POPULATION DYNAMICS, REAL SECTOR DEVELOPMENT AND ENVIRONMENTAL CONSEQUENCES: A COMPARATIVE ANALYSIS OF THE NIGERIAN AGRICULTURAL AND INDUSTRIAL SECTORS
By
Nigerian Institute of Social and Economic Research (NISER), Ibadan

I PROJECT SUMMARY

1. Project Title: POPULATION DYNAMICS, REAL SECTOR DEVELOPMENT AN ENVIRONMENTAL CONSEQUENCES: A COMPARATIVE ANALYSIS OF THE NIGERIAN AGRICULTURAL AND INDUSTRIAL SECTORS

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4. Centres or teams involved in the project: Nigerian Institute of Social and Economic Reseach

5. Number of all researchers who will participate in the project: 7

6. Disciplines involved: Agricultural Economics, Demography, Geography, Economics, Environment, Agronomy

7. Area(s) of study: Kebbi State, Borno State, Benue State, Niger State, Imo State, Cross River State, Kaduna State, Ekiti State, Anambra State, Lagos State, Edo State, Kano State, Bauchi State all in Nigeria.

8. Key words describing the project:

-Population: population density, demographic characteristics

-Development: agricultural production, urban farming, industrial production

-Environment: soil contamination, productivity loss, land misuse

-Geographical Field: Sub-Saharan Africa

-Methods of Analysis: Pooled time series-cross sectional regression, production functions

-Sources of data: NISER NAMRP data set, 1995/96 Survey of Industrial Enterprises

9. Summary of the project:

The population dynamics in Nigeria seem to be at the centre of the prevailing development challenges. Rising population density in many areas put pressure on available natural resources especially land; thus impairing any significant expansion in farm size. On the other hand high population growth rate implies that the agricultural sector is becoming increasingly pressured to increase production. The land use and agricultural production methods have considerable environmental implications. In areas of low population density and suitable arable land, shifting cultivation is the order of the day thus leading to extensive deforestation. Where land is a limiting factor, the production practices encourage soil degradation either through the use of modern inputs such as fertilizer, herbicides and pesticides or through

continuous cultivation without attention to loss of soil nutrients.

The industrial sector has been a beneficiary of migration which is crucial phenomenon in population dynamics. The employment opportunities offered by the sector is one of the pull factors fuelling the drift from rural to urban areas where major industries are located. For a long time now, the migrants cannot be absorbed by available firms and some of them engage in activities which have adverse environmental consequences. Thus, the broad objective of the study is to compare the population-related environmental consequences of production activities in the agricultural and industrial sectors of the Nigerian economy. Specifically, the study seeks to (i) examine the demographic changes in agricultural households and the resultant effects on agricultural production and resource utilization; (ii) examine the existing agricultural production systems and their environmental consequences in different agro-ecological zones; (iii) identify agro-ecological zones with high and rising population densities and determine the impact of such population pressure on the use and management of available renewable natural resources;(iv) determine the environmental consequences of the production activities of selected industrial enterprises in different urban centres across the country; (v) examine the economic activities of migrants in the selected urban destinations and determine their environmental consequences; and (vi) recommend appropriate measures for sustainable population, industrial and agricultural development in the country.

Conceptually, the study focuses on the system of recursive interactions among population dynamics, agricultural and industrial sector development and environmental resource dynamics. In general, the system of relationships is such that *ceteris paribus*, change in any one of the three elements brings forth corresponding changes in the other two elements. In analysing the relationships, the study will use existing panel data under the NISER Annual Monitoring Research Project (NAMRP) (1992-2001)as well as the data set from the survey of industrial enterprises conducted in 1995/96. Primary data will be collected for only one of the objectives relating to the comparison of environmental consequences of economic activities of migrants and non-migrants.

In the analysis we shall examine the trend in demographic characteristics (age, gender, household size etc) of farmers and the effects on agricultural productivity and land use in a regression analysis. Pooled time-series cross- sectional data approach will be adopted. The same data set will be used to analyse the productivity differences between users of modern inputs such as fertilizer, pesticides, herbicides etc and non-users. A production function approach will be adopted using appropriate econometric techniques. With the assistance of an agronomist, soil samples will be taken in typical farms representing the two production systems and laboratory analysis will be carried out to determine the soil quality and extent of contamination. This will enable us to further assess the environmental consequences of the production systems quite apart from the results of the productivity analysis. To examine the effect of population density (pressure), on input utilization and productivity of farmers as well as land use and management techniques, production functions will be estimated and marginal productivities of inputs compared between farmers in high and low population density areas within the same zone and across the southern and northern zones using the same NAMRP data set.

