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# AFRICAN RURAL EMPLOYMENT RESEARCH NETWORK

## WORKING PAPER

AFRICAN RURAL EMPLOYMENT STUDY:

PROGRESS REPORT AND  
PLAN OF WORK,  
1972-76

Working Paper No. 1

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**Department of Agricultural Economics  
Michigan State University  
East Lansing, Michigan 48824**

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Janet L. Munn

*With the Compliments of*

**Professor Carl K. Eicher**

**Department of Agricultural Economics**

**Michigan State University**

**East Lansing, Michigan 48823**

**U. S. A.**

**Phone (517) 353-9330**

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## PREFACE

The African Rural Employment Research Network was initiated in 1971 through a planning Contract (AID/csd 3606) which enabled a group of African and Michigan State University (MSU) scholars to jointly develop a three-year proposal for research on rural employment. This research has subsequently been funded under the present contract (AID/csd 3625) with Michigan State University beginning on June 30, 1972. Michigan State University has since developed subcontracts with scholars in Nigeria, Sierra Leone and Ethiopia to enable local scholars to undertake research in cooperation with MSU.

The purpose of this Working Paper is to summarize the progress of the Research Network to date and provide a work plan for the remainder of the project--1974-76. [It is anticipated that it will take four years (June 1972-June 1976) to complete the study rather than three years (1972-1975) as originally planned.] The Working Paper describes comparative micro-level research being undertaken on the demand for and supply of labor in agricultural production, employment in the rural nonfarm sector and rural-urban migration in Sierra Leone, Nigeria, Ethiopia, as well as detailed plans for a comprehensive analysis of the employment problem based on integrated micro-level research in one country--Sierra Leone.

Carl K. Eicher  
Professor of Agricultural Economics  
Michigan State University  
East Lansing, Michigan

## I. INTRODUCTION: PROBLEM DEFINITION, OBJECTIVES AND THE NETWORK APPROACH

### The Employment Problem

A major premise of the research is that employment and unemployment cannot be studied in isolation from overall growth, development and structural change in the economy. The employment problem as broadly defined in our study has at least three dimensions. First is the efficiency dimension resulting from underutilization of labor. Although rural labor is generally fully utilized at certain seasons in Africa there appears to be a considerable slack at other seasons. Since labor is the major factor of production in rural areas, the total production system must therefore be considered. Second is the equity dimension which arises from the importance that labor remuneration assumes as a determinant of income distribution. Finally there is the socio-political dimension arising out of overt unemployment, particularly of school-leavers. Although overt unemployment is overwhelmingly concentrated in urban areas, the problem has its roots in rural areas since a large majority are rural-urban migrants. Hence rural-urban migration must be considered an integral part of the employment problem.

Given this broad conception of the employment problem, any comprehensive evaluation of development strategies as they affect rural employment must consider a complex of interactions affecting supply and demand for labor in rural areas and its migration to urban areas. The analytical framework and methodology that underlie the research have been developed to explicitly consider major interactions in rural areas between agriculture and rural small-scale industries and migration. In Sierra Leone

where policy evaluation will be undertaken at the national level, the research is also designed to consider interactions between the rural and urban sectors in a general equilibrium framework. This emphasis on intra-sectoral and inter-sectoral relationships as they affect employment will add strength to policy recommendations that are lacking in comprehensive country studies of employment, such as the I.L.O. studies in Colombia, Sri Lanka, Kenya and Iran.<sup>1/</sup>

A major contribution of the Network to the study of employment problems will be to base policy recommendations on a comprehensive set of primary data generated in rural areas. Almost all country studies of employment have depended largely on secondary data in rural areas which are generally spotty in coverage and of poor quality. To our knowledge, this is the first research effort in Africa to generate data on farm and non-farm economic activities in rural areas at weekly or less intervals over a complete cropping year (12 months).<sup>2/</sup>

Furthermore, the data collection is integrated so that studies of agricultural production, rural nonfarm activities, migration and household consumption will be collected in the same villages and as far as possible in the same households. This integrated data collection approach should have widespread relevance to micro-level approaches to rural employment and development both in providing greater insights into the operation of the rural economy and in producing economies of scale in data collection.

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<sup>1/</sup>Thorbecke [1973] reviewed the ILO country studies and noted their lack of a general equilibrium framework.

<sup>2/</sup>The I.L.O. is adding a rural-urban section in its Geneva office in order to launch a research program on rural employment with emphasis on micro-studies of labor utilization in rural areas.

## Objectives of the Research Contract<sup>1/</sup>

### General Objectives

By bringing together selected African and U.S. colleagues in workshops and seminars on conceptual and methodological issues to facilitate development of an information system and to coordinate the training component of this project, the contractor (MSU) shall:

- (1) Conduct micro-studies of the economic viability of labor-for-capital substitution in production and marketing of selected high priority food crops.
- (2) Identify rural labor supply and characteristics of migration.
- (3) Evaluate rural employment policies related to national goals in a partial equilibrium framework involving regional demand and supply projections.
- (4) Provide necessary empirical evidence for more substantive sector analyses through the systematic application of a simulation approach, alternative input/output or other programming approaches.

### Specific Objectives

The contractor shall:

- (1) Develop and refine a conceptual framework and work plan for analyzing the employment problems and policies of developing countries at both the micro- and macro-economic level and

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<sup>1/</sup>From pages S-2 and S-3 of contract AID/csd 3625.

incorporating the employment component into project, sub-sector, and sector analysis in developing countries, with emphasis on tropical Africa, as represented by Ethiopia, Nigeria, and Sierra Leone. Other African countries may be included as mutually agreed.

- (2) Conduct rural employment studies which will include, but not be limited to:
  - (a) Demand for labor in agricultural production systems,
  - (b) Demand for labor in off-farm rural activities,
  - (c) Determinants of out-migration.
- (3) Evaluate the effects of micro and macro agricultural policies on rural employment and income and develop general policy guidelines for the Ministries of Agriculture and Planning in dealing with the employment problem in tropical Africa.
- (4) Provide an improved theoretical and quantified basis for incorporating labor into sectoral and macro-planning models.
- (5) Formulate specific agricultural policy guidelines to deal with employment problems in selected African countries.
- (6) Stimulate the development of a community of African scholars through a network which will link them with each other and with worldwide scholars engaged in employment research by, but not limited to:
  - (a) Seminars and workshops,
  - (b) Stimulating interchange between scholars,
  - (c) Promoting joint and complementary research efforts.

## Evolution of the African Rural Employment Research Network

In 1971-72 a group of African and Michigan State University Scholars formed a Research Network and jointly developed a proposal to study problems of rural employment in Africa. The Research Network is a collaborative research and information system which brings together U.S. and African scholars for the purpose of developing and carrying out comparative research on a common problem--employment. We shall briefly review the evolution of the Research Network over the 1971-74 period.<sup>1/</sup>

In most African countries, except Nigeria, agricultural economists are few in number, isolated, and sometimes find it difficult to keep abreast of ongoing research both within Africa and overseas. Typically there is one university per country and approximately two to four local agricultural economists at the Ph.D. level and ten to twenty with Master's degrees.<sup>2/</sup> Agricultural economists in the universities are largely engaged in teaching. Two universities have, however, recently introduced graduate programs. The University of Ibadan in Nigeria introduced a

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<sup>1/</sup>The Network is utilized to develop the methodology and primary data collection called for in the specific objectives 1-5 in AID/csd 3625, as well as contributing to objective 6 which requires the contractor to, "...stimulate the development of a community of African scholars through a network which will link them with each other and with worldwide scholars engaged in employment research by, but not limited to: (a) seminars and workshops, (b) simulating interchange between scholars and (c) promoting joint and complementary research efforts."

<sup>2/</sup>For example, there is one local Ph.D. in agricultural economics in the Republic of Zaire, one in Sierra Leone, four in Ethiopia, one in Kenya and none in Tanzania. In Nigeria, on the other hand, there are four departments of agricultural economics in six universities and about 15 Nigerians with Ph.D.'s in agricultural economics.

