PROJECT TITTLE

AGRICULTURAL EFFECTS ON ENVIRONMENT

CASE STUDY OF BACITA SUGAR COMPANY

BY

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PGD/GEO/99/200/060

SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENT FOR THE AWARD OF POST GRADUATE DIPLOMA IN ENVIRONMENTAL MANAGEMENT GEOGRAPHY DEPARTMENT, FEDERAL UNIVERSITY OF TECHNOLOGY, MINNA

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CERTIFICATICATION

I hereby certify that this work carried out by Mohammed Kobo Abdul Agaie has been supervise, read and approved as a partial fulfillment of the requirement for the award of PGD Environmental Management, Department of Geography, Federal University of Technology, Minna, Niger State.

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DEDICATION

Sincere and honourable dedication to my Late Father (Abdullahi N. Adamu) and Late Mother (Zainab Abdullahi) who provided me an opportunity to attain this level of academic endeavor. Thanks to my an intimate friend by name Moh'd A. Ciroma. The Director NALDA for his moral and financial support throughout my course.

ACKNOWLEDGEMENT

Thanks to Almighty God, for sparing my life and give me opportunity to attend this course successfully; now been opportune to write this project for the Post-Graduate Diploma (P.G.D) Programme.

"IN THE NAME OF ALLAH, The BENEFICENT THE MERCIFUL". It is said one thousand journey starts by a step which made me to send my gratitude to my intimate friend and brother by name Moh'd Ciroma Agaie (The Ag. Director NALDA) Niger State, Minna. He is the basic foundation for my course and also gives me his moral support throughout the Programme.

My profound appreciation and gratitude to the course coordinator (Dr. M. T. Usman), The H.O.D (Dr. Umar) and the rest of our lecturers who gave us their maximum cooperation and guidance throughout our course.

Certainly more sincere appreciation and thanks to the Managing Director Engr. I. J. Gana Bacita Sugar Company, The Protocol Officer, The Training Officer (Mal. Yelwa), The Project manager and the entire members of the community for the necessary information and cooperation rendered to me pertaining the project.

Finally, I wish to express my hearty appreciation, gratitude and thanks to every one concern to my achievement. I certainly will remain obliged to you all.

ABSTRACT

The effects of agricultural projects on environment could be negative or positive. Both are observed in Bacita Sugar company. For the impact assessment of irrigated agricultural input in aspect of ecological dis-equilibrium or interruption of the physical, biological and social processes adapted in large scale irrigation projects. Clearly, the projects can not be considered as not having both negative and positive socio-economic and environmental effects although it has its advantages.

Part of the positive effects to the community and environment include the increase in agricultural production, increase in farmers income and desirable transformation of portable water supply to community for drinking and domestic uses.

The negative side include gradual deterioration in the quality of both irrigated soil and water; growth of variety of aquatic weeds, prevalence of vectors which serve as mode of transmission and intermediate host for certain water-borne diseases; etc.

The most causes of these undesirable effect are traced to application of chemical inputs, water management, poor feasibility studies, lack of grass- root participation in decision making process and lack of incorporation of appropriate measures to protect environment and health in the project plan. As the problems are identified, the suitable methods suggested to solve problems includes:-

(i.) Continuous monitoring of soil and water in irrigated fields.

(ii.) Comprehensive feasibility studies.

(iii.) Enlightenment in efficient utilization of inputs.

(iv.) Proper management of funds to boost the moral of the projects activities.

Finally, unless these measures are taken large-scale irrigation may undermine the basis of agriculture itself, though such ventures are needed for self-sufficiency in food and raw materials production in the country.

TABLE OF CONTENTS

CHAPTER ONE

1.0 INTRODUCTION

The Nigerian Sugar Plantation Company at Bacita is an indigenous National Company, managed and operated by Nigerians using the vast natural resources of the country. The sugar plantation for the Nigerian Sugar Company Ltd. (NISUCO), Bacita has been under irrigation since 1964.

Approximately, 5,600 hectares almost 6,000 hectares of sugar cane have been planted to date, an average of 30,000 (tones) of sugar annually has been produced for the last 20 years with production varying from a low of 16,400 tones in 1983/84 to a high of 36,084 in 1973/74.

The company is situated at Bacita in Kwara State, 30 kilometers from Jebba and 120 Kilometers North of Ilorin the Kwara State Capital. The map attached.