In disseminating the results all the stakeholders and intended beneficiaries will be contacted and invited to participate in a dissemination workshop which will be held our Institute.

II DESCRIPTION OF THE PROJECT

Problem

Nigeria is the most populous country in Africa. Both the geographical and population size tend to pose serious development challenges. Over the last four decades, the population has more than doubled; increasing from about 55 million in 1963 to about 120 million in 2003. Prior to the advent of oil in the early 1970s, the nation and population relied on agriculture as a source of employment, income, export earnings and food. As the oil fortunes grew substantially, the country embarked on the development of the industrial sector and gradually reduced the intensity and emphasis on agricultural development. To date, none of the sectors has developed to its fullest potential. The agricultural sector cannot provide sufficient food for the citizens nor sufficient raw materials for the industries. The industrial sector is highly import dependent, operates far below capacity and has not been able to contribute significantly to the solution of the mounting unemployment problem.

The population dynamics seem to be at the centre of the prevailing development challenges. Over the years, the mortality rate has been on the decline while the birth rate and fertility rate remain high. The population has been rising rapidly both in the urban and rural areas but more so in the former than latter. Rising population density in many areas put pressure on available natural resources especially land; thus impairing any significant expansion in farm size. On the other hand high population growth rate implies that the agricultural sector is becoming increasingly pressured to increase production. An additional pressure is also imposed by the migration of able bodied youths from the rural to the urban areas. This phenomenon has tended to increase potential food demand and further widens the food supply-demand gap. It also means that farmers have to rely more on family labour, including children, in order to meet their agricultural labour requirements. And this is part of the reasons for maintaining high fertility rates especially in rural areas.

The land use and agricultural production methods have considerable environmental implications. In areas of low population density and suitable arable land, shifting cultivation is the order of the day thus leading to extensive deforestation. Where land is a limiting factor, the production practices encourage soil degradation either through the use of modern inputs such as fertilizer, herbicides and pesticides or through continuous cultivation without attention to loss of soil nutrients. Irrigated agriculture can also have adverse environmental consequences in terms of water logging and contamination of ground water.

The industrial sector has been a beneficiary of migration. The employment opportunities offered by the sector is one of the pull factors fuelling the drift from rural to urban areas where major industries are located. For a long time now, the migrants cannot be absorbed by available firms and some of them engage in activities (street trading, farming, mining, vandalization of oil pipelines etc) which have adverse environmental consequences. The foregoing pattern of population, development (agricudltural and industrial) and environment interactions raises a number of pertinent research questions. The following are illustrative.

S   What unintended or involuntary production activities are carried out by migrants in their urban destinations? And what are the associated environmental consequences?

S   What demographic changes have occurred among farming households? And how have such changes affected agricultural production and resource utilization in different agro-ecological zones of Nigeria?

S   What are the environmental effects of rising population densities in different agro-

ecological zones of the country?

S   How have the different agricultural production systems (rainfed agriculture, irrigated agriculture, extensive agriculture, intensive agriculture etc) affected the environment?

S   What are the various environmental effects of industrial activities in urban and rural areas?

S   Is the settlement pattern and location of industrial enterprises environmentally consistent? If not, what are the emerging environmental consequences? For instance, if enterprises are located close to residential areas or vice versa and if industrial wastes are disposed close to such areas, the environmental effects can be quite severe.

These issues have not been properly addressed in the country. There is therefore, a great lacuna to be filled by the study being proposed.

National Importance of the Problem

Agriculture continues to remain the mainstay of the Nigerian economy, contributing about 40% of the GDP and main source of employment for about two-thirds of the population. Nevertheless, output growth in the sector in not consistent with population growth and to date the country is a net importer of food. Recently, the import bill is becoming increasingly unbearable and some import restrictions are being imposed by the government; meaning that a significant increase in domestic production is required to satisfy domestic demand. In this connection, there is need for concerted efforts to ensure sustainable agricultural development, curtail the rapid population growth rate and thus ameliorate the possible environmental consequences. Irrigated agriculture is being emphasized in the country and the government is investing heavily in the construction of dams and irrigation development in general, however, the environmental implications are rarely addressed. This study will assess the environmental effects of irrigation and provide suggestions for improved irrigation management and improved yield from irrigated agriculture in the country.