Master's degree in 1970,<sup>1/</sup> while Makerere University in Uganda introduced a Master's degree in 1971. This discussion underscores the need to expand the supply of African agricultural economists and to develop mechanisms whereby Africans gain first-hand experience in designing and carrying out agricultural economic research in Africa. These objectives are included in the MSU subcontracts in Sierra Leone, Nigeria and Ethiopia under Contract AID/csd 3625.

### Country Research Under African Leadership

The Network utilizes subcontracts with African scholars to carry out the research in cooperation with U.S. scholars. The research in Sierra Leone is being directed by Dr. Dunstan S. C. Spencer, a Sierra Leonean agricultural economist at Njala University College, University of Sierra Leone, under a subcontract with Michigan State University.<sup>2/</sup> In Nigeria research is being carried out under the leadership of Professor S. O. Olayide, Department of Agricultural Economics, University of Ibadan, through a subcontract with Michigan State and a \$60,000 grant from the Rockefeller Foundation.

In Ethiopia, a five-year research program on small farmers will be carried out in the Ada District of Ethiopia through a subcontract with the Institute of Development Research (IDR), Haile Sellassie I University,

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<sup>1/</sup> Currently there are six Master's degree students in residence in agricultural economics at Ibadan: five are Nigerian and one is from the Camerons.

<sup>2/</sup> Njala University College has received grants from the Rockefeller Foundation (\$16,000) and the Population Council (\$15,250) to underwrite part of the cost of Njala's Rural Employment Study.

but with MSU providing leadership for the first two to three years of the five-year project.

### Annual Conferences:

Annual conferences of Network researchers are an important component of the Network's information system. The main purpose of the annual conference is to discuss research methodology, preliminary research findings, and develop plans of work for the coming year. The conferences normally include 18-24 Network researchers, plus representatives from several donor agencies, foundations and scholars from other regions.<sup>1/</sup> To date, conferences have been held in Ibadan, Nigeria in December, 1971; in Bellagio, Italy in October, 1972 and in Njala, Sierra Leone in November, 1973. A conference is scheduled in Ethiopia in October, 1974 and a final conference will be convened in East Lansing, Michigan in June, 1976.<sup>2/</sup>

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<sup>1/</sup>For example, at the 1973 conference in Sierra Leone, Mahar Mangahas, of the Philippines, reported on employment and income distribution in the Philippines. Abraham Weisblat of the Agricultural Development Council reported on research in India and Lehman Felcher of AID/Washington reported on his recent research on employment and income distribution in Latin America.

<sup>2/</sup>The final conference will tentatively include ten Network researchers, ten government leaders and civil servants and ten representatives of donor agencies and related research teams which have been focusing on employment and income distribution research in Asia and Latin America.

### Inter-Regional Linkages

Efforts are being made to facilitate an intellectual exchange among Network researchers in Africa. A Sierra Leonean--Dr. Dunstan Spencer--has been engaged as a consultant to the Ada research project in Ethiopia. Spencer has been able to draw on his seven years of research experience in Sierra Leone in his recommendations for the design of the Ada research, as well as gain first-hand information on Ethiopia that can be incorporated into his research and teaching in Sierra Leone.

The Network is attempting to facilitate scholarly exchanges with researchers in other African countries, Asia and Latin America who are working on similar problems. Network researchers--David Norman of Nigeria and Eric Tollens of Zaire--were recently invited to participate in an Agricultural Development Council/CIMMYT sponsored meeting in Singapore on methodology for primary data collection for small farmers. Tollens, Spencer, and Norman will be invited to participate in a follow-up ADC/CIMMYT sponsored seminar on primary data collection which will be held in 1974 or 1975.

Dr. Hartwig de Haen of the University of Bonn will spend July in Sierra Leone as a consultant on the macro modeling of the Sierra Leonean study. de Haen has served as a consultant to MSU's Korean Agricultural Simulation Project over the past two years. Carl Liedholm will spend four months of the 1974-75 academic year interacting with scholars engaged in employment research at the Economic Growth Center, Yale University and at the Institute of Development Studies, Sussex University. Furthermore, a number of Network researchers have given seminars on the research program and findings to scholars working on related problems in the World Bank, FAO and the ILO.

Inter-University Cooperation in Facilitating Ph.D. Dissertation  
Research in Africa

The Network has encouraged African graduate students in the United States' universities to return to Sierra Leone, Nigeria and Ethiopia to collect data for their dissertations as members of research teams in these countries. For example, a Sierra Leonean graduate student at Ohio State-- Joseph Tommy--and a Nigerian graduate student at MSU--Enyinna Chuta--will collect data for their Ph.D. dissertations in Sierra Leone as members of the Sierra Leone research team. Also arrangements are being made for an Ethiopian Ph.D. candidate in agricultural economics at Wisconsin--Ato Gebremicael--to return to Ethiopia in December, 1974 for 12 months to collect data for his dissertation as a member of the MSU/IDR research team.

Three Cornell Ph.D. candidates in agricultural economics have visited MSU to discuss their ongoing and projected dissertation research. Peter Matlon spent the summer of 1973 at MSU developing his Ph.D. dissertation proposal on employment and income distribution in groundnut production in Nigeria. Matlon arrived in Nigeria in late 1973 and is working informally with a Network researcher--Dr. David Norman--of Ahmadu Bello University for 18 months. Mr. James Akinwumi, a Nigerian agricultural economist, also visited MSU in 1973 to utilize the African Rural Employment Library and discuss his projected dissertation research in Nigeria. An Ethiopian agricultural economist--Tesfai Teclé---visited MSU to review the results of his dissertation research on Rural Development Programs in Ethiopia and to discuss his projected research in Ethiopia. Dr. Tesfai recently joined the Institute for Development Research, Haile Sellassie I University in Ethiopia; he will be a member of the IDR/MSU research team. The IDR/MSU

research program will also encourage Ethiopians to pursue graduate training in the United States. Ato Girma Begashaw of HSIU has received an AID scholarship which will enable him to begin his Ph.D. program at MSU in the fall of 1974. It is anticipated that at least one more Ethiopian agricultural economist from HSIU will be enrolled in a graduate school in the U.S. in the fall of 1974 followed by one to two more students per year over the next two to three years.

### Network Library

The African Rural Employment Network has developed a small but highly useful library of approximately 2,800 articles, papers and unpublished conference proceedings. The Network library is located in the Department of Agricultural Economics at MSU. The Network librarian sends two copies of each monthly acquisition list (see Appendix) to all Network researchers; the Network Library supplies copies of the publications requested by Network researchers in the field. The provision of free copies of library materials to Network researchers substantially speeds up the flow of information since conference papers and working papers are often published after a time lag of one or two years. It also reduces the isolation of African scholars with limited library materials.

### Publications

The Network is committed to the rapid dissemination of research results through its African Rural Employment Papers. Papers are automatically sent to every African university library, Department of Economics and

Agricultural Economics and Social Science Research Institute in Africa and to institutions and scholars in 70 countries. The mailing list currently totals 1,100.

To date ten African Rural Employment Papers have been published and a total of nine to ten additional papers will be published in 1974 and 1975. All African Rural Employment Papers are subjected to both internal and external reviews prior to publishing. If funds can be secured from other sources, it is proposed to translate all African Rural Employment Papers into French for free distribution in French-speaking countries in Africa.

The African Rural Employment Papers (AREP's) are distributed without charge to libraries, institutions, government agencies and officers, and scholars (approximately 50 percent of the papers are distributed within the United States and 50 percent outside the United States). Ten papers have been published at an average printing cost of 70 cents per Paper. The total number of Papers distributed as of April 1974 is as follows:

<u>AREP No.</u>	<u>Number Distributed</u>
1	1,992
2	1,463
3	1,283
4	1,106
5	1,275
6	1,234
7	1,173
8	1,341
9	1,199
10	1,100
<b>Total</b>	<b>13,166</b>

Duplicate copies of each paper are mailed as follows: 50 copies to the Agency for International Development in Washington, D.C. to be distributed to all US/AID Missions; 20 copies to the Center for Research on Economic Development at the University of Michigan to be distributed to their personnel; 145 copies to the Library of Congress in Washington, D.C. for distribution to U.S. libraries and 20 copies to FAO, Rome.

