

**FUELWOOD EXTRACTION AROUND MINNA
AND ITS IMPACT ON THE ENVIRONMENT**

BY

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DEDICATION

This project is dedicated to Almighty God, the giver of all natural resources. It is also dedicated to all humanity who make use of the God's given natural resources. The dedication is in appreciation of the natural resources and with hope of their wise use.

ACKNOWLEDGEMENT

I wish to express my thanks to Almighty God who endowed me with knowledge and strength throughout the period of my academic programme.

I am greatly indebted to all my lecturers in the Department of Geography, Federal University of Technology, Minna who developed my academic potentials.

My special appreciation goes to Prof. J.M. Baba, Prof. A.A. Adefolalu, and Dr. P.S. Akinyeye who made me appreciate natural resources of land, atmosphere and water.

I sincerely appreciate my course mates for their support and encouragement.

DECLARATION

I hereby declare that this thesis was wholly and solely written by me under the supervision of Prof. J.M. Baba. No part of this work had ever been wholly or partially presented before for any degree elsewhere.

Information obtained from published and unpublished works of others have been referenced and acknowledged accordingly.

PAUL Y. GANA

DATE

CERTIFICATION

This is to certify that this project report being submitted by Paul Y. Gana to the Department of Geography, Federal University of Technology, Minna, Niger State, Nigeria is considered adequate and worthy of presentation for the post graduate project.

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ABSTRACT

Man until quite recently have taken for granted the continued abundance of the material resources on which our physical well being depends.

This project examines the nature and scope of fuel wood use around Minna and its impact on the environment. The paper assess and evaluates the rate of deforestation and the public awareness on consequences of deforestation

The nature of deforestation is shown to be a systemic one as the distance from Minna to supply areas is on the increase. The tools for fuel wood exploitation and the very processes of land utilization is also on cus.

The widening dimension of fuel wood extraction as a result of the rapid expansion of population and agricultural land under the impact of a variety of social, economic and political factors in contemporary Nigeria to be considered in another forum.

The alternative policy measures towards solving the problem is suggested at the end of the study.

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CHAPTER ONE

1.0 INTRODUCTION

1.1 BACKGROUND INFORMATION

The planet we live in is composed of many parts. The ocean of gases called the atmosphere; water bodies in ocean, lakes, streams and underground called hydrosphere; and the solid part made up of soil debris, rocks, mountains, plains known as lithosphere. All these parts work together to produce a conducive environment for life, to exist. The interface of these parts called the biosphere sustains a variety of plants and animals in a complex interwoven systems.

Energy and nutrients come from the sun, water, air and land; all of which give energy and food to a vast array of living things. Undisturbed, these systems could support life through nature's in-built renewal mechanism forever. Human beings are part of this system.

This planet earth is dynamic because these systems undergo changes naturally through weather processes, vegetation changes and animal factors. Soil erosion, volcanic eruption, flood, drought, desertification, deforestation by lightning fire for example are natural environmental phenomena.

The Environmental factors have within them processes of adjusting or adapting to these changes without much adverse effect on the total environment.

Man with population expansion, technological advancement, and coupled with his bid to improve his standard of living has launched an assault on the environment. Until quite recently we have taken for granted the continued abundance of the material resources on which our physical

well-being depends. Thomas Malthus (1798) first drew attention to the finite resources as the population increased. J.M. Baba 1992 conclude that past ignorant choices of man in the course of his economic operations have initiated some harmful effects on the environment and now threatens the very well-being of man that the activities were intended to promote.

On the other side are some that believe that the world is filled with crises of every kind, yet somehow human life goes on. We have after all, an abundance of technicians to deal with the trauma in the physical creation; somehow a solution will be found in due course, as solutions are found for most other ills in society.

Julian Simon (1981) equally drew attention to the dependability of technology to solve all problems that might emanate from population expansion and resource scarcity. "TECHNOLOGY CURE – ALL".

1.2 FOREST RESOURCES

For many thousands of years man has made use of forest resources in a variety of ways. Wood has always been used wherever it was available as a fuel.

The process began slowly and relatively speeded up by population expansion and industrial growth in many areas. Introduction of mechanization {power saw, tractors and heavy plant for transporting logs} made forest exploitation both quicker and easier.

Wood is a vital material in building and construction industry, in furniture making, and in its original form, as plywood and fibre board. Wood is also the major raw material of the enormous pulp and paper industry, where paper is essential for education. Wood or the cellulose it

contains, is also the basis of synthetic fibres such as rayon and acetate important in the modern textiles industry. Plants, as consumable and renewable source of food, fuel, clothing, shelter and many other categories of life essential to man. In many under-developed countries and Nigeria; Wood is the main source of fuel. About 98 percent of total timber removals in Nigeria are devoted to fuel supplies {Goh Cheng Leong 1972}.

The wide-spread activities of man in agriculture, herding, forest cropping, industry, domestic and urbanization guarantee that a considerable proportion of earth's land surface does not bear natural vegetation. To an ordinary Nigerian, the resources seem endless and therefore little attention is paid to the possibility of forest exhaustion. Unknown to him is the fact that the vegetation at a particular place evolves with time. Usually starting with very simple plant communities, then leading gradually to more complex communities and ultimately to the establishment of a relatively stable plant community – the climax.

With a newly formed ground surface or with that denuded of vegetation, the process of succession takes place in which one plant community invades the area and is followed in turn by other plant communities in an orderly sequence culminating in the vegetation climax. Forest takes quite a long time to regenerate. It is believed that tropical large forest trees take between 50 to 100 years to mature.

Plants relationship with their environment is considered together with all the organisms {plants and animals living in one place at one time; in terms of their total environment and to each other}.

The sustained activity within a particular plant community functioning as a stable ecosystem, and the gradual modification of a

succession stages; require that the plants and animals within that community contribute to their operation through their own physical and chemical processes and through their life cycle of growth and subsequent decay.