Moreover, the country is committed to the goal of industrial development in the belief that this is the route to higher employment rates, higher productivity and higher incomes for an increasing share of the population. The environmental resource requirement for achieving the industrial development objectives is of significant policy relevance. A careful analysis of the interconnections among population dynamics, environment and development in the real sectors will contribute to the achievement of expected policy outcomes.

Relevance for Policies on Sustainable Development

The government has placed considerable emphasis on sustainable development. An understanding of the various ways by which development efforts in the selected sectors can proceed in a manner that is environment friendly will be helpful in achieving the goals of sustainability. In so far as any given resource is not renewable, and to the extent that any sectoral project is based on such a resource it would not be sustainable. The key to sustainable environmental resource utilization therefore is sound environmental policy and management which is lacking in the country. The proposed study will provide useful input to the formulation of appropriate policy and management strategies, to curb the depletion of available environmental resources.

Scientific Objectives

The broad objective of the study is to compare the population-related environmental consequences of production activities in the agricultural and industrial sectors of the Nigerian economy. Specifically, the study seeks to achieve the following objectives.

(i)   To examine the demographic changes in agricultural households and the resultant effects on agricultural production and resource utilization;

(ii)   To examine the existing agricultural production systems and their environmental consequences in different agro-ecological zones;

(iii)   To identify agro-ecological zones with high and rising population densities and determine the impact of such population pressure on the use and management of available renewable natural resources;

(iv)   To determine the environmental consequences of the production activities of selected industrial enterprises in different urban centres across the country;

(v)   To examine the economic activities of migrants in the selected urban destinations and determine their environmental consequences; and

(vi)   To recommend appropriate measures for sustainable population, industrial and agricultural development in the country.

Working Hypotheses:

(i)   Farmers' demographic characteristics have no significant effect on their productivity and resource utilization.

(ii)   modern (or intensive) agriculture has no significantly adverse consequences on soil quality and farmers'productivity,

(iii)   population density has no significant effect of the productivity of farmers,

(iv)   industrial production activities have no significant environmental effects in Nigeria and

(v)   there is no significant difference in the environmental consequences of economic activities of migrants and non-migrants in major urban centres in Nigeria .

Data

The study will benefit from the existing data under the NISER Annual Monitoring Research Project (NAMRP). This project was introduced in 1990 by the Nigerian Institute of Social and Economic Research (NISER) to provide a framework for monitoring activities in key sectors of the Nigerian economy. As staff of NISER it should be possible for us to use the data on the agricultural component of NAMRP which cover the demographic characteristics of farming households, input utilization, production and yield in respect of producers of cereals, legumes, as well as roots and tubers in different agro-ecological zones of Nigeria. This longitudinal data will be available for the period 1992 - 2001 and will particularly be useful in accomplishing the first three objectives on our list. Existing data based on 1995/1996 survey of industrial enterprises across the country by NISER researchers will be used to accomplish objective (iv). Existing data in other institutions such as the Federal Office of Statistics, Central Bank of Nigeria, Federal Ministries of Agriculture, Industry and Environment will also be obtained and used in the study.

Primary data will be collected to address only one of the objectives relating to the comparison of environmental consequences of economic activities of migrants and non-migrants. Also, soil samples will have to be collected from farms in areas of high and low population

densities and areas of intensive and non-intensive agricultural production systems.

Methodology
Conceptually, the proposed study is focused on the system of recursive interactions among population dynamics, agricultural and industrial sector development and environmental resource dynamics. In general, the system of relationships is such that *ceteris paribus*, change in any one of the three elements brings forth corresponding changes in the other two elements. The essence of policy is to influence, in one way or the other, the cause-and-effect patterns in ways conducive to sustainable human welfare.

Population Dynamics refers to changes in the size, demographic structure and spatial distribution of a given population over time. Such changes can be traced to natural environmental changes, changes in economic and political circumstances, changes in reproductive health management technology and, ultimately changes in human reproductive and location decisions. Every one of these changes is subject to policy interventions either to reinforce, or otherwise dampen or reverse it.