In addition to the African Rural Employment Papers, a new series of Working Papers is being launched in 1974 to report new ideas, preliminary research findings, research plans, etc. These papers will be largely for internal circulation among Network researchers.

#### The Network Approach to Date

Although the Network has taken about one year to develop a research proposal and one year to develop subcontracts for field research, the Network has demonstrated that it can:

- (a) encourage local scholars to develop the organizational and administrative capacity to provide research leadership through subcontracts,
- (b) contribute to the development of improved methodology which transcends national boundaries,
- (c) guide agricultural economics graduate students in American universities to Ph.D. dissertation research on current problems in selected African countries,
- (d) speed up the flow of library materials to researchers in Africa,
- (e) stimulate an intellectual exchange among researchers in other regions of the world who are focusing on similar problems,

(f) encourage the financing of research on employment problems in Africa by other donors such as the Rockefeller Foundation, the Population Council, etc.

The Network is an approach to organizing research which both U.S. and African scholars have found to be of mutual benefit. However, it is a time consuming process and obviously is only one of many alternative methods of organizing research. For example, it will take four years to complete the research program under AID/csd 3625, rather than three years as originally planned.

## II. THE GENERAL RESEARCH PROGRAM: THEORY AND METHODOLOGY

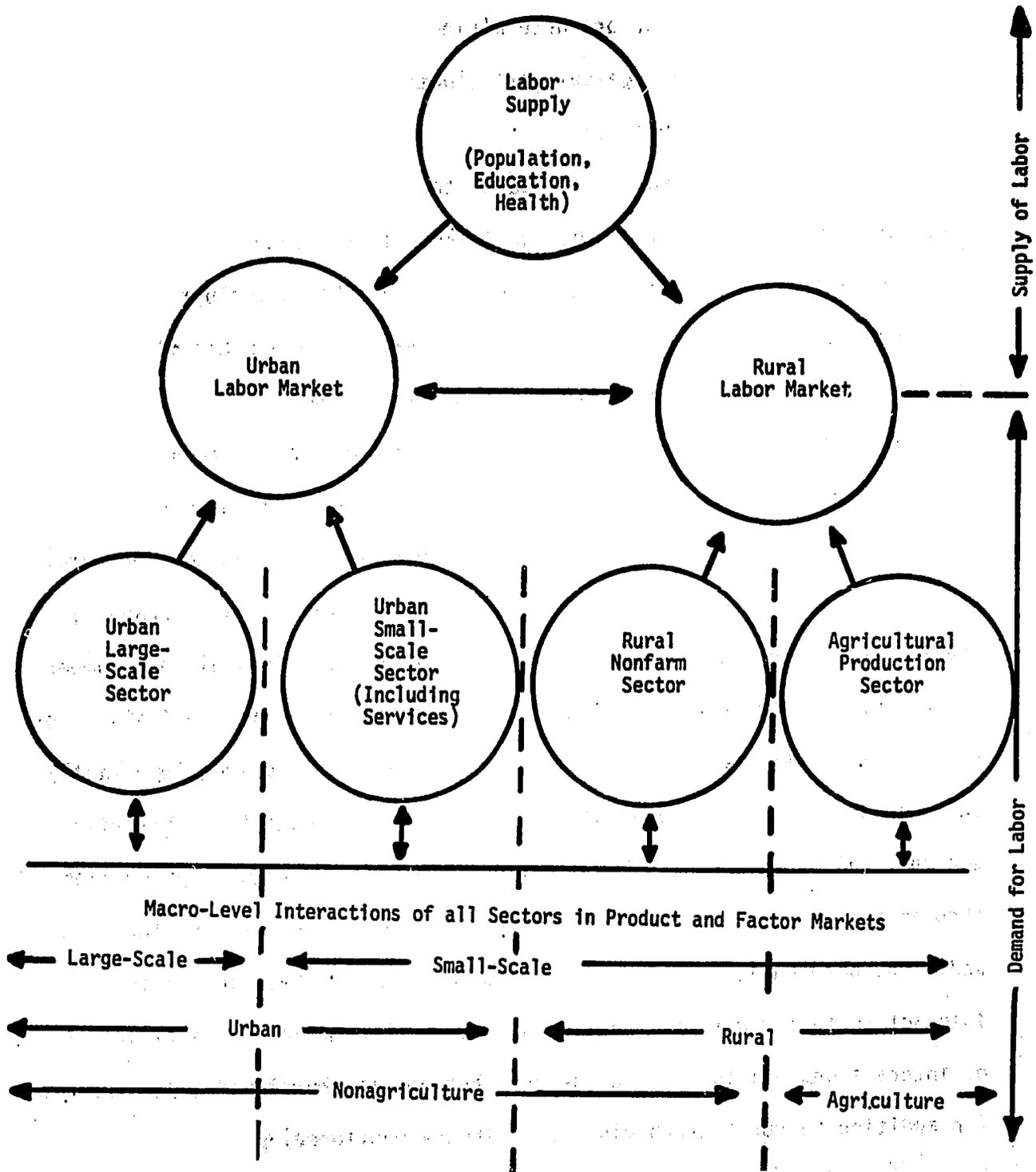
### Overall Framework for the Research Program

The focus of the research is on the rural labor market--that is the utilization, allocation and remuneration of the rural labor force. The rural labor market can be viewed in a supply and demand framework (see Figure 1 from Byerlee and Eicher [1972]). The most important source of demand for labor in rural areas is generated by agricultural production for both subsistence and cash. Thus a major thrust of the research will be to analyze the impact of alternative agricultural production systems, including new biological and mechanical techniques on the demand for labor.

In addition, recent evidence assembled by Liedholm [1973] and others indicates that rural nonagricultural production is an important source of employment in rural areas in Africa. For purposes of this research, the rural nonagricultural sector has been disaggregated into (a) rural small-scale industries producing consumer goods where the choice of technique can be a major determinant of the demand for labor and (b) agricultural based industries such as marketing, processing, storage. These industries and the input delivery industries employ a large amount of labor and represent a potentially important bottleneck to expanded rural employment through increasing agricultural output.

Relatively less attention is being given in this study to the supply side of the rural labor market partly because demographic research is being extensively carried out by other AID sponsored research and partly because we are primarily concerned with a medium term planning horizon where population policies would have little relevance. However attention is

Figure 1.



being given to education as a determinant of the quality of the labor force and also as an important factor influencing rural-urban migration and urban unemployment. Also the factors determining the total supply of labor in rural areas, particularly age-sex participation and the length of the working day, are being analyzed.

The rural labor market is linked to the urban labor market through rural-urban migration. Since the rural labor market cannot be studied in isolation and because rural-urban migration and urban unemployment is considered a major problem by African governments, rural-urban migration studies are a major component of the research program.

Although the studies of the rural-labor market identified above (agricultural production, rural small-scale production, rural nonfarm industries and rural-urban migration) will provide essential data on rural labor utilization and incomes, they are not sufficient for a comprehensive analysis of the employment problem because of the need to analyze a number of interactions between sectors that are important in policy analysis. For example, the expansion of rural small-scale industries depends importantly on consumer expenditures generated by agricultural production. Likewise agricultural based industry is directly linked to agricultural production through the backward and forward linkages of the agricultural sector. In addition, both agricultural production and nonagricultural production interact in factor markets, particularly the labor market. A similar set of interactions exists at a macro-level between the rural and urban sectors (in addition to rural-urban migration already mentioned) which must ultimately be considered in national policy evaluation. These include urban demands for food, linkages between rural small-scale industry and urban industry and rural-urban interactions in the capital market.

From this overall framework, a number of micro-level studies can be identified as essential for an analysis of rural employment. These include (a) demand for labor in agricultural production, (b) growth and employment in the rural nonfarm sector, (c) determinants and impacts of rural-urban migration and (d) rural consumption patterns.