Forestry has traditionally been regarded as an extractive industry, and forests which once covered about 60 percent of the earth's land surface have been greatly reduced by clearance for various uses. Treatment of forest as an inexhaustive resource can lead to many environmental problems apart from forest depletion. Where trees formerly clothed mountains or hill slopes, the removal of the forests has most often initiated or encouraged soil erosion by gullying or sheet wash, or has prompted landslides. The soil so removed from the land can help to silt up river and thus cause flooding or reduce the possibilities of potentials of agriculture and navigation.

Many other environmental problems that result from deforestation also include among others soil impoverishment and climate change, which have been well documented by Geographers and Environmentalists. The original expanse of tropical forest, - some 16 million square kilometers, - has already been reduced to 8 million square kilometers mainly within the past four decades {Food and Agriculture Organization, 1982 Myers, 1980} and the rate of deforestation is accelerating {Myers 1989}. In the tropical forest zone, deforestation leads not only to loss of hardwood stocks, it also causes, as a major externality, a decline of water shed functions in at least 1.4 million square kilometers of catchment systems and in valley lands of the humid tropics where some 2 billion people live {World Resource institute and World Bank, 1985}.

Diverse consequences of deforestation will adversely affect human well-being. Even more important in the long term could be the mass extinction of tropical forest species with elimination of their genetic resources. A still more important repercussion of tropical deforestation could lie with climate change. There are linkages between the world's forest and climatic patterns at local, regional and global levels {Myers 1989}.

1.3 STATEMENT OF THE PROBLEM

Fuel wood is assuming an increasing role as a source of energy in Nigeria; even so, that the alternative sources are either not available or are expensive. This new fuel wood role is leading to accelerated deforestation.

Minna the Niger State Headquarters had witnessed in flux of population since the creation of Niger State. The inflow had increased in recent times due to immigration of people from the Northern part in search of humid land for agriculture and pastoralism. The political upheavals in some surrounding states of Kaduna, Kano and recently Plateau had increased the number of residents in Minna.

Fuel wood is the principal source of energy in Minna. Kerosine which would have been an alternative is out of reach to the average residents. We witness motor vehicles loaded with fuel wood to Minna from surrounding villages everyday.

The natural questions that should come to mind readily are that for how long would this fuel wood last? Is there any possible repercussion on the land where fuel wood are extracted? At present, nobody seems to

worry on the rate of fuel wood extraction around Minna. Can this study create any awareness and maintain continuous supply of fuel wood?

Being aware that deforestation is a source of many environmental problems, there is a need to see how this phenomenon of fuel wood extraction is addressed around Minna.

1.4 STUDY AREA

Minna, the Niger State Headquarters, is situated in the heart of guinea Savanna belt or zone of Nigeria. The zone is characterised with tall grasses and patched woodland, generally referred to as the middle belt of Nigeria.

The area spread over approximately 200 square kilometers occupying between latitudes 9°32'N and 9°41'N, and longitudes 6°30' and 6°35' East.

Minna made boundary with Zungeru in the Northern part, Lapai in the South, Suleja in the East and Bida in the Western part.

Since Minna assumed the status of the state Headquarters, it has grown to include villages like Tungan, Maitumbi, Bosso, Kpakungu and of recent Maikunkele and Chanchaga. In the early years of their existence these villages were self supporting in fuel wood use but now have to demand on commercial vendors for fuel wood supply. This is due to the expansion of Minna municipal and increase in demand of fuel wood there.

The supply areas of fuel wood is shifted further away from the immediate surrounding villages of Maikunkele, Chanchaga, Maitumbi and Kpakungu to include villages from 20 to 50 kilometers away from Minna. These areas of fuel wood supply I referred to as the surroundings of Minna.

Fuel wood supply to Minna comes from different directions. For the purpose of this study; Bida route, Lapai route, Suleja route, Gwada route and Zungeru routes are considered.

Minna in this context therefore comprises the municipal and the immediate villages while surrounding is taken from the distant villages that supply the fuel wood to Minna Area.

