container	2	8.3
TOTAL	24	100

Source: Field Survey 1999/2000

5.1.0 FIRE FIGHTING

Industries engaged in manufacturing of furniture, cotton Ginnery, are vulnerable to fire hazards. The factory Acts, there stipulated that the industrial premises must not only be easily accessible to fire fighters but also fire extinguishing apparatus be installed in all industrial buildings. In Minna 15

industrial establishments 16.7% have fire extinguisher installed with the industrial unit. While 83.3% of the total industrial establishment ~~re~~ are not having fire – extinguisher, but only depend on the fire service in the town. See Table 10 below.

ACCESSIBILITY TO FIRE – FIGHTERS

ACCESSIBILITY	NUMBER	%
Accessibility	4	16.7
Not Accessibility	20	83.3
TOTAL	**24**	**100**

Source: Field Surveys 1999/2000

5.1.1 TELEPHONE SERVICES

One would expect that the provision of an adequate and dependable telephone services was indispensable to industrial establishment, for quick and efficient communications and transactions. However, in Minna 15 industrial Units of all type covered by this study do not have this essential service nor do they have any public telephone booths nearby.

The Federal Ministry of Communications has not been able to cope with the increasing demand for the installation of telephones by industrial and commercial organizations.

5.1..2 STORAGE FACILITIES FOR FINISHED PRODUCTS

From the survey conducted of 24 industrial establishments i.e 79.2% have storage facilities for their finished product while 20.8% of them store their product outside the industrial establishment. See Table 11 below.

STORAGE FACILITIES

LOCATION	NO OF INDUSTRIAL EST.	%
Accessibility	4	16.7
Not Accessibility	20	83.3
TOTAL	**24**	**100**

Source: Field Surveys 1999/2000

5.1.3 FACILITIES IN THE INDUSTRY

The efficiency of industrial workers depends, among other factors on the quality of environment in which work is executed and the facilities provided to them in and around the factory premises. These include canteen, dispensary in-door recreation room, cooperative store etc, depending on the nature of the industrial undertaking in Minna do provide most of these conveniences. However, they are grossly inadequate or not even available, especially with regards to recreational facilities, dispensary etc. See Table 12 below.

FACILITIES IN THE INDUSTRY

TYPE OF FACILITIES	NO. OF FACILITIES IN THE INDUSTRY	%
Canteen	12	50.0
First Aid	8	33.3
In-door Game	4	16.7
TOTAL	**24**	**100**

Source: Field Surveys 1999/2000

5.1.4 PARKING FACILITIES

It is widely recognized that off-street parking is essential to a well – planned industrial establishments. Industrial premises need truck parking lots for loading and off – loading raw materials and finished goods. They also need off –street parking facilities, about 45.8% of the industrial establishments in Minna have parking lots for both loading and off- loading and also for the workers. While about 54.2% parked along the street, thereby seriously impending the free flow of traffic on these roads. See Table 13 below:

PARKING LOT FOR INDUSTRILA ESTABLISHMENTS

LOCATION	NO. OF VEHICLES	%
Along street	13	54.2%
In parking lots	11	45.8
TOTAL	24	100

Source: Field Survey 1999/2000

5.1.5 FINANCIAL SUPPORT

The survey revealed that the agro-allied industrial establishment in Minna are mainly in the hands of private entrepreneurs. About 75% of the total industrial establishment are financed by the private individual 16.7% were financed by the group organizations, while 8.3% were financed by the government. See table 14 below.

SOURCE	NO. OF INDUSTRIAL EST.	%
Private	18	75.0
Cooperative/Group	4	16.7
Government	2	8.3
TOTAL	**24**	**100**

Source: Field Surveys 1999/2000

5.1.6 INDUSTRIAL INFRASTRUCTURE

For establishing and a successfully operating industries it is necessary to provide, at reasonable cost and required quantities, infrastructural facilities like pipe borne water, sewage, electricity, industrial gases, fire fighting equipments, Telephone and postal services, etc. Almost all the establishment interviewed couldn't give information on must of these utilities and services due to non-availability of them.

However, from the survey conducted it has been observed that the main source of light or power in the industrial establishment is from N.E.P.A. About

75% of the total number of the industries were served with N.E.P.A, while 25% of the electricity is obtained from private plants or generators. See Table 15 below:

SOURCE OF POWER	NO. OF INDUSTRIES USED	%
N.E.P.A	18	75
PRIVATE	6	25
TOTAL	24	100

Source: Field Surveys 1999/2000

5.1.7 INDUSTRIAL POLLUTION

Most industrial plants produced various types of pollutions and nuisances, hazards. The type and extent of these depends upon the industrial methods and processes.

Most agro-allied industries in Minna produces, Airborned, land borne and water borne wastes and pollution. The results of these field survey regarding the nuisance and hazards produced by major agro-allied industrial units are show in Table 16 below.