Environmental Dynamics: All elements of the natural environment are to varying degrees subject to changes in the available stocks and quality as distributed spatially. Of particular concern are those elements with significant asset value to human society, otherwise termed natural resources. These include land, minerals embedded in land, soil, forests, surface as well as underground water and associated biodiversity, the air and other atmospheric resources. These elements of the natural environment remained in 'dynamic equilibrium' for as long as they were subject only to the long-term cyclical forces of nature. However, systematic changes in the quantity and quality of and hence, the need for management strategies for the resources became inevitable as a consequence of increased population pressure and aggressive resource exploitation for agricultural and industrial developments.

Agriculture and Industrial Sector Development:
Development can be understood in terms of economic growth, modernization, socio-economic transformation, and distributive justice (cf. Mabogunje, 1981: 35-46). Whichever way, development is a dynamic process of "… upward movement of the entire social system…" (Myrdal, 1968, 1869), or the attainment of a number of ideals of modernization such as "… rise in productivity …and a rationally coordinated system of policy measures that can remove a host of undesirable conditions that (perpetuate) a state of underdevelopment" (Black, 1966, paraphrased in Meier, 1976:6). Of specific relevance in the present context is the notion of economic development as the process whereby the real per capita income of an area increases over a long period of time in such a way that the number of people below an absolute poverty line does not increase, and the distribution of income does not become more unequal (Meier, op. cit.: 6).

Population – Environment Interactions:
Controlling for the effects of other factors e.g. cultural nuances, technology, external aid, and environmental resource base expansion through territorial expansion, population growth translates to additional pressure on existing environmental resources: increased population

density implies increased land use intensity which may lead to increased incidence of conflicts over control of available stock of resources and thus, disruption of economic activities, increased soil erosion and diminished soil fertility and productivity. The direct soil productivity effect of increased population density is to lower per capita agricultural output and income. Similarly, increased population density leads to higher net forest resource extraction rates and subsequent deforestation and associated bio-diversity losses, higher net mineral resources extraction rates and associated land degradation. The cumulative effect of all these is steady decline in the quality and quality of the environmental resource base and hence, lower degree of (agricultural and industrial sectors) development sustainability in the given geographic area.

Unmitigated population pressure on the environment and the conflicts it generates over resource control in turn put environmental pressure on population and leads to voluntary and/or involuntary net migration from a given area. Conversely, environmental conditions conducive to peace, sustained agricultural productivity and higher incomes will induce increased population growth both through net in-migration and natural increase.

Population – Real Sector Development Interactions
A major premise of the proposed study is that environmental carrying capacities and sustainable development are directly and indirectly determined by the population factor. Unmitigated population growth indirectly inhibits agricultural sector productivity and incomes through its negative effects on land and forest resources. Similar effects are transmitted to the industrial sector, indirectly through disruptions in the backward and forward linkage systems for raw material inputs as well as industrial products, induced by adverse population changes.

The direct interactions between population dynamics and real sector development are recursive. There is a direct relationship between shifts in population size, structure and socioeconomic characteristics on one hand, and changes in demand for a wide range of industrial products, *ceteris paribus*. Expansion in industrial activity and productivity in turn generates more employment and income, thus leading to improved socioeconomic characteristics. The literature suggests that the lower demand for many children under improved socioeconomic conditions encourages lower fertility rates, although such change in fertility behavior may initially be limited to the industrial labor force. To the extent that industrial expansion has significant backward linkages with the agriculture sector, the fertility behavior effects will also be felt in the rural agricultural population.

Method of Analysis: In view of the diversity of inter-relationships to be examined different analytical techniques will be used in addressing each of the objectives. Using NISER's NAMRP panel data set from 1992 -2001 across seven zones we shall examine the trend in demographic characteristics (age, gender, household size etc) of farmers and the effects on agricultural productivity and land use in a regression analysis. Pooled time-series cross- sectional data approach will be adopted. The same data set will be used to analyse the productivity differences between users of modern inputs such as fertilizer, pesticides, herbicides etc and non-users. A production function approach will be adopted and using appropriate econometric techniques tests of significant differences will be carried out to address objective (ii) and associated hypothesis. This will be the first time the data set will be used for this type of analysis. With the assistance of an agronomist, soil samples will be taken in typical farms representing the two production systems and laboratory analysis will be carried out to determine the soil quality and extent of

contamination. This will enable us to further assess the environmental consequences of the production systems quite apart from the results of the productivity analysis.