### Micro-Level Analysis of the Rural Labor Market

#### Demand for Labor in Agricultural Production

Until recently there has been relatively little economic analysis in African countries of labor utilization in agricultural production over a complete 12 month cropping cycle. The studies to date reveal comparatively low rates of labor use on an annual basis in traditional African agriculture. However, these findings do not imply surplus labor in the traditional sense since there is considerable seasonality of labor utilization and also a significant proportion of labor is utilized in off-farm activities. Norman [1973] provides a comprehensive analysis of both phenomena in northern Nigeria; his results identify a definite seasonal labor constraint during the planting and weeding season (June/July) and up to 50 percent of the labor time of the head of farm households is spent in off-farm activities. Moreover his analysis indicates that the rural labor market is operating efficiently in the sense the MVP of labor conforms fairly well with the wage rate, although it was not established that this was true of all seasons. Spencer's [1973] analysis of rice production in Sierra Leone also confirms widespread seasonal labor constraints as reflected in the shadow price of labor in a programming model.

The utilization of labor time has historically been closely related to the introduction of cash crops which has probably increased aggregate

labor inputs in agricultural production in areas where cash crops are produced. On the basis of a survey of completed research, Byerlee and Eicher [1972] were not able to draw definite conclusions about the relative importance of the sources of labor for the expansion of cash crop production, i.e., leisure, seasonal slack or off-farm labor.

Idachaba [1973] has developed a theoretical framework for analysing the impact of taxing export crops on labor utilization in export crop production in Nigeria. Within the assumptions of his model, he demonstrates that taxes on export crops lead to a decrease in labor utilization on export crops. However, he is not able to assess to what extent this decrease in labor is absorbed in food crop production as opposed to out-migration to urban areas.

A major change in labor utilization in agricultural production is expected with the introduction of alternative production systems and technologies. Spencer [1973], in his analysis of five alternative rice production systems in Sierra Leone, shows considerable differences in labor requirements for swampland rice production and upland rice production. Partly because of a seasonal labor bottleneck, his LP analysis suggests greater attention should be given to upland production.

Because of the seasonal labor bottlenecks which are now confirmed in many African countries and the "land surplus" status often ascribed to many countries in tropical Africa and open unemployment in urban areas, mechanization is a major policy issue. However, Gemmill and Eicher's [1973] exhaustive review of research on mechanization in Africa identified few comprehensive studies of mechanization which were adequate for national policy analysis. In fact, most studies were shown to be short-term and static in conception (see Figure 2). They advance a framework to evaluate

Figure 2. Classification of Economic Studies of Farm Mechanisation in Less Developed Countries  
by Method of Analysis<sup>a/</sup>

Generality of Study	Type of Policy Decision								
		Short-Term (Static)			Medium-Term (Dynamic)			Long-Term (Perspective)	
	Cost Benefit	Cross-Section	Linear Programming	General Equilibrium	Budgeting	Program-ming	Simulation	Historical	Instrumental
L o c a l	Baldwin (1957) Chancellor (1969) Dalton and Enikwaw (1971) Ellis (1972) b/ Green (1971) b/ Kolawole (1972) Laurent (1968) Lidman (1968) b/ Lord (1963) Peacock (1967) Purvis (1968) Renaut (1966) Van Wersch (1968) Weil (1970) Yudelman (1971)		Ahmad (1972) Clayton (1965) Gotsch (1973-a)						
R e g i o n a l	Chopra (1972) Gemmill (1971)	Donaldson and McInerney (1973) Inukai (1970) Johi (1970) Rao (1972)	Panagides and Ferreira (1970) Vours (1-71)		Singh and Billings (1971)	Singh and Day (1972) Singh and Ahn (1972)		Day (1967)	
C o u n t r y w i d e	Bose and Clark (1969) b/ Kaneda (1969) b/ Timmer (1972-a) b/ Weitz-Hettelsater Engineers (1971)			Thirsk (1972) Sanders (1973)	Johnston, Cownie and Duff (1970) Johnston and Kilby (1972)		Johnson, et. al. (1971) Rossmiller, et. al. (1972)	Jasny (1936) Kautsky (1900) Marx (1966) Miller (1970) Mesa-Lago (1971) Roberts (1972) Wheelright and McFarlane (1970) Whetham (1970) White (1964)	Gotsch (1972) Schmitz and Seckler (1970)

<sup>a/</sup>Source: Gemmill and Eicher [1973].

<sup>b/</sup>These cost-benefit studies were economic, rather than just financial in nature.

mechanization at both the country level and the village level. At the country level a critical issue is the determination of factor prices and the elasticity of capital-labor substitution. At the village-level asset distribution is likely to play a key role on the adoption of new technologies. Gemmill and Eicher [1973] conclude that research to evaluate a range of mechanical technologies as they affect output, employment and income distribution for the whole country within a medium-term horizon will be most useful to policy makers.

The conceptual work to date by Network researchers on the demand for labor in agricultural production is being used as a base for the development of primary data collection. For example, Norman's [1973] village studies have stimulated research on the movement of labor between farm and off-farm employment in Sierra Leone, Nigeria, Ethiopia and Ghana. Likewise, the Gemmill/Eicher [1973] framework is guiding network research on farm mechanization in Sierra Leone and Ethiopia and a number of countries in Asia and Latin America.

#### Growth and Employment in the Rural Nonfarm Sector

Nonagricultural activities in rural Africa have been virtually ignored by economists, national accountants and policy makers. Liedholm's [1973] review of empirical evidence demonstrates the importance of nonagricultural activities as a source of employment and output in rural areas. The scope of activities varies from (a) nontraded home production for own use, to (b) specialized production of traded consumer goods and services such as tailoring, carpentry, bicycle repairs, etc. and (c) agriculturally linked activities such as agricultural processing and agricultural input industries.

Liedholm hypothesizes the specialized production of consumer goods and services through rural small-scale industries has potential as a dynamic source of rural employment and incomes in rural areas of African countries. Although the Hymer-Resnick [1969] model assigns a declining role to rural consumer goods industries during the process of development,<sup>1/</sup> Liedholm's review of rural consumption studies in Africa suggests that the income elasticity for these goods may be positive and thus that the decline of these industries cannot be assumed with certainty. Moreover, the Hymer-Resnick model will be modified in the Sierra Leone research program by (a) relaxing the assumption that output of the rural nonfarm sector cannot be traded to urban areas and abroad and (b) considering the effects of the backward and forward linkages of agriculture on the growth of the rural nonfarm sector. These linkages will be traced using an input-output framework. In addition, there are complex seasonal factors to be taken into account because both the demand for the output of rural industries and the supply of labor to these industries are seasonally influenced. Finally, the choice of technique question is crucial in analyzing rural employment. In this respect the research in Sierra Leone will draw on Timmer's [1972] analysis of rice processing in Indonesia where simple activity analysis was used to demonstrate how relative factor prices significantly influenced the choice of techniques and hence employment in rice processing in Indonesia.

A framework developed by Liedholm [1973] for studying small-scale industries in rural areas includes an analysis of both supply and demand as constraints on long-term growth in these industries. This framework

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<sup>1/</sup>Primarily because of an assumed low or negative income elasticity of demand for consumer goods produced by rural small-scale industries.

is being extensively tested in Sierra Leone by Chuta and Liedholm. In addition a general theory of household firm decision making is being synthesized from the Hymer-Resnick model and Becker's [1965] theory of allocation of time in order to provide an empirically testable micro-economic model for investigating the seasonal movement of labor between farm and nonfarm jobs. Again a village or region in Sierra Leone will form the basis for application of the model.

### Determinants and Impacts of Rural-Urban Migration

Although rural-urban migration is regarded as a major problem in most African countries, there is surprisingly little research available on the determinants and impact of migration that is relevant to formulation of economic policy. Although there is much research by anthropologists and geographers, which provide important information on the characteristics of rural-urban migration, there is little information on the specific determinants of migration that can be used in formulating policies for dealing with the migration problem.<sup>1/</sup>

More recently, the interest of economists in rural-urban migration in Africa has been stimulated by the Todaro [1969] and the Harris-Todaro [1970] models of rural-urban migration which have direct policy relevance. However, to date, empirical evidence for testing the Todaro model and its derivatives has not been forthcoming.