PLATE 3 **AIR POLLUTION PRODUCED BY BURNING OF SAW DUST.**

PLATE 4 **POLLUTION PRODUCED BY BURNING OF RICE HUSK**

INDUSTRIAL POLLUTION

YPE OF NUISANCE	NO. OF EST.	%
Noise/Vibration	9	37.5
Heat/Dust	6	25.0
Odour	7	29.2
Fume	2	8.2
TOTAL	**24**	**100**

Source: Field Surveys 1999/2000

The survey also shows that major agro allied industrial unit in Minna showed that 41.7% of the total level of industrial pollution is accommodating, while 38.3% of the industrial pollution is said to be non-accommodating. Although some of these industrial pollution can not be measured readily. See Table 17 below.

LEVEL OF TOLERANCE

LEVEL OF TOLERANCE	NO. OF INDUSTRIES	%
Accommodating	10	41.7%
Non-Accommodating	14	58.3
TOTAL	24	100

Source: Field Survey 1999/2000

CHAPTER SIX

RECOMMENDATION AND CONCLUSION

6.0 LOCATION OF AGRO-ALLIED INDUSTRIES

Location requirements vary from individual industries. Each industry has different reasons for locating in a particular environment. Whatever the case may be, future locations should try and incorporate those locational requirement requirements. Though there is no rigidly in this aspects, considerations, should be made of the health, safety of surrounding communities and also consider other factors as conveniences and economy.

6.1 SPACE REQUIREMENTS

It is recommended that future space requirements of industries be made at a minimum of 4 hectares per 1000 population of industrial workers in an area. This should be based on available land for industrial purposes and the need, so that adjustment can be made. The minimum size of a district should be 128 hectares up to an ideal size of 256 hectares depending upon demand. This is to allow for the provision of various plot sizes and the economic provision of utilities and guarantee a profitable and efficient management of an industrial establishment.

6.2 RECREATIONAL FACILITIES

It is recommended that the state government and other development authority should encourage the industrialist and private investors in the development of leisure parks within the industrial establishments.

6.3 REFUSE DISPOSAL

A refuse depot site should be provided where all the dry refuse and solid waste from the industries are to be disposed and treated. Refuse collection points should be provided within maximum walking distance. From these various collection points, the domestic refuse is transported to the refuse depot site for treatment.

6.4 PARKING

On street parking of vehicles within industrial establishment should be restricted on all the roads. But be permitted at minimum points after the development exercise and be restricted to some types of vehicles.

All industries should be compelled to provide parking space for all categories of vehicles. Both employees, visitors, company vehicles and trucks be provided with adequate parking space. Lay by bus (temporary only) is recommended at various locations along the district roads for mainly public transport use.

6.5 LOADING AND OFF-LOADING

Loading and off-loading facilities are recommended to be at the rear or side of lots. It cost less usually to lay plant or grade and excavate track and trunks than to raise floor by concrete means.

6.6 COMMON FACILITIES

With a view to minimize the cost of social overhead, the community facilities is recommended on a cooperative and sharing basis. These include food canteen, clinic, Raw material depot, filling station etc.

6.7 LANDSCAPING AND AESTHETICS

It is difficult to achieve a good quality of space and visual design in an industrial environment, due to uniformity of plans and varied nature of industrial plants. The authority concern of an industrial lay out would therefore, do well to consult planners and architects at all stages of development from the inception of the idea to execution of the project. In addition to its aesthetic value, landscaping serves various utilization purposes such as regulating the mind, mitigating dust and noise, affording shade etc.

6.8 GROUPING OF INDUSTRIAL STABLISHMENT

In Minna industrial lay out, the various types of industrial establishments have been located arbitrarily without any regard to the nature of industries and

the industrial processes. I have, in this recommendations proposed industrial location in Minna be grouped in three categories i.e. light, medium and Heavy industry and according to their basis of performance. For instance, industries that consume large quantities of water, (e.g. Food and beverages industries, Textile factories etc) falls under Heavy industry. While the group under medium industry are (leather factories, Timber and furniture industries etc). And under light industry are (corn mills, rice Mills, Bakeries, Block factories etc).

6.9 CIRCULATION

A well design network of roads, streets, parking and loading/unloading plat forms for the efficient circulation of people, goods and services is an essential component of the proposed industrial establishment. Easy and quick access to work, sheds, service etc is ensured at the same time, including roads, cul-de-sac and steep gradients are avoided. Care should be taken to design the circulation system so as to be extended when necessary, and at the same time not to permit through traffic. The road geometric is simple and rational, avoiding bad inter sections, insufficient safe – sight distance, etc which are common in several existing industrial layouts.

6.1.0 SOURCE OF POWER SUPPLY

Industrial establishment is to get its power supply from the existing N.E.P.A but with alternative measures, i.e. a stand by generating plants should be installed for the industrial establishments. All the wiring/electrical connection

of power in the proposed industrial development are to be under ground cable to ensure safety, economy in the provision of power supply

6.1.1 MANAGEMENT AND FINANCING

Implementation is another important aspect of the Agro-allied industrial development. Industrial layouts, should be translated into readily at every stage of development. A proposal which is not implemented indicates dissipation of energy, effort, time and money in the preparation of the scheme. Hence, the following elements becomes very crucial:-

- Financial mechanism
- Legal mechanism
- * Implementation Agencies
- Public participation

6.1.2 FINANCIAL MECHANISM

Financial mechanism is one of the most important key elements affecting the development of industrial establishment. Without adequate financial support, the whole scheme will proved abortive. In addition to the numerous government financial inducements to encourage industrial developments, it is expected to that financial institutions as the New Nigerian Investment Limited (NNIL), the Nigerian Industrial Development Bank (N.I.D.B) Banks, F.E.A.P, P.A.P, etc should try and grant loans for industrial schemes.