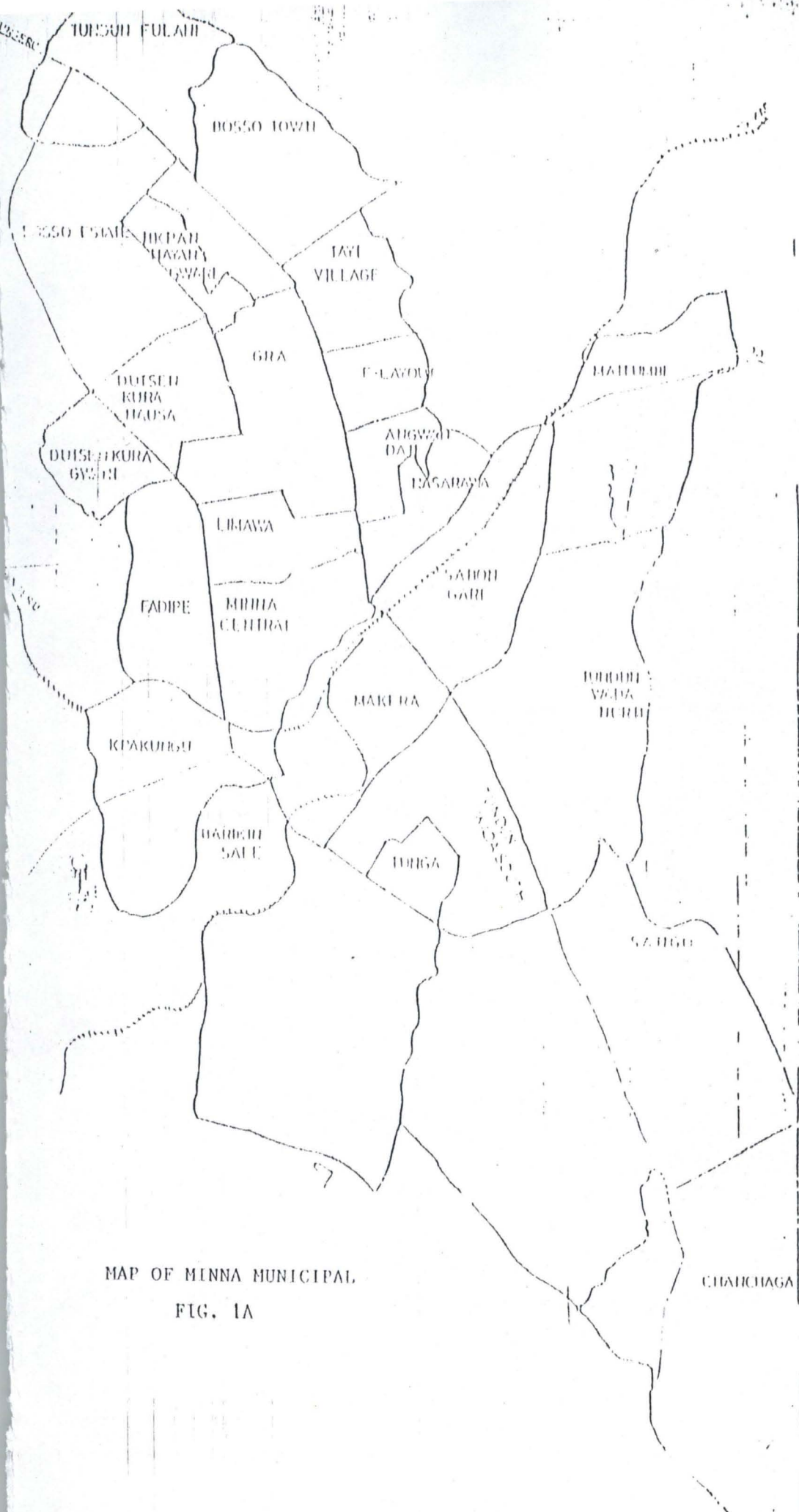
Fig. 1A & B attached.

1.5 SIGNIFICANCE OF THE STUDY

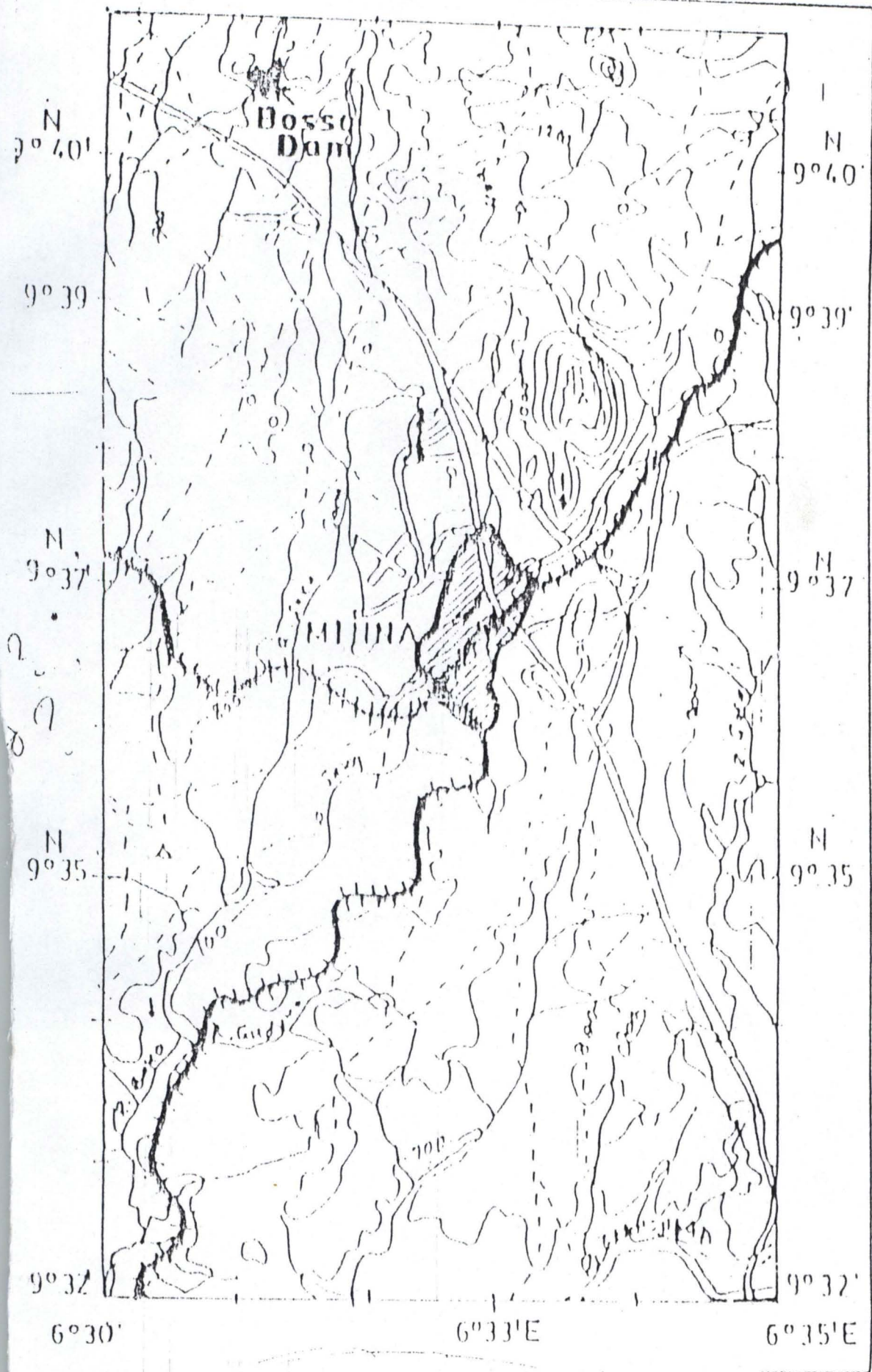
The aesthetic environment of Minna has deteriorated considerably. In the late 1960s the entire area of Minna was adorned with trees and the roads linking Minna Municipal with Bosso, Maitumbi, Tunga and Kpakungu Villages then were forested which gave a unique aesthetic scenery.