The company produces at present over 30,000 tones of refined sugar annually, provides employment for 3,000 permanent staff and 2,500 seasonal workers. Over 50,000 Nigerians derive their livelihood from the company.

The surface and sprinkler irrigation methods been established successfully as far as the yield of sugar cane from the plantation is concerned. The methods adopted for the sugar-cane plantation are water distribution efficiency, water conveyance efficiency, water application efficiency, and crop water use efficiency.

The excess water irrigation of rain from the sugar plantation are drained through the drainage canals. The determination of the designed parameters were based on available data collected from the company as well as from experiments carried out by the author, such data include meteorological data collected by the company and data from land survey and soil test carried –out. This guides an efficient and feasible design.

In fact, large scale irrigation projects have potential, if well managed of enhancing agricultural productivity thereby providing

food security and raising the economic base of poor farmers, the physical, social and economic adverse side effects are not left behind.

1.1 BACK GROUND OF THE STUDY AREA (PROJECT – DESCRIPTION) HISTORY.

It was in 1956 that the Nigerian Government decided to investigate the possibilities on having a sugar industry of its own. In pursuance of this objective, Bookers MC Connel Limited; A British sugar manufacturing company was contacted to carry out the survey. In order to grow cane on a commercial scale the area to be selected must be determined by the following factors:-

(a.) Availability of fairly flats vast and unoccupied fertile soil.

(b.) Sufficient water for irrigation.

(c.) Convenience for communication by road, rail and river.

The experts ultimately selected Bacita as a place, which seemed to them to fulfill most of the conditions, required as stated above. The Federal Government accepted the report of the experts early in 1959 and a Nigerian sugar syndicate was set-up to carryout detailed investigation in to the possibility of sugar production in the area recommended.

Following the success of the trial cane plots after three years of study, Nigerian had assumed full responsibility for the management of the estate by 1973.

1.2 CLIMATIC CONDITION OF THE AREA:-

Attached are the tables, which show the monthly minimum and maximum temperature, rainfall, relative humidity, wind-speed, sunshine and evaporation. The rainfall occurs generally between the month of April or May to October. The peak normally occurs in the month of August. In term of temperature, the relative humidity varies all the year round.

1.3 HYDROLOGICAL CONDITIONS:-

The sources of water are rivers Niger and Oshin through the Kainji and Jebba dams respectively. The water is obtained by diverting water over weir constructed across both rivers in to a canal,

which transport this water to the sugar cane plantation estate. There is enough water supply.

1.4 TOPOGRAPHY:-

The area is relatively flat with gentle slopes in some areas. The soil of the area as investigated by Haggion soil survey 3–12 (1962) is mostly sandy-loam. The topography of the project area makes it possible for the practice of both surface and sprinkler method of irrigation. In establishment of any project work on the field the vertical slope was found to be 0.004% while the cross slope was 0.002%.

1.5 AIMS AND OBJECTIVES OF THE PROJECT.

(i.) To facilitate domestic supply of refined sugar through improved irrigation.

(ii.) To save foreign or increase foreign earning for the country through export.

(iii.) To assess the level of agro-chemical application i.e synthetic chemical fertilizer, insecticides/herbicides and other pest control chemicals; and their effects on the project areas.

(iv.) To determine the level of floristic uniformity or species diversity and its effects on the project area.

(v.) To assess the level of susceptibility of soil to erosion as a result of irrigation practices in project area.

(vi.) To assess the effect of creating a pocket of extensive surface water due to Dam construction on the environment.

(vii.) To design an effective surface irrigation method.

1.6 JUSTIFICATION OF THE PROJECT.

The Nigerian Sugar Company Bacita in the recent past saw the need for an expansion for the project because of the increasing demand for their products granulated sweet-cane-sugar and from point of view of satisfying the economic necessities of the community.

The focus of this project therefore, is to design surface irrigation method that can be applicable both now and in the future. The surface irrigation method was selected because it is highly economical and feasible. In addition, the surface method of irrigation is generally easy and cheap to install where conditions are suitable. This design work is however concerned with surface irrigation particularly the furrow method.

Generally, the growth period in tropical countries extends all round the year, needing perennial water where irrigation is most needed. Irrigation water may be applied to crops by flooding it on the field surface (surface irrigation), by applying it beneath the soil surface (sub-surface) by spraying it under pressure (sprinkler) or by applying it on drops (drip –irrigation).