During the first phase of Network research, major attention has been given to refining the theoretical and methodological basis for empirical

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<sup>1/</sup> The most complete study of rural-urban migration to date in Africa is the survey of 15,000 households in both rural and urban areas in Ghana. Although Caldwell was able to identify the major socio-economic characteristics of migrants, he was not able to draw conclusions on the effects of incomes, education, wage policies, etc. on the rate of migration.

research on migration. Byerlee [1972, 1973] has provided a general theoretical schema for viewing the rural-urban migration process in Africa (see Figure 3). This schema distinguishes between the monetary returns and the nonmonetary or psychic returns from migration. The monetary returns can be analyzed within a simple benefit-cost framework. However, major conceptual problems arise in measuring some of the monetary benefits of rural-urban migration and in particular in measuring the rural-urban income differential.

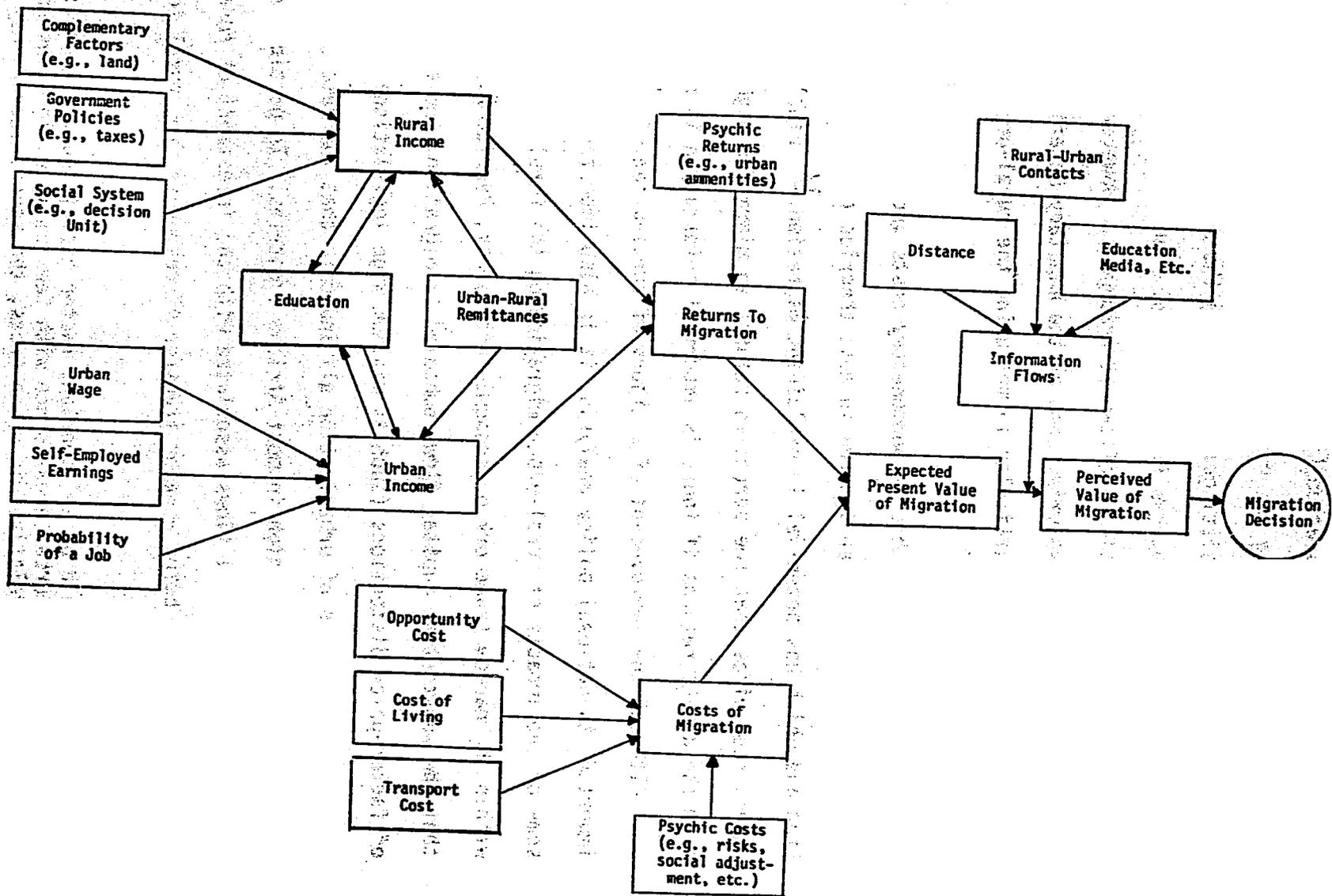
With respect to psychic or nonmonetary costs and returns, risk is a major factor that has been ignored in most theories of rural-urban migration and which has potential in explaining migration.<sup>1/</sup> Finally, this schema recognizes that the perceived returns to migration might differ from the actual returns if there is imperfect information in rural areas.

Although the improvement of a theory of rural-urban migration is important to national policy analysis, it is also important to understand some of the impacts of rural-urban migration on the rural communities. Thus, within the narrow framework of economic efficiency, Byerlee [1972] suggests that the substantial capital flows embodied in migration, the existence of factor-price distortions (such as minimum wage legislation) and the negative externalities of urbanization all indicate that the rate of rural-urban migration is too high in most African countries. In particular, he identifies human capital flows associated with the investment of rural people in education as being a major transfer of resources from rural to urban

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<sup>1/</sup> Thus, this could be an important factor explaining the migration of school-leavers to urban areas since with few family obligations and with the support of relatives in urban areas, the school-leavers may experience relatively little risk in the migration process as compared with an older or established household head.

Figure 3. A Framework for the Analysis of the Migration Decision



areas that has not been incorporated into existing dual economy models.<sup>1/</sup> Partly countering this, of course, is the flow of remittances from urban to rural areas which could be used as a source of investment in agriculture. Network researchers, Essang and Mabawonku [1974] explore some of the impacts of rural-urban migration on rural areas associated with the depletion of both labor and human capital resources. However, a theory is not well developed to explain how rural farm households adjust to depletion of these resources.

In addition to theoretical improvements, major attention has also been given to developing a suitable methodology for studying rural-urban migration. Basically this methodology has three characteristics. First, the data for migration are being collected through surveys in both rural and urban areas. This is a major departure from previous studies of migration in Africa which have typically depended on census data or have concentrated on surveys in urban areas. Secondly, an effort is being made to conduct tracer studies; that is, migrants identified in rural areas are being traced to urban areas to provide greater comparability between urban incomes, rural incomes, and more accurate data on remittances. Finally, as far as possible, the migration studies are being integrated with other rural farm household surveys.<sup>2/</sup> This will provide more accurate data on rural incomes.

Within this overall framework, rural-urban migration studies are being carried out in Western Nigeria, Ghana, Sierra Leone and Ethiopia. In 1972-73

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<sup>1/</sup> For example, Mellor [1973] in a recent article on intersectoral resource transfers, ignores the possibility of resource transfers associated with human capital in migration.

<sup>2/</sup> In Sierra Leone, the sample of rural households being used for the migration study is identical to the sample being used for the farm management study.

Essang and Mabawonku [1974] interviewed 180 families in six villages in Western Nigeria and then traced and interviewed 480 migrants from these 180 families in urban areas in Western Nigeria and in Lagos. The results of Essang/Mabawonku research showed that rural-urban migration is determined by the rural-urban income differential and rural education but is not significantly affected by an index of urban amenities.

In Ghana, John Nabila [1974] has recently completed a tracer study of migration from the FraFra area of northern Ghana to both rural and urban areas in southern Ghana. Although results are still being analyzed,<sup>1/</sup> this study promises to provide a more indepth understanding of migration processes in Ghana than the more general study by Caldwell [1969]. In Sierra Leone, a major migration study will commence in July 1974 by Tommy and Byerlee. An attempt will be made to quantify the magnitudes of rural-urban capital transfers embodied in migration as a part of the total effort to measure rural-urban resource transfers in Sierra Leone.<sup>2/</sup>

### Rural Consumption Patterns

Knowledge of rural consumption patterns is important for analyzing intersectoral linkages. Although there have been many consumer studies conducted in urban areas in Africa, relatively few rural consumption studies exist (Liedholm [1973]). Thus in Sierra Leone and Ethiopia, attention is being given to analyzing consumption patterns in rural areas with the

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<sup>1/</sup>Nabila's findings will be reported in a forthcoming African Rural Employment Paper.