The scenic environment came under a serious attack when Minna was chosen as the state Headquarters in 1976. The forest environment gradually gave way for the construction of roads and buildings. Therefore; Bosso, Tunga and Maitumbi that were so remote before were linked-up and these areas now have become part and parcel of Minna. The only areas that bear the former scenery of Minna today is the Government Reserved Areas near the Government House.

The trees also suffered more intensely with expanded programme to supply electricity to the residents of Minna and surrounding villages. This situation is continuous as year by year National Electric power Authority Management trim trees and fell some that are directly under cable lines. Now one can easily count the number of trees in Minna municipal and its immediate surroundings.



MAP OF MINNA MUNICIPAL
 FIG. 1A



MAP OF MINNA SHOWING
LATITUDE AND LONGITUDE

FIG 1B

Minna and its surrounding villages had suffered serious flood in the late 1980s. Could this be traced to land exposure due to tree clearance? The ever expanding population in Minna due to in-flux of people from rural areas had brought serious shortages of fuel wood for energy. Minna municipal and even her immediate surrounding villages depend on far distances for fuel wood supply. This is evidenced by the use of motor vehicles for conveyance of fuel wood.

As the distance of supplies continue to increase, there is need to study the situation of fuel wood extraction and supply to Minna in order to sustain the supply and the environment. There is equally the need to study the present state of extraction and the management of the extraction environment to maintain a steady supply of fuel wood to Minna. We also have to study this phenomenon to discover any environmental consequences felling of fuel wood might have caused.

1.6 AIM AND OBJECTIVES OF THE STUDY

The study is centrally aimed to find out the rate of fuel wood extraction and consequent impact it has on the environment. This study therefore has several objectives to unfold the aim.

- (1) It seeks to appraise the rate of deforestation in the fuel wood supply areas and whether the cost of alternative source of energy (coal, kerosine and gas) is responsible for unprecedented deforestation around Minna.
- (2) The study intend to evaluate the diverse impacts deforestation might have on the environment and on human well-being.

The study also intend to survey the principal reasons behind fuel wood extraction – that is for various uses – economical, Agricultural domestic, industrial and construction purposes.

To be incorporated in the objectives of this study is to create a general awareness to the eminent environmental degradation of accelerated deforestation and to offer possible solution.

It would highlight the importance of reforestation and afforestation that could be undertaken to offset the negative climate and other consequences of deforestation.

1.7 FOCUS/SCOPE OF THE STUDY

FOCUS

My particular concern is fuel wood extraction and the probable environmental impact it might have around the areas of extraction. The study intends to focus on the ever-increasing use of fuel wood in Minna, Niger State Headquarters. More so, that the alternative sources of energy like kerosine and gas are either not available or are too expensive.

This trend calls for concern, more so, that forest usually regenerate slowly. Already distances of the supply areas have been on the increase over years.

Of the next particular interest is the technology applied to the extraction of fuel wood in the supply areas. The rate of extraction would determine the demand and the rate of degradation. The relationship of biodiversity with human population would also be evidence in the type of technology applied to extraction of fuel wood.

The awareness level of the suppliers and beneficiaries in fuel wood business, and the possible danger they pose to the environment also form another basis of the study.

SCOPE

I indeed intend to carry out survey of areas, which supply Minna with fuel wood. Basically four routes are identified to be the main supply routes. Here I want to consider fuel wood coming to Minna from Bida, Zungeru, Lapai, Suleja routes. Less importantly the fuel wood supply from Gwada route can be of interest.

With the increases in distance of supply areas motors vehicles are engaged in the supply of fuel wood to Minna. I therefore, intend to use the vehicle load of wood as a parameter of measurements for both quantity supplied and use for the particular period of study. This means in other words, that the scope is limited to the fuel wood marketed through the use of commercial fuel wood vehicles.

The response of the environment can be numerous and may vary with geographic space due to some micro-climate and edaphic elements. Some of these effects may not necessary be seen due to time space and could be long-time effect. So I restrict the study to resource depletion through the evidence that can be derived from forest regeneration and sustainability of the environment.

1.8 LIMITATIONS

It would be very difficult to offer the complete picture of fuel wood extraction history in and around Minna due to lack of database. It is equally going to be difficult to survey all the fuel wood use in Minna and

their sources of supply. The fuel wood bought and transported by private individuals are not included in this study. Fuel wood that is conveyed by head, and tree felling in the surrounding are also excluded in this study.

I therefore, want to be concern here with fuel wood that is commercially marketed through the use of commercial fuel wood trucks only.

1.9 ORGANIZATION OF THE STUDY

Pre – survey of the areas of supply fuel wood is carried out and 5 routes were identified. Minna Bida toute, Suleja route, Zungeru route, Lapai route and Gwada route.

Equally, 5 locations are chosen at each route for survey. A survey questionnaire is used since it would be difficult to survey all these areas for fuel wood supply condition.