1.7 SCOPE AND LIMITATION OF THE STUDY.

As indicated in the topic, the research is primarily concerned with examining the effect of agricultural project with the particular emphasis on irrigated agriculture in Bacita Sugar project area. The finding may be of help to subsequent researches on similar topic, though the study is of a limited scope.

The particular research work is necessary because of inadequate attention given to the immense environment.

ANNEX
Fig. : 2

NIGERIA

BACITA SUGAR EXPANSION PROJECT

MAP OF THE PROJECT AREA

THE NIGERIAN-SUGAR COMPANY LIMITED, BACITA ESTATE PRODUCTION STATISTIC FOR EACH AGRICULTURALYEAR FROM 1964 - 1990

YEAR	HECTARES HARVESTED	TONES CANE HARVESTED	TONES SUGAR PRODUCED	TC/HA	TC/TS	TS/HA
1964/65	1,734.52	78,554	4,900	63.63	16.03	3.98
1965/66	1,883.12	134,794	1,2074	71.58	11.16	6.40
1966/67	2,430.88	213,718	20,927	87.92	10.21	3.60
1967/68	2,586.00	199,738	19,365	77.24	10.32	7.49
1968/69	276,14.14	249,983	22,753	92.09	10.99	3.38
1969/70	3,324.73	288,831	25,990	86.88	11.11	7.81
1970/71	3,628.77	261,585	23,770	72.08	11.00	6.55
1971/72	3,610.16	257,990	25,610	71.46	10.07	7.09
1972/73	3,751.07	267,454	27,250	71.31	9.81	7.26
1973/74	4,296.30	341,517	35,084	79.49	9.73	8.17
1974/75	4,499.45	365,624	348,420	81.26	10.49	7.14
1975/76	4,576.28	322,298	31,733	72.61	10.47	6.93
1967/77	FAMERS	2,842	274			
	4643.02	333757	32832	71.88	10.17	7.07
1977/78	FAMERS	6226	579			
	4056.	276203	24393	58.08	11.32	6.01
1978/78	FAMERS	2/116	1933			
	4513.03	313344	26972	69.43	11.62	5.98
1978/80	FAMERS	14981	1378			
	5068.53	336137	30790	66.32	10.72	6.07
1980/81	FAMERS	13425	1335			
	5025.25	317916	29895	62.64	10.63	5.89
1981/82	FAMERS	6466	635			
	4832.09	245954	23101	50.90	10.65	4.78
1982/83	FAMERS	5822	551			
	4996.60	296270	27658	59.29	10.71	5.54
1983/84	FAMERS	3632	333			
	4668.35	176931	16073	37.90	11.01	3.44
1984/85	FAMERS	4362	382			
	4438.91	227848	20019	51.35	11.39	4.51
	4438.91	227848	20019	51.35	11.39	4.51
-177						
1985/86	FAMERS	8358	852			
	4742.48	283638	25351	53.48	10.01	5.36
533	FAMERS	14100	1392			
1986/87	5141.61	329285	31946	64.05	10.31	6.21
-525	FAMERS	15401	1476			
1987/88	5366.28	321395	30154	59.89	10.65	5.62
-706	FAMERS	18559	1850			
1988/89	5386.57	292207	29305	54.25	9.97	.44
-521	FARMERS	14748	1475			
1989/90	5229.49	244406	24738	46.74	9.88	4.73