6.1.3 LEGAL MECHANISM

Industrial development involves a lot of planning decision and policies which need legal backing for a hitch-free implementation of the scheme. It is recommended that the agro-allied industrial plans layouts be passed into law by the Niger State government and hence the town and country planning law becomes applicable in the implementation of the scheme. The professional rights of the planners is protected under this law and this he can implement the scheme without fear a favour to any party with an interest to the scheme. This will greatly enhanced the quality of the proposed industrial development.

6.1.4 IMPLEMENTATION AGENCIES

The implementation of the Agro-allied industrial development will involve multiple administrative bodies and agencies participating for the successful accomplishment of the scheme, with the as the central co-ordination. It is recommended that a task – force committee be set up comprising heads of departments of agencies participating in the plan implementation. The Ministry of Environment will however, be entrusted with the duty of securing, co-ordination of the various professional groups to be involved in the scheme as will as formulation of additional implementation policies.

6.1.5 PUBLIC PARTICIPATION

The development of an industrial establishment particularly the agro-allied industries will require public participation for a successful realization of the scheme. Whence, N.E.PA., NITEL, Ministry of Health, Water Board etc. have immense contribution to make in the realization of the plan. However, it is recommended that the provision of these community facilities, and amenities, should not only be the sole responsibility of the government, but also the public organization, private companies, and private investors

6.1.6 ADMINISTRATION

Finally, it is recommended that a body to be called "INDUSTRIAL DEVELOPMENT BOARD" under the Ministry of Environment be set up. Its main duties will be to provide and maintain industrial facilities for common use of tenants, enforce restrictions, prohibitions and regulate the general activities of the various industries as regards setback, storage, coverage and other functions that may be assigned to it.

6.1.7 IMPLEMENTATION STRATEGY.

In order to effect a realistic implementation, it becomes inevitable to design industrial by lay out in Minna, this pinpointing the priority crease which need immediate action n and programming to indicate the sequence of Implementation. The development will lay emphases on the environmental impact assessment. These include the servicing industrial site with drainage,

electricity, water, roads/rail and Telephone services at the government. Government will also meet the payment of compensation where necessary.

6.1.8 CONCLUSION

It is only through strict adherence to design standards and environmental lams for industrial development that a meaningful, desired – end can be achieved. Any thing devoid of that, the much needed attractive setting and establishment will only be an elusion; rather, the unwanted chaotic situation n shall remain the order of the day. And instead of setting, it will be industrial pieces, disharmony and hazards,

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APPENDIX

AGRO-ALLIED INDUSTRIAL SURVEY.
IN MINNA NIGER STATE CAPITAL.

QUESTIONAIRE: -

TOPIC: - AGRO-ALLIED INDUSTRIES AND THEIR IMPACT ON THE ENVIRONMENT,
(THE INFORMATION WILL BE USED FOR ACADEMIC PURPOSE ONLY AND STRICTLY CONFIDENTIAL.)

1. a. Name of Establishment/Factory: - ----------

-

b. Year of Establishment: ----------

--

c. Address of the Factory: ----------

--

2. Type of services the industry rendered: ----------

(a)

(b)

(c)

3. Type of product Manufactured: -

(a)

(b)

(c)

4. No of employee in the Factory

(a)

(b)

(c)

Sources of Raw Material for the Industry :-

(a) Within Minna

(b) Outside Minna

(c) Other area (Specify)

6. Industrial Land Area Plot Size

(a)

(b)

(c)

7. Classification of Industry

(a)

(b)

(c)

8. Type of Industry: -

(a)

(b)

(c)

9. Distance Fro m Industrial size to Home: -

   - Less than 1 km
   - 2 – 3 km
   - 4 –5 km

10. Mode of transportation: -

    (a) Private Vehicles.

    (b) Commercial.

    (c) Other (Specify).

11. Ways of Refuse Disposal: -

    (a) Refuse bin

    (b) Through drains

    (c) Refuse container.

    (d) Other (Specify).

12. Accessibility to facilities in the industry (Specify).

13. Type of facilities in the Industry (Specify).

14. Type of Industrial Pollution; -

    (a) Dust

    (a) Heat

    (b) Fume

    (c) Vibration / Noise

15. Level of Industrial Pollution: -

    (a) Accommodating

(b) Non – Accommodating.

16. Source of Finance: -

(a) Private

(b) State government

(c) Federal government

(d) Local government

(e) Other (Specify).

17. Type of Industrial Infrastructure: -

- N.E.PA ----------

- Private plant----------

- Other source ----------