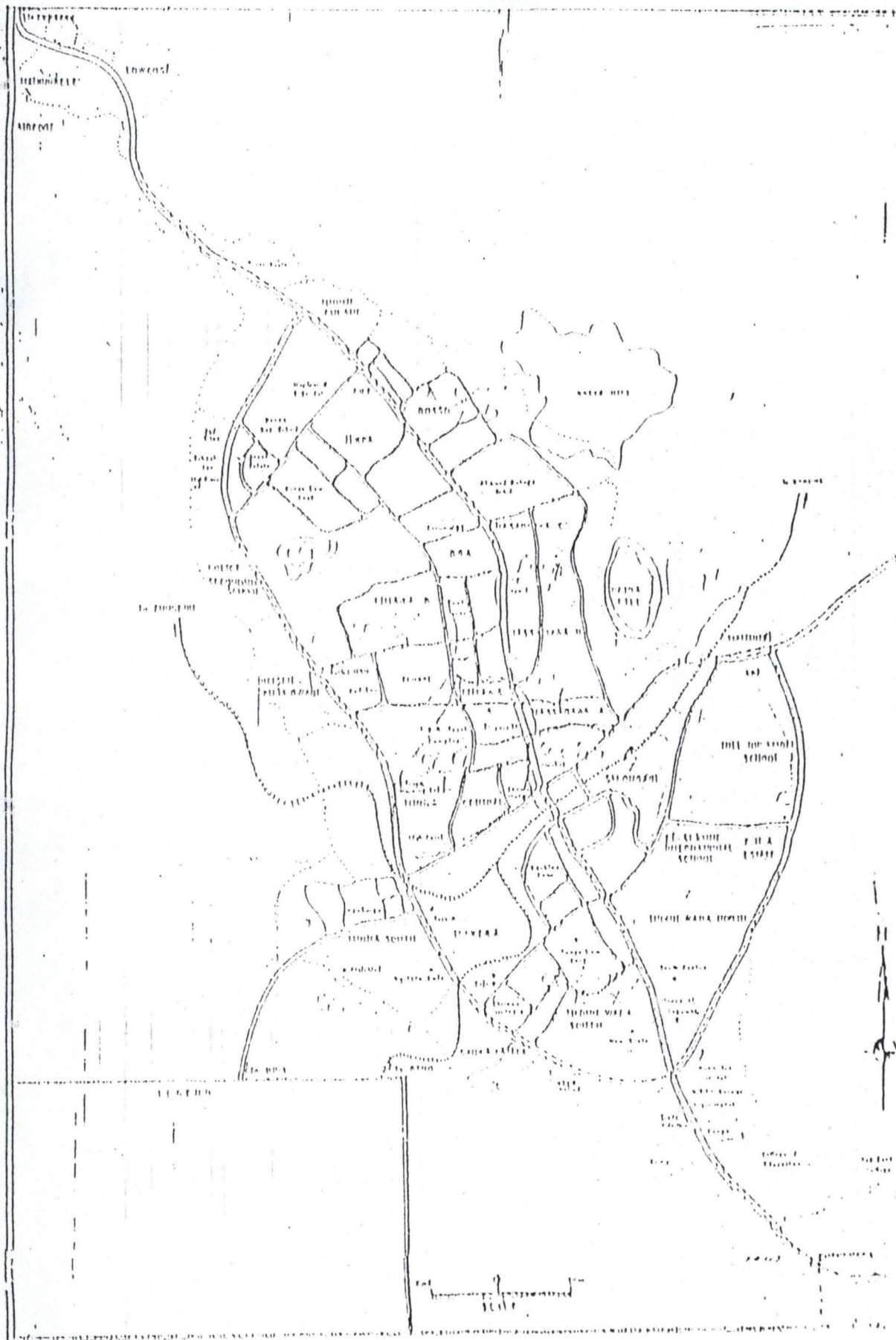
The study opens with a broad background that provided emphasize on the diversity of natural resources and the disparity in their quality and use, to enhance improved standard of living among the world's peoples. The introductory part further highlighted numerous problems that issue out as a result of man's use of natural resources, with particular interest in deforestation problems.

Chapter 2 outlines the historical situation of fuel wood in Nigeria from the existing literature on deforestation.

In chapter 3, methods of data collection are outlined. Technology that is applied, transportation of fuel wood and the rate of regeneration of forest all considered here.

Chapter 4 addresses some general observations made and highlight the dependency of man on the environment and the need to manage natural resources.

General conclusion offers useful suggestions on how to handle fuel wood situation for sustainability.



MAP OF MINNA
 MAIKUNKELE AND CHANCHAGA
 INCLUSIVE.

FIG. 1C

CHAPTER TWO

2.1 LITERATURE REVIEW

Literature abound on environment – Man relationship. Many have blamed man as the main cause of all environmental problems. However, man until recent times did not realise that he has to husband and manage natural resources such as soil, forest and minerals.

2.2 GLOBAL VIEWS

The world's forests have been traditionally seen as wilderness of exploration and exploitation, sources of timber and fuel wood. More recently, tropical forests and savanna wood lands in particular have come to be perceived as sites for agricultural expansion to feed the steaming population. The original expanse of tropical forests, some 16 million square kilometers, has already been reduced to 8 million square kilometers, mainly within the past four decades {Food and Agricultural Organization 1982; Myers 1980}; and the rate of deforestation is accelerating {Myers, 1989a}.

Until the late 1970s, the rate of outright destruction of forest cover was estimated at a minimum of 76,000 to 92,000 square kilometers a year {Houghto et al 1985; Melillo et al 1985}.

In Europe much of the land was cleared for agriculture in the early times. The development of industry led to rapid use of the remaining forests for fuel, usually in the form of charcoal and for constructional purposes. In China forests have been greatly reduced by its long-established civilization based on agriculture, except where the land was unsuited for farming or was too remote. Even today three-quarters of the

136 million cubic meters of timber removed annually from China's forests is used as fuel.

In North America, forest exploitation began much later, but from the beginning forest removal has been very rapid {Goh Cheng leong and Gillian C. Morgan June 1972}.

2.3 REGIONAL VIEWS

The widespread bush burning in the developing countries has contributed in no small measures to the regional deforestation. In the Brazillian Amazonian forest alone during the past few years wide burning involves a total of 50,000 square kilometers in the dry season of 1987 {Malingreau and Tucker, 1988; Setzer and Perreira, 1989}.