The NAMRP data set will also be used for objective (iii). Within the seven zones, settlements of high and low population densities will be identified and the data will be re-classified accordingly. It is known that the former are likely to be from the southern zones while the latter are to be found in the northern zones. Even within each zone such categories of farmers will be identified.To examine the effect of population density (pressure), on input utilization and productivity of farmers as well as land use and management techniques, production functions will be estimated and marginal productivities of inputs compared between farmers in high and low population density areas within the same zone and across the southern and northern zones. The results of this econometric analysis will enable us accept or reject hypothesis (iii) above. Of course the environmental implications of the results will also be pointed out.

Objective (iv) will be addressed using existing data set obtained in a survey of industrial enterprises in 5 urban centres across the country- Lagos, Ibadan, Kano, Kaduna and Onitsha. However, in achieving objective (v) primary data will be collected in the same urban centres but this time focusing on economic activities of migrants in comparison with non-migrants. This is to capture the issue of population dynamics vis a vis the development and environment interlinkages. Attention will be focused on urban agriculture, land use (or misuse) for commercial, production and aesthetic purposes and other environment unfriendly activities. A characterization of the land use pattern will be undertaken including detailed analysis and comparison of the costs and benefits. Appropriate statistical techniques will be used for the comparison and for testing hypothesis (v) above.

With a view to empirically determining the environmental impact of agricultural and industrial activities, the research team plans to carry out appropriate soil and water analysis. Using standard experimental field work techniques soil and water samples shall be taken on farmlands devoted to intensive and extensive production systems as well as outside the manufacturing plants in the cities of Lagos, Ibadan, Kano, Kaduna and Onitsha. The underlisted parameters shall be determined with the methods stated.

Use and valorization of results
The results of the study will be useful (i) as input into policy making (ii) as teaching materials (iii) as input into the legislative process both at national and regional levels (iv) as input into management decisions by private sector enterprises and (v) as materials for extension services by resource managers, NGOs and development partners. Thus, in disseminating the results all the stakeholders
and intended beneficiaries indicated above will be contacted and invited to participate in our dissemination workshop which we hold routinely in our Institute. Besides, special arrangements are already in existence through which we channel our research findings to policy makers and members of the parliament. Specifically, policy memoranda will be distilled and passed to members of the executive arm of government and relevant agencies. The parliamentarians in various committees relevant to the study will be invited to participate in our usual Legislative Round table in which the findings will be packaged for dissemination and further deliberation. The Round table is a capacity building forum our Institute is planning to offer to the Nigerian law makers.

Parameters for Soil and Water Analysis

S/N	Parameters	Method
1	Dissolved Oxygen (DO)	Titrimetry
2	Salinity (as chloride)	Titrimetry
3	Total Suspended Solids (TSS)	Gravimetry
4	Total Dissolved Solids	TDS Meter
5	Turbidity	Turbidity meter
6	Total Hydrocarbon Content	Spectrophotometry
7	Temperature	Mercury-in-glass thermometer
8	Hydrogen ion concentration	pH meter
9	Electrical conductivity	Conductivity meter
10	Alkalinity	Titrimetry
11	NO_3N	Colorimetry
12	SO_4S	Turbidimetry
13	PO_4P	Colorimetry
14	Ammonia (NH3)	Spectrophotometry
15	Exchangeable cations (Ca^{24}, K^4, Mg^{24}, Mn^{24})	Atomic Absorption Spectrophotometry
16	Heavy metals (Fe, Zn, Cr, Pb, Cu, Cd, hg, V, Ni, Ba)	Atomic Absorption Spectrophotometry
17	Colour	Spectrophotometry
18	Tranparency	Seeejo Disc
19	Biochemical Oxygen Demand (BOD^5)	
20	Chemical Oxygen Demand (COD)	

Bibliography
Articles
1.   Bola Akanji and Folake Okediran (1990), "Agrochemicals in Achieving Optimum Crop Production Goals: The Other Side. *Revue Africaine Des Sciences Sociale et Humanes*, No. 1, Vol. 1, 1990, pp.71-81.