<sup>2/</sup>It is tentatively planned that a small conference of Network researchers and other African scholars will be held in 1975 on the topic of rural-urban migration to provide some generalizations with respect to theory, methodology and policy.

objectives of (a) estimating income elasticities for major commodities by income group in order to be able to determine the effect of income distribution on the labor intensity of consumption patterns and (b) measuring the income elasticities for nonagricultural goods disaggregated by origin, i.e., rurally produced goods, urban produced goods and goods imported from abroad.

As with other studies, the consumption study will be integrated with the farm management study. It is expected to provide a major check since both the sources of income and the expenditure of income will be identified. Furthermore, in this manner rural savings can be estimated as a residual between expenditures and incomes.<sup>1/</sup>

#### Policy Analysis at the Sector and Project Level

Each of the micro-level studies discussed above has important policy implications in themselves. For example, estimates of the elasticity of rural-urban migration with respect to the urban minimum wage has implications for government wage pricing policy. Likewise the analysis of farm mechanization decisions and the effect of factor prices on the choice of mechanical techniques will provide guidelines to policy makers on capital and labor pricing policies. However, a more comprehensive evaluation of alternative rural development strategies requires that the various micro-level studies be integrated to enable interactions between sectors, both in rural areas and between rural and urban areas, to be analyzed. Thus one of the objectives of the Network research program will be to carry out

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<sup>1/</sup>The methodology for these studies will be presented in a forthcoming African Rural Employment Working Paper.

a country-wide study of employment with emphasis on rural employment and provide national policy guidelines for one country--Sierra Leone. In doing this, attention is being given to improving the methodology for incorporating equity objectives, particularly employment into (a) sector analysis and (b) project analysis.

#### Incorporating Employment in Agricultural Sector and Policy Analysis

The methodology for agricultural sector analysis and planning is being developed to incorporate labor as a factor determining sector output, income distribution and rural-urban migration. As a first step, the literature on agricultural sector analysis is being reviewed to determine the extent to which employment and income distribution have been incorporated into recent agricultural sector analyses and plans. From this review, some general guidelines will be provided for improved methodology for agricultural sector analysis and planning. Furthermore, a specific methodology will be developed for a situation in which good micro-level data exists as will be the case in Sierra Leone. This methodology will emphasize the sector interactions between the farm and the nonfarm sectors in rural areas as being an important determinant of total labor utilization and also the interactions between the rural and urban sectors as being necessary for any comprehensive evaluation of agricultural policy (see Byerlee and Halter [1974]).

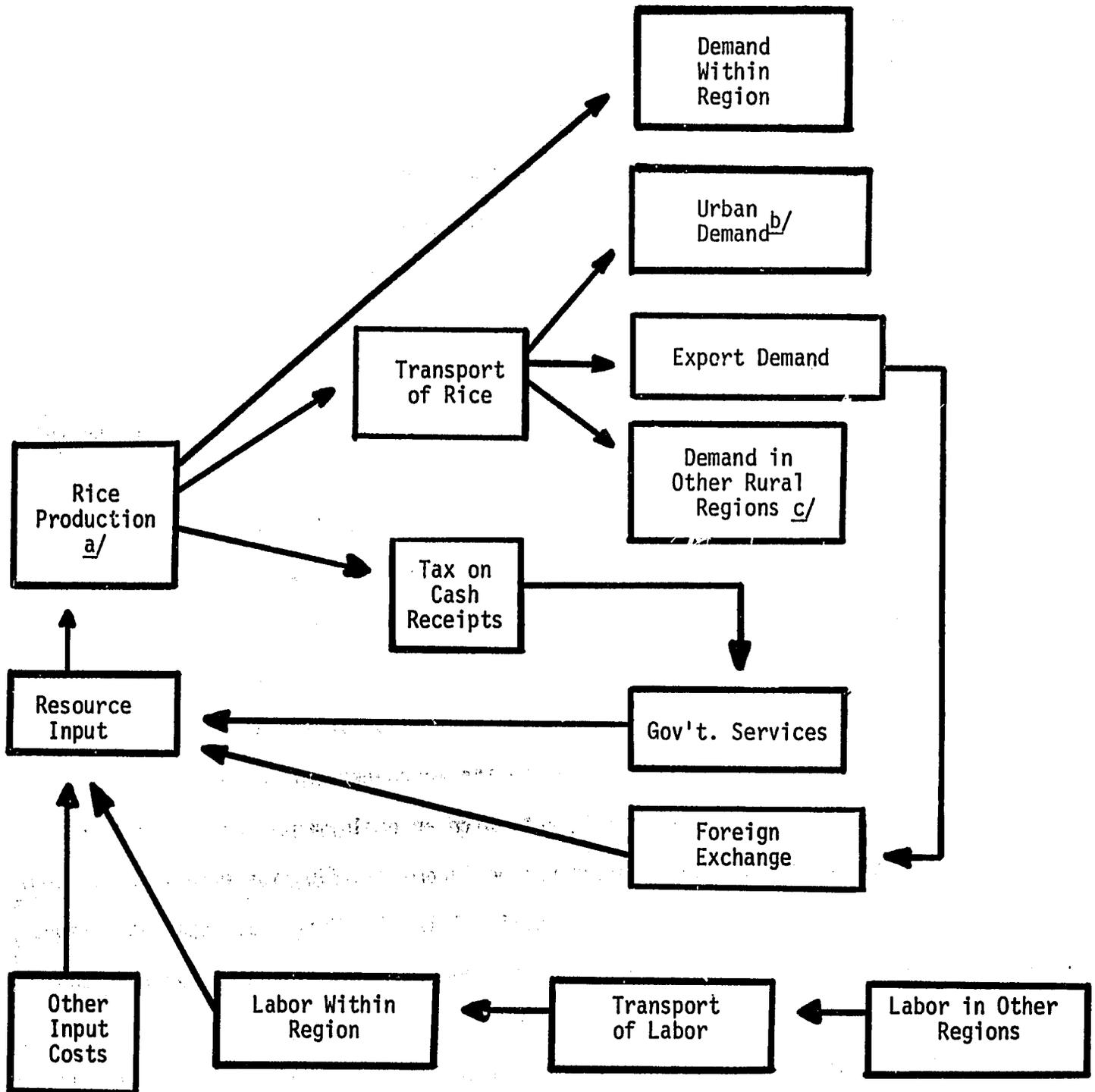
Some promising steps have already been made by Spencer [1973] and Byerlee [1973] toward developing a methodology for conducting agricultural policy analysis with emphasis on employment. Spencer [1973] has constructed an aggregate linear programming model of the rice industry of

Sierra Leone. A unique feature of this model is the use of primary data collected specifically for this analysis. The model shown in Figure 4 includes five rice production systems, incorporates labor seasonally as a constraint on production and allows for interregional flows of labor and commodities. This model is then used to evaluate the effects of alternative agricultural policies including introduction of mechanical techniques, the use of fertilizer and the introduction of new rice varieties on the demand for labor and also on the total production of rice. Through this model Spencer is also able to trace some of the tradeoffs between an employment maximizing strategy and a strategy which emphasizes food self-sufficiency in rice.

Byerlee [1973] has developed a simulation approach for measuring the indirect employment-income distribution effects of various agricultural development strategies in Nigeria. Essentially this model comprises three submodels as indicated in Figure 5. The core of the model is a dynamic macro-economic model built upon an input-output framework. This interacts with a detailed model of the agricultural sector to estimate the effects of agricultural policies on variables, such as agricultural exports, incomes and food prices, which are used in the macro-economic model. In addition, the macro-economic model interacts with an employment-incomes model to determine the overall employment and income distribution effects of various agricultural strategies at the national level. This model enables various rural-urban linkages, such as rural-urban migration and the backward and forward linkages of agriculture to be analysed.