Slash – and – burn farming by small holders is the principal factor in deforestation in the Philippines, Indonesia, Thailand and Indian sub-continent {Myers 1989a}.

Shifting cultivation characterized by slash – and burn system by small holders is also the same principal factor in deforestation on the African continent. Countries like Madagascar, Tanzania, Kenya, Ivory Coast and Nigeria are in this experience {Myers 1989a}.

Colombia, Peru, Ecuador, Bolivia, Plus other regions with smaller amounts of forest cover remaining show another regional level of deforestation.

As for other agents of deforestation, cattle raising almost entirely confined to Latin America eliminated some 20,000 square kilometers of forest per year in the late 1970s. fuel wood gatherers together with charcoal manufacturers, accounted for roughly 25,000 square kilometers a

year. Commercial logger affected around 4,000 square kilometers of forest per year {Almi, 1988}.

2.4 NATIONAL VIEWS

Different nations have exploited the forest resources for different reasons. But population growth is a prominent factor in the likely progressive expansion of numbers of shifted cultivators, and hence in the accelerating rates of deforestation.

Kenya's forests covered 12 percent of national territory in 1960 when the population was only 6 million. Since the forests often occupy fertile lands where property rights are vague at best, they have been a prime focus for agricultural settlement by landless peasants. Today forests occupy only a little over 2 percent of Kenya's land area {Norman Myers, 1988}.

Nigeria's tropical rainforest has been estimated, that, under the influence of both population growth and poor management practices, at least 250,000 hectares are destroyed every year to earn Nigeria a place among the 14 topmost tropical countries faced with this problem {Wood, 1990}.

Isiehei and Akeredolu estimated that about one third of the more than 60 million hectares of Nigeria's savanna is burned annually. In addition, about 1 million tones of Nitrogen is emitted annually into the atmosphere by the burning of semi – deciduous forest. Apart from dust particles, the annual burning of fuel wood in the country release about 6.42 million tones of carbon monoxide, 87,600 Tones of hydrocarbons, 40,900 tones of oxides of Nitrogen and 26 Tones of the gas called benzopyrene gas into the atmosphere {P.S. Akinyeye Lecture Note 2004}.

The increase in population and government expanded program on agriculture were seen as another cause of forest reserve depletion and source of frequent conflict between the sedentary farmer and pastoral Nomad {J.M. Baba, Article in .R.A. Clino-Colo, et al eds}.

2.5 CONCLUSION

Clearly then population growth is just one among many variables, though it can sometimes rank as *primus interpare*; important too are such factors as technology types, energy inputs, property rights, trade relations, economic systems, and political persuasions that either reduce or aggravate the impact of population growth on deforestation. There is a general agreement by all scholars and schools for the use of the natural resources on which man's life depends, but wide disagreement on how and when the resources should be used and managed.

The present world with its 5 billion inhabitants is showing many ecological stresses and environmental strains. What will happen within another few decades when there are twice as many people, demanding three times as much food and fiber, seeking perhaps four times as much energy, and engaging in five to ten times as much economic activity; if the third world is to leave behind its pervasive poverty {World Commission on Environment and Development, 1987}? What will be the expanding impact of population growth, plus the associated factors of consumerism, technology, poverty, and so forth, upon the global environment and particularly upon the world's forests?

The global concern calls for sustainable management among the resource users. Most scholars now call for conservation of the environment.

The government of Nigeria proclaims that it is bound to meet the basic needs of peasant farmers, if necessary, by turning a blind eye to their invasion of forest lands. In the sum, the situation would work itself out through default rather than design; there is nothing resembling an officially recognized, legally sanctioned, or codified response to the situation.

J.M. Baba {1992} drew attention to the Brundtland report as the nexus of relationships which exist between human economic activities and environmental quality. The concept of sustainable development was an outgrowth of the Report's projections and is simply defined as "Development which meets the needs of the present generation without compromising the ability of future generations to meet their own needs" {Brundtland, et, al, 1987, Quoted in Bukar, 1989}. Baba further said "the answer to the sustainable development is first and foremost that the right choices be made in the processes of resource utilisation. But the basis for a right choice is, in turn, the right information.

CHAPTER THREE

METHODOLOGY

3.0 PROCEDURES

3.1 OFFICE PLANNING

The existing map of Minna was acquired from department of Geography F.U.T., Minna to properly demarcate the land area of Minna. Maikunkele and Chanchaga Villages 12 kilometers each away from Minna municipal are included in Minna land area. These areas are exempted from survey area of fuel wood supply to Minna.

3.2 FIELD RECONNAISSANCE

I went through the 5 fuel wood entrances to Minna to ascertain the viability of the study to be embarked upon. Bida route, Suleja route, Zungeru route, Gwada route and Lapai route are found to be the main sources of fuel wood supply to Minna.

3.3 PILOT STUDY

A few loading centres along the road were marked for survey. Since vehicles are involved in transporting fuel wood to Minna. Local means of transport, Head transport and beast of burden are used to bring out fuel wood from the bush to the road side for onward transportation to Minna.

3.4 SURVEY INSTRUMENT

It is difficult for one to reach and survey all necessary parameters of deforestation involving fuel wood extraction. I therefore, intend to rely on the information from the natives extracting fuel wood in the locality-using questionnaire.

The questionnaire is drafted to find out the following:

- (a) The rate of deforestation in a bit to supply Minna with fuel wood.
- (b) The distance of supply areas from Minna.
- (c) The technology applied in extraction of fuel wood.
- (d) The personnel involve in fuel wood extraction.
- (e) Benefits accruing to the people extracting fuel wood.
- (f) Any environmental problems.
- (g) Any solution in place to check the problems.

See Appendix 1 and 2

3.5 PERSONNEL

A few enumerators {interviewers} would be used to administer the questionnaire. They would also help in recording the responses from respondents on the paper that is on questionnaire.