2.   A.Y. Okediran and B.O. Akanji (1989), "Combating the Hazards of Agrochemicals in Nigeria". *Business and Property Law*, Vol. 2, No. 12, Nov/Dec., pp. 74-80.

3.   Lal, R. (1986), "Soil Surface Management in the Tropics for Intensive Land Use, High and Sustained Production". *Advances in Soil Science 5*: *1-109.*

4.   Areola, O. (1985), "Extractable Copper Content of Soils under Peasant Cocoa Farms in Ibadan Region, Nigeria". *Turrialba,* Vol. 35(3), pp.229-232.

Books

1.   McGauhey, P.H. (1968), *Engineering Management of Water Quality,* McGraw-Hill Book Co., New York.

2.   Lutz, Ernst *et al* (eds) (1998), *Agriculture and the Environment: Perspectives on Sustainable,* World Bank, Washington, D.C.

3.   U.S. Department of Agriculture (1991), *Agriculture and the Environment Yearbook,* U.S. Department of Agriculture, Washington, D.C.

4.   Olokesusi, Femi *et al* (1997), *The Technological Impact of Environmental Standards and Practice Relating to Pollution Control on Nigerian Industries,* African Technology Policy Brief, Vol. 2(5), Technopol Publishers, Ibadan.

5.   Areola, Olusegun (1991), *The Good Earth,* An Inaugural Lecture, University of Ibadan Press, Ibadan.

6.   Mortimore, M. (1989), *The Causes, Nature and Rate of Soil Degradation in the Northern Most States of Nigeria and an Assessment of the Role of Fertilizer in Counteracting the Processes of Degradation,* The World Bank Environment Department Working Paper No. 17.

7.   Food and Agriculture Organization (FAO), (1995), *World Agriculture: Towards 2010,* FAO, Rome.

8. United Nations (1992). *Earth Summit - Agenda 21*, The United nations Programme of Action from Rio, The United nations Department of Public Information, New York, Section 5.3

9. EOLSS & UNESCO (1997). *Conceptual Framework,* Encyclopedia of Life Support Systems (EOLSS) Publishers Co. Ltd., Surrey, U.K.

10. Mabogunje, Akin L. (1981). The Development Process - A Spatial Perspective

Chapter in Books

1.   Ohaji, S.M.O. (1988), "The Effects of Brewery Effluent Discharge on the Quality of Ikpoba River". In: P.O. Sada and F.O. Odemerho (eds), *Environmental Issues and Management in Nigerian Development,* Evans Brothers (Nigeria Publishers) Limited.

2.   Postel, Sandra (1987), "Stabilizing Chemical Cycles". In: Lester Brown *et al* (eds), *State of the World*, Worldwatch Institute, Washington, D.C., pp.157-176.

3.   Sobulo, R.A. and O.A. Osiname (1985), "Fertilizer use in the Tropics: Nigerian Experience, In: Sobulo, R.A. and E.J. Udo (eds), pp.193-203.

Conference Papers

1. Olokesusi, Femi (1998), "Pesticide use in Cocoa Production and its Environmental Effects under Liberalization Policies in Ondo State, Nigeria". Paper presented at the Regional Seminar on Cocoa Liberalization in West and Central Africa at Abidjan, Cote d'Ivoire, 16-18 November.

2. Olofin, E.A. (1980), "Some Effects of the Tiga Dam and Reservoir on the Downstream Environment in the Kano River Basin, Kano State, Nigeria". Paper presented at the Pre-Congress Symposium of the IHP-IGU, Tsukuba, Japan.

3. Olomola, Ade S.(2002) "Environmental Degradation, Natural Resource Management and Sustainable Development in Nigeria: Issues and Research Priorities" Invited Paper Presented at the NISER/NATCOM UNESCO Workshop on Management of Socio-Economic Transformation in Nigeria, NISER, Ibadan, December 10, 2002 (forthcoming in workshop proceedings).

Thesis and Research Reports

1. Olokesusi, Femi (1992), "Framework for Environmental Impact Assessment in Nigeria: Case Study of Large-Scale Irrigation Projects in the Sudano-Sahelian Zone". Ph.D Thesis submitted to the University of Ibadan, Ibadan, Nigeria.