DOMESTIC SUGAR PRODUCTION, IMPORTS AND CONSUMPTION (TONES). DOMESTIC PRODUCTION

1964-1990

Year	Bacita	Human	Total	Imports	Consumption	Domestic
1964/65	4000	0	4900	60000	64900	7.6
1965/66	12074	0	12074	58926	71000	17.0
1966/67	20927	0	20927	54073	75000	27.9
1967/68	19365	0	19365	58635	78000	24.8
1968/69	22753	0	22753	60247	83000	27.4
1969/70	25990	0	25990	74010	100,000	26.0
1970/71	23770	0	23770	91230	1150000	20.7
1971/72	25610	0	25610	124390	150000	17.1
1972/73	27250	0	27250	177750	205000	13.3
1973/74	35084	0	35084	250916	286000	12.3
1974/75	34840	0	34840	318160	353000	9.9
1975/76	31733	0	31733	408267	440000	7.2
1976/77	33016	0	33016	486894	520000	6.4
1977/78	24972	0	24972	550028	575000	4.3
1978/79	28905	0	28905	546095	575000	5.0
1979/80	32162	0	32162	630338	665200	4.9
1980/81	31230	10,000	41230	783770	825000	5.0
1981/82	23670	13,800	37470	612530	650000	5.8
1982/83	28143	11,800	28843	810057	850000	4.7
1983/84	16395	NONE	16395	898634	915029	1.8
1984/85	20401	8,000	28401	907000	935401	3.04
1985/86	26203	17,000	43203	900000	946630	4.9
1986/87	33338	20,000	53638	894700	948338	5.7
1987/88	31630	15,000	46630	900000	946630	4.9
1988/89	31154	20,000	51154	895000	946154	5.4
1989/90	26213	19,800	66013	953987	100,000	4.6

CHAPTER TWO

LITERATURE REVIEW

In the history of Nigeria Agricultural Project, in terms of large scale irrigated agriculture has received high priority since the mid 1970s (Ref. Baba 1972, Abdulmuim 1979 and Olafin 1992).

In the 3rd national development plan (1975-1980) Vol. pp-92) the development of water resources for agriculture was considered a pre-requisite for realization of the full agricultural potential of the country. For that the desire for and urgency of an aggressive as result on grievous Crises in agricultural production in post oil boom period led to a number of individually owned, corporate by controlled and Government established large scale agricultural projects (L.S.A.P.) which have sprouted in various parts of the country.

Therefore, it will be noted or mentioned that literature on the issue of impact or effect of large scale agricultural project on environment particularly irrigation agriculture in Nigerian in very scanty.

Briggs-et-al (1992) stated that just as environmental factors influence farming activity so that activity affects the environment. Agricultural systems are to that extent artificial system thus, they can be seen as attempt to maintain the environment in an artificial and more usefully productive state by control of soil fertility, vegetation fauna and microclimate.

Despite the success of these attempts as indicated by agricultural activities and they greater biomass production of agricultural systems in similar environments. It also has negative effect by damaging the environment and possibly undermine the basis of agriculture itself.

Admittedly large scale farming in the late regions has often yielded spectacular results mainly in terms of tonnage of out-put per hectare. Large scale agricultural projects adhere strictly to the standard and ethics of modern agriculture which require the use of many agro-chemicals, fertilizer, insecticides, herbicides and other

pest control chemicals in order to improve production and animals including fish; and reduces post harvest losses to the minimum.

In attempt to maximize agricultural yield the application of these chemicals causes harm to non-target organisms including earthworms and man himself.

In addition, chemicals through irrigation returns to water and polluted water bodies thereby affecting water quality. Such effects may lead to the extinction of aquatic species, fish plant plantation and other micro-invertebrates Yaigbevwen (1985).

In 1992, Baba noted that chemical inputs as fertilizers, insecticides and herbicides which though may benefit the production system in the short –run are often ultimately injurious to the environment in the long-run, especially when present in large quantities or through indiscriminate use.

CHAPTER THREE

1.0 DATA AND METHOD

The meteorology used in this research in regard to the agricultural effect on environment was suggested by the tittle under the following study: -

(a.) It is obtained through literature review.

(b.) Through the administration of questionnaires and direct interview techniques with the members of the community and staff of the company.

(c.) Fieldwork datas.

(d.) Soil sampling datas.

(e.) Detail survey of the project area.

(f.) Laboratory experiments.

(g.) Data analysis on climate change for the period of Ten years.

1.1. LITERATURE REVIEW

Guides and teaches how to examine and collect the existing and past knowledge-work datas which served as the theoretical frame work or basis of the research work.

This is also enable me to justify the need for the purpose of the study select objective hypothesis. The review of the relevant material enables me to establish the context and significance of the problem and new ideas and approaches to dealing with the problem in the study.

1.2. THE ADMINISTRATION OF QUESTIONNAIRES.

The questionnaires were issued to find the general assessment of the effect of the agriculture; especially the establishment of sugar-cane irrigation system production on environment in the project areas.