Both the natives that supply fuel wood and the commercial vehicle drivers that transport fuel wood will form the bulk of the respondents.

Any enlightened member of the local community or school staff in survey units can assist in interpretation of the questionnaire in the local language and recording of the responses on paper.

3.6 SAMLING PROCEDURES

For the purpose of this survey 5 units {stations} are chosen from any route or direction of fuel wood supply to Minna.

Overall total of 25 units {stations} in 5 identified routes. The responses from each route would be classified accordingly to give directional trend. Finally common features of fuel wood trends would give general area view.

CHAPTER FOUR

4.0 RESULTS AND PRESENTATION

The parameters of interest that include

- 1) The personnel involve in fuel wood extraction
- 2) The technology applied in extraction of fuel wood
- 3) The source of land where fuel wood are extracted
- 4) The quantity of fuel wood extraction annually
- 5) The distance of the supply areas from Minna.

Are presented in tabular forms below.

TABLE 4.1 SEX INVOLVED IN FUELWOOD EXTRACTION

500 people interviewed 10 at each station

STATION	MALE	FEMALE	TOTAL
1	-	10	10
2	4	6	10
3	1	9	10
4	3	7	10
5	2	8	10
6	-	10	10
7	5	5	10
8	-	10	10
9	-	10	10
10	6	4	10
11	1	9	10
12.	2	8	10
13.	1	9	10
14	2	8	10

15	4	6	10
16	-	10	10
17	-	10	10
18	-	10	10
19	-	10	10
20	2	8	10
21	1	9	10
22	4	6	10
23	8	2	10
24	1	9	10
25	2	8	10
26	2	8	10
27	6	4	10
28	1	9	10
29	-	10	10
30	4	6	10
31	5	6	10
32	1	9	10
33	2	8	10
34	3	7	10
35	2	8	10
36	6	4	10
37	6	4	10
38	1	9	10
39	4	6	10
40	1	9	10
41	3	7	10
42	-	10	10
43	4	6	10
44	-	10	10

45	9	1	10
46	2	8	10
47	2	8	10
48	3	7	10
49	7	3	10
50	5	5	10
TOTAL	128	372	500

Fuel wood extraction traditionally over years were left in the hand of women who have much to do with cooking and more so that money released from its sales negligible. From the table above its clear the men are now taken kin interest in fuel wood.

TABLE 4.2 LAND SOURCE FOR FUELWOOD EXTRACTION

500 people interviewed, 10 at each station

STATION	LAND OWNERSHIP		TOTAL
	PRIVATE	PUBLIC	
1	2	8	10
2	3	3	10
3	4	6	10
4	2	8	10
5	-	10	10
6	-	10	10
7	-	10	10
8	-	10	10
9	-	10	10
10	-	10	10
11	5	5	10
12	2	8	10
13	6	4	10
14	1	9	10

15	2	8	10
16	3	7	10
17	-	10	10
18	1	9	10
19	1	9	10
20	1	9	10
21	3	7	10
22	2	8	10
23	4	6	10
24	6	4	10
25	3	7	10
26	2	8	10
27	6	4	10
28	1	9	10
29	-	9	10
30	4	6	10
31	5	5	10
32	1	9	10
33	2	8	10
34	3	7	10
35	2	8	10
36	6	4	10
37	6	4	10
38	1	9	10
38	4	6	10
39	6	4	10
40	3	7	10
41	4	6	10
42	-	10	10
43	4	6	10
44	-	10	10
45	9	1	10
46	2	8	10
47	2	8	10
48	3	7	10
49	7	3	10
50	5	5	10
TOTAL	128	372	500

The general trend of fuel wood extraction around Minna is on public land where properly rights are vague at best. Only a small proportion of land for fuel wood extraction is privately owned. In that case agricultural settlement by peasants serve as a source of fuel wood for sale.

TABLE 4.3 INSTRUMENT USED FOR FUELWOOD EXTRACTION

500 people interviewed, 10 at each station

Station	LOCAL IMPLEMENTS		MODERN IMPLEMENT	
	Axe	Cutlass	Powered saw	Caterpillar
1	10	-	-	-
2	8	2	-	-
3	7	3	-	-
4	6	4	-	-
5	5	4	1	-
6	6	4	-	-
7	5	5	-	-
8	8	1	1	-
9	10	-	-	-
10	9	-	1	-
11	8	-	2	-
12	7	-	-	3
13	6	-	4	-
14	5	5	-	-
15	8	2	-	-
16	10	-	-	-
17	8	-	-	2
18	6	4	-	-
19	4	6	-	-
20	7	3	-	-
21	9	1	-	-
22	8	2	-	-
23	10	-	-	-

24	8	-	2	-
25	7	3	-	-
26	3	6	1	-
27	6	-	4	-
28	-	-	9	1
29	8	1	1	-
30	5	5	-	-
31	9	1	-	-
32	8	2	-	-
33	7	1	-	-
34	10	-	-	-
35	9	1	-	-
36	10	-	-	-
37	10	-	-	-
38	10	-	-	-
39	10	-	-	-
40	8	2	-	-
41	9	-	1	-
42	8	-	2	-
43	7	3	-	-
44	6	4	-	-
45	5	5	-	-
46	4	3	3	-
47	6	-	4	-
48	6	2	2	-
49	3	7	-	-
50	6	1	-	3
TOTAL	359	93	48	8
G/TOTAL	452		48	

Around Minna extraction is mostly done manually the use of local implements. The fuel wood is transported home by head where it await onward movement. The local implement are used to cut down trees during dry season and bigger ones are fired from the base.

Powered saw are occasionally used to fell very big trees for lumbering. The landowners where such trees occurred are normally given a token of money.