2.. Federal Office of Statistics (n.d.), *Rural Agricultural Sample Survey, 1986-87,* Federal Office of Statistics, Lagos.

3. Olomola, Ade S. (2002) Herders Sedentarization Policy And Its Implications for Sustainable Management of Environmental Resources in Nigerian Drylands. A Research Report Submitted to UAPS, Dakar, Senegal

III THE TEAM
1. Person in Charge
Name: Professor Olomola   First Name: Aderibigbe S.
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Name: Professor D. Olu Ajakaiye
Position: Director-General

3. Table of the Members of the Team

Name	First Name	Parent Organization	Proportion of time (a)
Prof. Olomola	Aderibigbe	Nigerian Institute of Social & Economic Research	25
Prof. Olokesusi	Femi	-as above-	25
Prof. Agunbiade	Ajiboye	-as above-	25
Dr (Mrs) Akanji	Bola	-as above-	25
Mrs. Nelson-Twakor	Nancy	-as above-	25
Dr Togun	Adeniyi	University of Ibadan	10

(a): proportion (in %) of working time dedicated to the project

4. Individual forms (not necessary since no one will put in more than 30% of time)

5. Presentation of the team

Origin of the Research Team

The 6-person research team was put together by the Director-General of the Nigerian Institute of Social and Economic Research (NISER), Ibadan, in response to the call for proposals. Five members of the team who are experienced researchers in different facets of the social sciences are full time employees of NISER. The sixth member of the team is a full-time staff of the Department of Crop Protection and Environmental Biology, University of Ibadan, Ibadan.

Short Biographies of Team Members

1. **Prof. Aderibigbe Olomola:** Professor Olomola obtained his Ph. D in Agricultural Economics in 1990 from the University of Ibadan but joined the Institute in 1985. Currently he is the Head of our Research and Consultancy Unit and Coordinator of the Institute's Programme on the Review of Nigerian Development. He is also the current Chairman of the Scientific Committee of the Agricultural Policy Network for West and Central Africa. He has well over 60 publications to his credit and had made over a hundred appearances in professional meetings in Nigeria, other African countries, Europe and the USA. He has served as consultants to several organizations including the World Bank, DFID, FAO, CIDA and the Nigerian government. He has worked in the network of UAPS (Union of African Population Studies) where he recently completed a research work on the environmental resource management implications of increasing herders population in the northern part of the country. He has a good grasp of development issues in Nigerian agriculture and the economy in general.

2. **Prof. Femi Olokesusi:** Currently Director, Physical Development Department, holds a Bachelor of Science (Hons) in Botany, University of Lagos; Masters of Environmental Studies, York University, Toronto and Ph.D Environmental Planning and Management, University of Ibadan, Ibadan. He has more than 20 years of research and consultancy in the area of environmental impact assessment, natural resources management and sustainable environmental technology policy issues. Prof. Olokesusi has to his credit more than 60 publications in form of edited books, journal articles and monographs, etc. in addition to several technical reports. He has consulted for the UNDP and DFID, among others.

3. **Professor Boye Agunbiade:** Professor Agunbiade has a Doctor of Philosophy degree in economic geography from the University of Iowa, Iowa City, U.S.A. (1981), and a Post-graduate Certificate in Investment Appraisal and Management from Harvard University, Cambridge, Mass., U.S.A. (1988). His research and consultancy experience covers a period of more than twenty-five years. As a faculty at the University of Iowa, U.S.A., and as a research staff at NISER, he has conducted research and taught university courses on

environmental policy issues and problems in development planning. He has also taught classes of professional planners courses on research methods and environmental policy analysis. The major part of his professional experience, however, has been acquired in executing several major research and consultancy projects sponsored by NISER, Nigerian Governments and major international institutions.

4.   **Dr (Mrs) Bola Akanji:** Dr. Bola Akanji has a doctorate degree in Agricultural Economics from the University of Ibadan, Ibadan. Special area of interest is trade and structural studies and policy analysis. She has published many papers in these areas as well as co-ordinated research projects on structural adjustment effects, poverty analysis, social impacts of agricultural growth as well as gender perspectives of agricultural and broad development issues. Currently Senior Research Fellow at the Agriculture and Rural Development Department of NISER.