The model is applied in Nigeria and is used to estimate the indirect effects of various food and export crop promotion strategies on total GNP.

Figure 4. Schematic Diagram of a Linear Programming Model of Rice Production in Sierra Leone



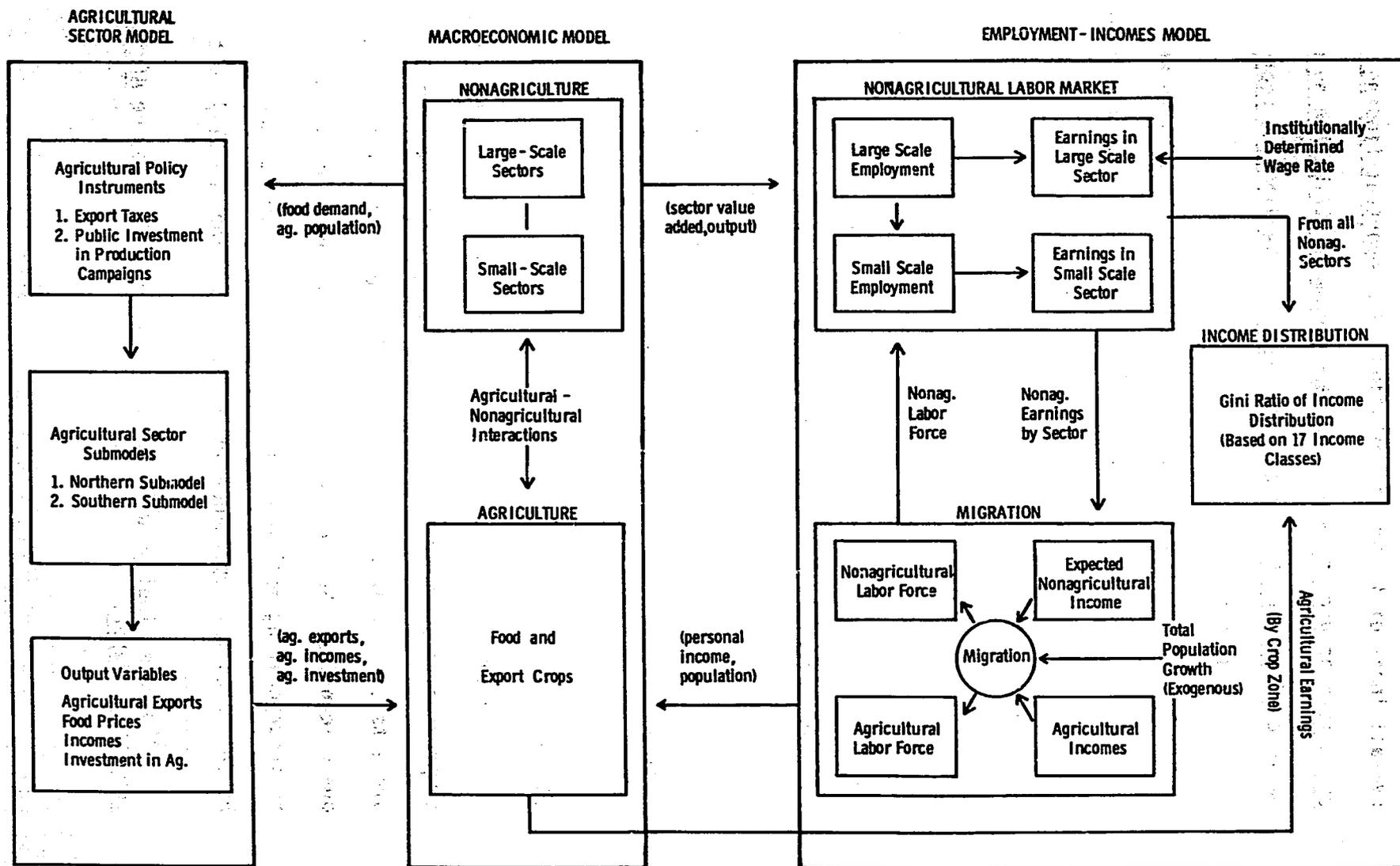
<sup>a/</sup> Differentiated by Region, System of Production and Level of Technology.

<sup>b/</sup> Differentiated into Four Urban Areas.

<sup>c/</sup> Five Other Rural Regions.

Source: Spencer [1973], p. 7.

Figure 5. Schema of Interactions Between a Macro-Economic Model  
an Agricultural Sector Model and an  
Employment-Incomes Model



Source: Byerlee [1973], p. 19.

rural-urban migration, nonagricultural employment and incomes and an overall index of income distribution. An important finding is that the objectives of growth, employment and income distribution do not appear to be in conflict in the current structure of the Nigerian economy (see later section on Nigeria).

There appears to be a good deal of complementarity between Spencer's and Byerlee's approaches. Spencer's model is well founded on micro-level data and is able to examine agricultural production systems in detail. However, he readily admits the limitations of his partial equilibrium approach. On the other hand, although Byerlee utilizes a general equilibrium analysis of agricultural strategies, his approach has a weak micro-theoretical and empirical foundation. During 1974 an approach which combines elements of both as well as new elements such as the rural non-farm sector will be developed for Sierra Leone and presented for discussion at the 1974 Network Conference which will be held in Debre Zeit, Ethiopia from September 30 - October 4th.

#### Incorporating Employment into Project Appraisal

Although major donors and many LDC's are stressing the need for a comprehensive approach to agricultural planning through sector analysis, projects still remain as important instruments of government planning and donor agencies. Recognizing this, William Ward is developing approaches to incorporating employment as an objective of agricultural projects.<sup>1/</sup> He indicates the importance which shadow pricing can play in the choice of

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<sup>1/</sup>Ward's findings will be published in a forthcoming African Rural Employment Paper.

technique and labor intensive projects. Thus the controversial issue of the correct opportunity costs for labor will have important implications in the choice of labor intensive projects. In addition, the shadow prices for capital and foreign exchange also have important implications for the choice of technique in any given project, and hence market prices need to be adjusted in many African countries. In each case, there are serious conceptual and even greater empirical problems in estimating appropriate shadow prices. But beyond this narrow efficiency approach to project appraisal, many donors and planners are recognizing the need for a multi-objective approach which recognizes equity objectives such as employment and income distribution in addition to the efficiency objective. In most cases, a project analyst will not have access to a relevant social welfare function but he may be able to provide policy makers with tradeoffs inherent in pursuing each of these objectives.<sup>1/</sup>

From this general review of project appraisal methods, it is proposed to provide some general guidelines for shadow pricing under assumptions relevant to rural Africa and for incorporating multiple objectives into project appraisal. These guidelines will be flexible enough to accommodate the varying amount of data available from situation to situation.<sup>2/</sup>

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<sup>1/</sup> Ward also stresses the need for measuring the indirect benefits of projects. This is particularly important when employment becomes an objective of project appraisal since the indirect employment effects of projects may vary significantly. He proposes an input-output approach as appropriate for measuring indirect benefits.

<sup>2/</sup> The guidelines will also provide a general listing of the types of data requirements so that these data may be collected by Network researchers during their field research.

### Data Collection Methodology

As stressed throughout this paper, substantial resources are being invested by the Network in primary data generation in order to go beyond the superficial analysis of the employment problem allowed by current secondary data. Consequently, considerable effort is being devoted to refining the methodology for collecting socio-economic information in rural areas of Africa. African Rural Employment Papers by Spencer [1972] and Norman [1973] document the considerable experience of these authors in field research. As the first papers on this topic for West Africa, they are invaluable to Network researchers and others contemplating field research. They are also being used in teaching in many African universities and are receiving recognition outside Africa.<sup>1/</sup>

In generating primary data in rural areas, attention is being given to (1) obtaining representative samples for aggregation and (2) collecting accurate information from the sample. The sampling procedure is best developed for Sierra Leone where the country is divided into various "resource" regions and the population stratified by farm and nonfarm households.<sup>2/</sup>

Collection of accurate information is being facilitated through frequent interviewing (once to twice weekly), standardizing procedures for selecting and training enumerators,<sup>3/</sup> and measuring inputs of labor,

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<sup>1/</sup>For example, Norman and Spencer have been asked to work with CIMMYT and the ADC in the planning of a series of regional seminars on methodologies for primary data collection in developing countries.