The questions are structured or based to examine the level of effect or impact of certain specific operational areas of irrigation system. Examples of agro-chemical application, construction of dam

etc on the soil flora and fauna and soil economic life of the people and some advantages on rural infrastructures.

1.3. FIELD-WORK –DATAS:- (TOPOGRAPHIC SURVEY).

Survey of the field was undertaken of the project so as to assess erodability of soil, possible evidence of water logging, saline soil due to water management and also observe the ponds/depressions on the field. A topographic survey is often required to provide a basis for planning the leveling programme and designing of an irrigation project.

1.4. DETAIL SURVEY OF THE PROJECT AREA.

The field was divided by means of the chains, in the grid systems and stakes were put at each grid-point. This is because the land was relatively flat without the usual surface features that will require closer observations. A spacing of 30 x 30m was used in locating the grid points, two based lines were established in each direction of the field and then the stakes were sighted in.

The whole project area covered about 6,000 hectares. About 2,700 hectares under the surface irrigation, while about 3,000 hectares under the over-head irrigation.

To make the survey information more readily understood and studied, a contour map was drawn using the contour lines of suitable interval.

1.5. SOIL SAMPLING

According to the information's gathered from the agricultural officers i/c ; because of the variable nature of the Bacita soils, a high degree of precision in sampling is not possible. Since the field was of standard size, the samples were taken along its diagonals as recommended by Taylor (1979). The total of twelve samples at depths of 15cm, 30cm and 45cm were taken which was done before the field was divided in to blocks 1 & 2. According to agric. Officer, usually the top 25mm of soil attach to the auger screw was discarded since it may consist of soil which had the scrape from the upper part of the hole or metal cylinder was removed.

1.6. DATA ANALYSIS ON CLIMATE CHANGE.

For the period of ten years. When data have been collected, statistical description was made or carried –out using simple techniques of frequency and percentage in form of table. This is mainly for accuracy and explicit comprehension of the work to avoid numerical complications that may render the inferences and interpretations invalid. Attached are the statistics data's.

1.7. PROBLEMS.

- Flooding
- Timely inavailability of the input.
- Inadequate machinaries for the work.

Flooding – Hazard:- It affects neighboring villages running about Two Hundred hectares of land. Series of years that the company had flooding hazards, had made production very low, which affects the company.

Example of since 1994, Nigerians premier Sugar Factory Bacita sugar cane farms flooded and lost about ₦ 1.417 billion.

TOTAL MONTHLY RAIN FALL IN MILLIMETER

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total	Mean
1993	0	0	94	22	236	167	146	309	296	32	0	0	1303	109
1994	0	0	0	105	179	177	265	185	275	124	0	0	1310	109
1995	0	0	17	12	122	156	2.11	195	287	105	0	0	1135	95
1996	0	0	0	6.2	92.6	195	226	229	2215	54.5	0	0	1024.8	85.4
1997	0	0	23.5	153.5	173	263	98.5	92.5	115.5	58.3	0	0	977.8	81.4
1998	0	0	9	60.5	166	263	100.5	197.5	310	88.5	0	0	1195	100
1999	0	0	0	37	153.5	240.5	116	197.5	220.5	67.1	0	0	1062.1	89
2000	0	0	0	20	114	269.5	206	317	296.5	55	0	0	1278	106.5

MAXIMUM TEMPERATURE IN DEGREE CENTIGRADE

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total	Mean
1997	34	37	36	36	37	34	35	33	30	33	36	36	114	35
1998	34	31	35	38	30	37	32	36	38	39	32	34	416	35
1999	33	32	35	37	37	33	31	34	36	33	32	33	406	34
2000	36	35	39	39	36	31	33	31	31	37	35	-	-	-

MINIMUM TEMPERATURE IN DEGREE CENTIGRADE (°C)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total	Mean
1997	23	26	25	25	23	22	22	23	23	23	19	19	273	23
1998	19	21	23	24	21	20	23	19	24	25	19	22	260	22
1999	22	23	21	24	24	23	25	21	22	22	22	17	266	23
2000	20	18	22	27	25	23	23	21	23	22	23	-	-	-

0900 MONTHLY MEAN PERCENTAGE RATE/HUMIDITY

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total	Mean
1997	56	61	70	72	69	74	80	76	79	72	69	69	847	71
1998	79	66	61	66	74	79	81	80	81	78	65	53	863	72
1999	73	70	64	77	75	69	78	74	81	75	76	71	883	74
2000	61	43	53	70	74	80	84	85	85	82	81	-	-	-

CHAPTER FOUR

1.1. DATA ANALYSIS AND DISCUSSION OF RESULTS

There are about eight communities, which are directly, affect or involved in Nigeria's premier sugar factory Bacita sugar cane irrigation. Each of these communities has at least 150 families.