5.   **Dr. Adeniyi Togun:** A Senior Lecturer in the Department of Crop Protection and Environmental Biology, Dr. Togun earned a Bachelor of Science degree (Hons) from the University of Nigeria, Nsukka followed by a Ph.D in Agriculture from the University of Ibadan, Ibadan. He has co-ordinated several studies on crop-environment interactions and environmental protection culminating in more than 30 publications in reputable journals, book chapters and conference proceedings.

6.   **Ms Nancy Twakor:** Nancy is a young hard working demographer affiliated with the Social Development Department of NISER. She has a Master's degree in Demography and Social Statistics with interest in the areas of reproductive health, demography and women issues. She belongs to various professional associations and has been involved in various research studies.

From the foregoing short biographies of the team members, you will note their long and varied but complementary expertise in three key areas germane to the chosen research theme - Population, Environment and Development. The latter is represented by agriculture and industry. NISER is eminently qualified to be the project institutional base given its rich long history, in-house expertise and availably research and consultancy resources. The history dates back to 1950 when the West African Institute of Social and Economic Research (WAISER) was set up to provide information on issues of vital importance to the development of the then British colonies in West Africa. At independence in 1960, WAISER became the ***Nigerian Institute of Social and Economic Research (NISER)*** and it was part of the University of Ibadan, Ibadan, until 1977 when it became autonomous vide Decree No. 70. NISER is, thus, the premier government policy think-tank and the leading research and consultancy parastatal of the Federal Government of Nigeria located at its own campus at Ojoo, along Oyo Road, Ibadan.

Functions

The functions of the institute, as stated in Decree 70 of 1977 are to:
a)   provide consultancy services to the Federal and State Governments, their agencies and organizations, in the field of economic and social development;
b)   conduct research into the economic and social problems of the country with a view to the application of the results thereof;

c)   organize seminars and conferences on problems of economic and social development in the country, whether on its own accounts or on behalf of the government of Nigeria or their agencies; and

d)   cooperate with Nigerian universities, research institutes and other institutions in the mobilization of the country's research potential for the task of national development and dissemination of research findings for the use of policy makers at all levels.

Organization

Apart from the Department of Administration and Finance, the institute has six research departments, five research units, one unit and a center with expertise in varying fields. The departments are: Agriculture and Rural Development; Business and Technology Development; Economic Development; Human Resources Development; Physical Development; and Social Development. The units are: Population Research, Transport Studies, Macro-Economic and Strategic Modeling Unit and Rural Policy Analysis and Management Unit and Political Development Unit, while the center is the African Resource Center for Indigenous Knowledge.

Administration

NISER has a Governing Council which determines its broad research policies and programmes. The Institute is headed by a Director-General, who is the Chief Executive. He is assisted by the Directors of Departments and Heads of Divisions, Units and Sections. The Institute is self-accounting and it has an internal auditor. The Institute is governed by a Governing Council whose functions according to Decree 70 of 1977 are: to determine broad policies and programmes of the Institute. NISER has a very well stocked Library and Data Processing Unit. As part of its capacity building process, the institute collaborates with reputable local, international and multi-lateral institutions and agencies. A few of these are the World Bank, DFID, CIDA, UNEP and UNESCO. The outputs of NISER's researches which have been published severely as books, monographs and occasional series.

IV WORK SCHEDULE

a) Research work to be carried out before the mid-term evaluation (from June 2003 - February 2004)
-Review of literature and development of research instruments,
-Survey of migrants and collection of primary data,
-Collection of soil samples in relevant ecological zones with different population densities and
-Preparation, processing and analysis of data in respect of environment and population. (6 months)

b) Interpretation of results and drafting of the mid-term report (for February 2004) - (3 months)

c) Research work to be carried out after the mid-term evaluation (from March 2004 to February2005)
-Preparation, processing and analysis of data in respect of the environmental effects of different agricultural production systems
-Preparation, processing and analysis of data in respect of the environmental effects of different

industrial enterprises
- Comparative analysis of environmental consequences of economic activities of migrants and non-migrants (3 months)

d) Further interpretation of results and drafting of the pre-report (for March 2005) including the planning and organization of review workshop (3 months)

e) Review meeting by researchers and planning for integration of workshop suggestions

f) Final drafting of the provisional report (for April 2005) (2 months)

g) Revision of the report after evaluation by the scientific committee (1 month)
        The research will be completed within a total of 18 months