TABLE 4.4 FUELWOOD QUANTITY SOLD PER ANNUAL (per ton)

500 people interviewed, 10 at each station

	TON PER ANNUAL			
People	5 – 10	11 – 20	21 – 30	31 – 40
500	70	81	261	73

Above 261 people extract fuel wood between 21-30 pick-ups each per annual. This table shows that due to the use of local implements only 15 people are able to supply 41-50 pick-ups load wood. The successes of these people are imbedded in family labour and use of money to buy from other suppliers at home

TABLE 4.5 DISTANCE OF SUPPLYING OF FUELWOOD FROM MINNA

STATION	KMS 0 – 20	KMS 21 – 40	KMS 41 – 60	KMS 61 – 80	KMS 81 – 100
	5	15	20	10	
TOTAL	5	10	20	15	-

The average distance of main fuel wood supply to Minna stood at 50kms from Minna. This table showed that there is an increasing short supply of fuel wood very close to Minna Municipal. In this area the only noticeable trees are shear butter, mango trees and locust bean trees.

The long distance supply necessitated the use of motor vehicle, which is another job opportunity for some retired civil servants.

Running through the five tables of different parameters one can conclusively draw some lines that bind the tables. Female sex played predominant role in fuel wood extraction this implies that fuel wood is still less labour intensive around Minna. This in turn connote the type of the instrument used and the amount of wood fell in a year.

Due to less quantity of fuel wood entering market, the land source where these woods are extracted is publicly owned or where property rights is vague at best.

One thing stands clear that the distance of fuel wood supply keep on increasing annually.

CHAPTER FIVE

5.0 SUMMARY, CONCLUSION AND RECOMMENDATIONS

5:1 SUMMARY

There is a close correlation between the quantity of wood supply and distance from Minna. This indicates that Minna can not satisfy her fuel wood needs from her immediate surrounding. This also indicates depletion of fuel wood gradually since the distance from Minna is continuously in the increase.

Male sex are increasingly being involved in fuel wood business because of its increasing monetary value. With male sex involvement there could be a rapid deforestation and a reduction in labour in agriculture.

Presently in all the areas surveyed there are no adverse environment problems. The only problem noticed is the gradual soil impoverishment which lead to more deforestation of virgin lands for agriculture.

Along Zungeru axis, charcoal is the main supply to Minna. Fuel wood is burnt and charcoal transported in sacks to Minna. The Charcoal is easier to transport, from long distances, but I noticed that it consumed more wood.

The sizes of fuel wood transported to Minna indicate gradual, depletion as the woods are in small sizes, only from long distances that you have big size wood.

Generally the people interviewed have a general believe that wood is God given and will not get exhausted at any time since God will always bring more. But acknowledge disappearance of big size trees from their environment, which indicate wood depletion.

5:2 CONCLUSIONS

Majority of fuel wood extractors are unaware of sustainable management and care less about exhaustion. The government has no also done much on environment education and legislation. People fell trees indiscriminately wherever they occur for various uses.

5:3 RECOMMENDATIONS

Environmental education and aware should be pursued in all directions to encourage sustainable development.

Alternative source of energy should be encouraged. These alternatives should be made less expensive and available to the reach of all.

Legislation should be put in place to safe guard indiscriminate fell of trees and permits or licenses be given to those who wish to go for commercial fuel wood business. This would reduce rapid growth of deforestation.

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SAMPLE QUESTIONNAIRE ON FUEL WOOD EXTRACTION AROUND MINNA

(A) GENERAL INFORMATION

- 1) Name of the farmer:..... (Optional):.....
- 2) Sex:..... Male/f emale
- 3) Residence:..... Town/Village:.....
- 4) Tribe:.....
- Native/Stranger:.....
- Main occupation:.....

(B) SUBJECT MATTER

Fuel wood extraction land

- (a) Inheritance (b) Lease (c) outright purchase
- (d) Short term rent (e) Non of the above.
- 1) If non of the above where do you extract wood?
Wild forest/public forests.
- 2) Where do you get your source?
(a) Family (b) hired (c) co-operatives (d) government
- 10) What instrument do you use in fuel wood extraction?
(a) Local implement (b) modern machines (c) fire.
- 11) Do you use power saw for fuel wood extraction? Yes/No.
- 12) If yes how much tipper/pick-up load do you make in a month?
- 13) Do you engage services of other people in fuel wood extraction? Yes/No.
- 14) If yes how many people do you employ
- 15) Do you extract wood for timber? Yes/No
- 16) If yes what do you use remnant branches for?
- 17) How much do you pay your worker each per month?
- 18) Which of these trees do you use for fuel?
(a) Sheer butter tree (b) Locus bean tree (c) Mango tree (d) Malaina tree.
- 19) How do you market your fuel wood? Wholesale/Retail
- 20) Do you produce charcoal? Yes/No.
- 21) If yes how many tonnes {cement bag weight}?
- 22) How do you transport fuel wood to market? By vehicle/by foot.
- 23) Where is your main market for fuel wood?.....

(24) What is your major production problem?

- (a) Transportation (b) Sales (c) Wood scarcity (d) government policy.

(C) **BENEFITS**

(25) How much do you earn from fuel wood sales in a year?.....

(26) From fuel wood sales how much do you spend on your children education?

(27) How much do you spend on buying food?.....

(28) Still from fuel wood sales how much do you spend on farm?.....

(29) Do you save any money from fuel wood sales? Yes/No.

(30) If yes how much?.....

(D) **AWARENESS DRIVE**

(31) Do you see anything happening to the environment where you extract fuel wood? Yes/No.

(32) If yes what is it?

(33) Is there anything to be done to check it? Yes/No

(34) If yes; what is it to be done?.....

(35) Do you like environment cleared of trees? Yes/No.

(36) If yes, why?

(37) If no what will you use instead of fuel wood?.....

(38) Have you ever think that fuel wood may get finished one day? Yes/No.

(39) If yes what is the remedy?.....

(40) If no what is the solution?.....