It was unfortunate that I could not get in contact with all farmers or the to get opinion of all the affected members of the communities. For that a sample study is employed by random sample method to distribute questionnaires to about one hundred members of the communities from these villages; Gbere, Bele, Yelwa, Oshebi, Fanagum and Bacita.

The respondents have their own plots of farming outside the project areas or promises. They even form cooperative societies in their deterrent communities. About ten to twelve hectres allocated to each cooperate society.

In this chapter the researcher intends to analysis and interpret the data colluded from the questionnaires administered on farmers and workers of the company and selected locations in the field. So as to establish the level of impact initiated by the sugar factory Bacita sugar cane irrigation farms.

1.2 EFFECTS OF THE AGRO CHEMICAL APPLICATIONS

The use of many agro chemicals in large guaranties in order to improve yield or to reduce damage done to crop plants and post harvest losses is a peculiar characteristics of large scale agricultural projects.

Fertilizers are applied manually on the cane set's in the furrow prior to covering or broadcaster on the ridges before interrow cultivation in case of Ratoons.

Main source of nitrogen (N2) is sulphate of ammonium (SA) urea calcium, ammonium nitrate (CAN) and 15:15:15: phosphorous regalements are obtained from triple super phosphate (T&P) or single super-phosphate (S.S.P). While potash is from Murata of potash

(MOP). Fertilizers are conpounded and used in the following rates for basic plant and Ratoons 78.75kg. N2 + 56.88kg. P205 +76.25kg K20 per hectre. The rates varies slightly as a result of differences in soil type, sugar cane varieties and result of last polar analysis.

1:3 HERBICIDES AND PESTICIDES:- An integrated weed control is practiced in the estate. After the eyes on the cane seats germinate in to shoots, the crop is

cultivated with various implements to control weeds and to let air and

water in to the soil.

Chemical weed control is done pre-emergence. A mixture of Divron 80wl 24D Amina or Atrazine + 24D is used pre-emergence while 24D plus gramozone is used post emergence. Asulox 40 mixed with actril is used to control the more stubborn weeds.

Termites, stem and shoot borers are the major insects' pests of sugar cane in Bacita Estate control is by soil drench with appromix of chemicals.

2.1 THE IMPACT OF IRRIGATION ON SOIL.

The soils of the area are derived primarily from the flood plains of rivers.

Virgin land is cleared off all forms of vegetative growth felled trees stumps and roots are piled in rows 30metres apart and burnt. Then the land is leveled, then followed by ploughing harrowing, and row making at 1.6m saplings. Ridging is then carried out using disdridgers.

Two types of irrigation are practiced viz. Overhead (sprinkler) irrigation and gravity (furrow) irrigation.

As the irrigation is equally drainage, since sugar cane can not thrive under water logged condition. The fields furrow and sprinkler are always designed to ensure efficient irrigation and proper drainage without excessive erosion. Sugar cane requires about 2.000mm of water per annum for optimum growth. The average rainfall in Bacita is 1.031mm representing only about half of the crop requirement.

2.2 EFFECTS OF IRRIGATION ON FLORA AND FAUNA

Introduction of irrigation can cause disturbances in the natural vegetation particularly during operations of land clearing, plougling and farming. In this process the nalnat rare plants and animals species may be destroyed and will be a general reduction in the flora and fauna diversity.

Although such ecological changes are really, difficult to quantify but new system related to perennial water bodies such as reservoir, canals, drainage, ditches are observed in the field. From data obtained 63% or 75% out of 85% respondents agreed that new plants are brought to the area due to irrigation, 30% or 54% of these respondents asses the level of such changes to be low. Thus implies that the farmers are conscious of changes in their environment.

There is also prevalence of such vectors as anopheles and serials which served as agents of some water-borne diseases to the residents of the dam area.

2:3 EFFECT ON HUMAN HEALTH.

Irrigation can create new ecological systems, which are related to water bodies such as reservoir, irrational canals and drainage ditches.

These water bodies provide medium for aquatic plants that serve as habitat for vectors and intermediate hosts for certain diseases.

From that data obtained on the prevalence of certain diseases in the area, it is clear that flariases, malaria and diarrhea are the common diseases.

- Malaria is about 50%
- Flariases is about 35% while
- Diarrhea is about 15%.

From the data collected, the project i.e sugar company is taken care the sick or illed people by treating them in their own established clinic and refer the major cases to teaching Hospital Ilorin.

2:4 SOCIO-ECONOMIC IMPACT

There is rapid progress in production of sugar, which is a great advantage for the community and the Government. Attached is the sketch of production for the past ten-year's duration.

SUMMARY OF FINDINGS

- Chemical inputs such as fertilizers and herbicides as gramazone are used in the project area.
- PH of most soil samples in the field varies from very strongly acidic to moderately acidic (PH 10.0 – 20.0)
- There is moderately high level of (Na) sodium in the sample of a certain location in the field.
- Poor drainage conditions led to water logging in some location in the field.
- There is prevalence of vectors of malaria and flimsies.
- No environmental and health protection measures in the project plan.
- The farmers appreciate increased in production and income.

CHAPTER FIVE

CONCLUSION AND RECOMMENDATION.

1:1 CONCLUSION:-

In view of my observation and survey of this project, it is clear that the sugar plantation for the Nigerian Sugar Company Ltd (NISUCO), Bacita as not initiating some undesirable socio-economic and environmental hazards. Though it could not be abandon since it has its advantages, such advantages could be enhanced while traces of certain factors capable of irrigating ecological diseases equilibrium should be removed or reversed.

To check acidity level in the soil, humming should be done where the PH is found to fall bellow PH 5.5 in value in the field. In improved trainability in the field especially in the field in areas observed to be flood and water logged, there is the need to make adequate provision for drainage facilities in order to prevent further deterioration of the field that could be endangered by salinity of left under excess of water all the time.

There is also need for gulag monitoring of hydrogen chemical condition of the ground water system in order to check Nitrate No3 and potassium intrusion do chemical fertilizers applications.

2:1 RECOMENDATION

There is need to identify more exactly the functions fulfilled by the various farming techniques in any large scale of irrigation project. Elaborate more closely the structure and dynamics of irrigated agriculture and consider in greater details the ways in which these schemes affect the environment from such as understanding it may then be possible to predict more accurately the environmental effects of irrigation system and wherever possible, develop policies which are more sensitive to the environment.

My recommendations are as follows; to enable achieve laudable objectives or goals.

(a.) A whole basin approach and comprehensive feasibility studies should be undertaken with accurate environmental impact assessment before the project.

(b.) Selection of irrigation method appropriates to the natural and socio-economic conditions.

(c.) Efficient monitoring of ground water and salinity conditions.

(d.) Continuous monitoring of soil and water in irrigation fields must be taken seriously and the results such studies should be used to take appropriate steps to safe guarded the quality of both soil and water.

(e.) Water shad management to reduce sedimentation and flood risks.

(f.) Farm management practices should be improved indiscriminate introduction of exotic technology should be curtailed.

(g.) There is need to quantify the environmental status of the existing projects with a view to arresting any unwanted trends.

(h.) Providing adequate infrastructures and social services in project areas.

(i.) Advising farmers through effective and sound extension services on appropriate farming and irrigation techniques.

(j.) There is need to teach efficient water utilization in all irrigation projects.

(k.) Providing adequate sanitation, domestic water supplies and control of water-borne diseases.

(l.) Providing capital and purchasing and marketing facilities for examples, through crop erasures.

(m.) Policy formulation should benefit from grass root contribution and the participating peasants should have priority access to activities, credit and inputs.

FEDERAL UNIVERSITY OF TECHNOLOGY, MINNA
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APPENDIX:

TOPIC:- RESEARCH QUESTIONAIRE

These questionnaires are designed to enable me obtained the detail honest data regard to establishment and the effect or the impact the project has on the community.

QUESTIONAIRE "A"

QUESTIOAIRE ON BACITA-SUGAR COMPANY AGRICULTURAL EFFECT ON ENVIRONMENT.

WORKING-STAFF QUESTIONAIRE

NOTE:- PLEASE, READ CAREFULLY AND GIVE CORRECT INFORMATIONS AS QUESTIONS BELLOW:-

1. SEX:- (a) Male ( ) (b) Female ( )
2. AGE:- (a) 15 – 25 ( ) (b) 26 – 35 ( ) (c) 36 Above ( )
3. OCCUPATION:- -
4. JOB TITTLE:- (A) Admin. ( ) (b) Factory ( ) (c) Field ( )
5. IF FACTORY:- (a) Foundry Dept. ( ) (b) Bayese Bugs ( ) (c) Boiler House ( ).
6. RANK:- (a) Senior Staff ( ) (b) Intermediate Staff ( ) (c) Junior staff ( )
7. Has the project made you better economically? (a) Yes ( ) (b) No ( ).
8. If Yes, how? (a) Through increased production by giving incentive ( )
   (b) Other sources ( )
9. Since the beginning of the project, is there any improvement in production and sales? (a) Yes ( ) (b) No ( )
10. If yes, how often? (a) Intermittently ( ) (b)Consequently ( ) (c)No. of years ( ).

11. Were measures necessary to protect the environment and health in co-operated in the project plan? (a) Yes ( ) (b) No ( ).
12. If yes, state the type of measures:-
13. State the commonest project and field work hazard:-
    (a) Environmental injury (pollution) ( ).
    (b) Foreign – body penetration ( ).
    (c) Animal invention ( )
    (d) Mention any out of the above stated.

QUESTIONAIRE "B"

QUESTIOAIRE ON BACITA-SUGAR COMPANY AGRICULTURAL EFFECT ON ENVIRONMENT.

MEMBERS OF THE COMMUNITY QUESTIONAIRE

NOTE:- PLEASE, READ CAREFULLY AND GIVE CORRECT INFORMATIONS AS BELLOW:-

1. SEX:- (a) Male ( ) (b) Female ( ).
2. AGE:- (a) 15 – 25 ( ) (b) 26 – 35 ( ) (c) 36 Above ( ).
3. OCCUPATION:- -
4. How many people lives in your house?
5. Do you have plot for farming?
6. If yes, how many hectres?
7. Do you use chemical impact on the plot/plots?
8. If yes, who provides?
   (a) Company ( )
   (b) Government ( )
9. What type of chemical input?
   (a) Fertilizer ( )
   (b) Pesticides ( )
   (c) Herbicides ( )
   (d) All of the above ( )
10. What type of fertilizer do you apply on your plot?
    (a) N.P.K. ( )
    (b) N.P.K. with CAN combination ( )

(c) UREA

(d) If any, mention.

11. Which of the hazard commonly experience?

(a) Flood

(b) Drought

(c) Deforestation

12. How often?

13. Which 0f the disease/diseases common in your area?

(a) Food poisoning ( )

(b) Worms infestation ( )

(c) Typhoid fever ( )

(d) Malaria fever ( )

(e) Onchochiasis ( )

(f) If any, mention.

14. Were you displaced in any way by flood? (a) Yes ( ) (b) No ( )

15. If yes, what level are the damages to the properties or lives?

(a) High ( ) (b) Very high ( ) (c) Low ( )

16. Do you receive any assistance?

(a) Yes ( ) (b) No ( )

17. Who render assistance?

(a) Company ( )

(b) State Government ( )

(c) All of the above ( )

SOCIO ECONOMIC IMPACT QUESTIONAIRE

1. Has the project made you better economically? (a) Yes ( ) (b) No ( )

2. If yes, how? (a) Increased production ( ) (b) High income ( ) (c) Better health care ( ) (d) All of the above ( )

3. Since the beginning of the project is there any improvement in transportation by construction of good roads? (a) Yes ( ) (b) No ( ).

REFERENCES

1. Olofin E. A. (1992) Some Economic and Environmental effects of Emigration in Nigeria, Dept of Geography Bayaro University, Kano.
2. UNRBRD (Ibid 1998) Information Brief on Swashi Dam and irrigation Project, Loye points Minna Niger State.
3. Adams W. M, (1990); Environmental and Sustainability in third word, London.
4. Johl, S. S. (1980) Irrigation and Agriculture Development UN New York, USA.
5. Odafen, A. E. (2000) Man's interference with Biogeochemical Cycle: - Departmental Lecture notes series No.2 Federal University of Technology, Minna, Niger State.