<sup>2/</sup>See the next section for a description of the sampling procedure in Sierra Leone.

<sup>3/</sup>See Njala University College [1974], Enumerators Reference Manual.

field size, yields, etc. A methodology for measuring labor inputs in man-hours by correlation with Moslem prayer times has been developed by Norman in Nigeria and is now being applied in Sierra Leone.

Finally, accuracy and consistency in data collection are further enhanced by the integration of the various research projects. In this way, farm management, rural nonfarm, migration and consumption data are often collected from the same firm-household and always in the same locality (e.g., village or enumeration area).

### III. THE COUNTRY RESEARCH PROGRAMS: PRELIMINARY RESULTS AND PLANS<sup>1</sup>

#### Sierra Leone Research Program

##### Problem Setting

Sierra Leone is a country of 2.7 million people in an area of almost 28,000 square miles. Agriculture is the dominant sector of the economy employing 77 percent of the labor force and producing 32 percent of the gross domestic product. Mining, the other important sector of the economy, produces 16 percent of GDP but employs only 5 percent of the labor force (Central Statistics Office, [1972]). From 1963/64 to 1970/71 the economy had an annual real growth rate of 4.4 percent but in agriculture the real growth rate was only 1.7 percent, just slightly above the officially estimated population growth rate of 1.5 percent <sup>1/</sup>(Central Statistics Office, [1972]).

In the agricultural sector, rice is the most important crop producing about 45 percent of agricultural value added. It is also the main source of cash revenues for the agricultural population accounting for 29 percent of cash sales of farmers. Coffee, cocoa and palm produce are also important cash crops and foreign exchange earners.

Until the diamond boom of the 1950's Sierra Leone was self-sufficient in rice. However, the large migration to diamond areas and the increase in nonagricultural incomes associated with the diamond discovery led to an increased demand for rice over supply and Sierra Leone now imports about

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<sup>1/</sup>In fact, the current population growth rate is generally believed to be somewhat higher than this in the order of 2.0 to 2.5 percent.

5 percent of total rice consumed. Rice self-sufficiency has become a major aim of government agricultural policy.

The structure of employment and unemployment in Sierra Leone parallels other African countries. Approximately 25 percent of the labor force is employed in nonagricultural sectors with over two-thirds of nonagricultural workers employed in small-scale sectors.<sup>1/</sup> At the same time registered unemployment figures reveal increasing urban unemployment during the 1960's and is now estimated at about 10 percent of the urban labor force.<sup>2/</sup> This arises from several factors. On the demand side, employment in large-scale sectors has stagnated and actually declined from 1965 to 1971 despite substantial increases in nonagricultural output. For example, in the large-scale manufacturing sector, output almost doubled from 1964/65 to 1970/71 but employment decreased slightly over this period. This stagnation of employment is probably due in part to the government minimum wage policies which have increased wages and promoted capital intensive technologies (Saylor, [1967]). On the supply side, the urban labor force has been growing rapidly as a result of rural-urban migration, stimulated by wide rural-urban income disparities which are again partly the result of minimum wage policies.<sup>3/</sup> This rapid increase in urban labor supply coupled with stagnation of employment in large-scale firms has left a substantial residual to be employed in small-scale sectors or become unemployed in urban areas.

<sup>1/</sup> Defined in Sierra Leone as establishments with less than six persons.

<sup>2/</sup> The recent household surveys show that the rate of open unemployment in urban areas is close to 10 percent in all provinces. The highest rate of unemployment of 15 percent occurs at Bo, the country's second largest city.

<sup>3/</sup> Recent household surveys show that rural incomes are approximately half of urban incomes.

### The Policy Issues

The Sierra Leone government has consistently recognized that agriculture is the backbone of the national economy as evidenced from numerous policy statements. An average of 22,000 tons of rice, the staple food crop, has been imported every year during the last decade. The government feels that this is an unnecessary use of scarce foreign exchange earnings. This coupled with the belief that Sierra Leone has the best rice lands in West Africa has led the government to put top priority on achieving self-sufficiency in rice production.

At the same time, government policy statements indicate increasing concern with unemployment (Spencer, [1972]). A recent address of the Minister of Agriculture stresses the need to find jobs in agriculture if Sierra Leone is to reduce rural-urban migration and seasonal unemployment in agriculture. The interest in agriculture arising out of continued imports of rice and the gloomy picture for employment in urban areas establishes the need to develop strategies to achieve the government of Sierra Leone's stated goals of (1) achieving self-sufficiency in rice and other staple foods, (2) expanding agricultural exports particularly for palm produce, coffee and cocoa and (3) raising the standard of living of farmers, providing year-round employment in rural areas and reducing rural-urban migration as a means of reducing urban unemployment.

The means for meeting these goals are varied. With respect to rice, the major commodity, there are a number of alternative production systems: (1) upland rice, (2) mangrove swamps, (3) inland swamps, (4) riverain grassland and (5) bolilands. At present major attention is being given

<sup>1</sup>/See Government of Sierra Leone [1961].

to promotion of inland swamp production through incentives to clear and stump previously uncultivated swamp areas. The government has undertaken to provide mechanical cultivation for riverain grasslands and bolid lands at a subsidized rate for farmers. Some attention is also being given to introducing improved biological technologies through distribution of seed and subsidizing fertilizer. Various credit schemes have also been tried. Finally, the Sierra Leone Rice Corporation can influence domestic prices through its own pricing policies and particularly through control of rice imports. All of these policies can potentially contribute to increased rice production in Sierra Leone. They can also have varying effects on rural incomes, migration and employment which need to be considered. Thus the impact of mechanical cultivation on employment has not been evaluated nor the implications of a strategy that emphasizes swamp cultivation for regional and personal income distribution analyzed.

In addition to rice, national policy making must consider the relative emphasis to be placed on increasing foreign exchange earnings through promotion of export crops such as cocoa and coffee and reducing imports of rice. The foreign exchange cost of reduced export earnings resulting from exclusive emphasis on rice production have not been evaluated.

Finally, various alternatives exist to increase rural employment and incomes through development of rural-small scale industries and reduced rural-urban migration. In particular the effects of government wage, trade and monetary policies need to be evaluated as they affect the relative position of small-scale and large-scale nonagricultural sectors in the economy.

### Relationship to Earlier Research

Until recently there has been only scattered research on the rural economy of Sierra Leone with isolated studies of particular rice production systems by Njoku [1971] and Kallon [1971] and of marketing by May-Parker [1973] and Mutti, et.al. [1968]. However, Spencer [1973] has recently undertaken the first comprehensive study of rice production in Sierra Leone using primary data collected from randomly selected farms over the whole country. Using an aggregate L.P. model he concluded that rice self-sufficiency would be difficult to achieve in the near future and that government policy would be more effective if emphasis were given to upland and mangrove swamp rice production and less emphasis to mechanical cultivation. Moreover his analysis shows that self-sufficiency could only be achieved through substantial interregional labor transfers and with an adverse regional income distribution. However, Spencer notes since he only studied one farming enterprise--rice--he is unable to analyze interactions between rice and other crops and other sectors of the economy. For example, does increasing rice production reduce the production of other food crops or could expanded export crop production be emphasized to provide the foreign exchange for importing rice? To address these questions requires an analysis of the total agricultural economy.

Research on migration in Sierra Leone has recently been summarized by Mills [1973]. Nearly all research has been descriptive in nature identifying the major migration flows and the characteristics of migrants. Levi [1970] has attempted to isolate the determinants of migration but his efforts were hampered by poor secondary data, such as the use of per capita rice production as a proxy for rural incomes and nonexistent data on other variables. Mills [1973] has recently undertaken a study of migrants in one district focusing on short-term migrants. To date there

has been no comprehensive study of rural-urban or rural-rural migration in Sierra Leone which analyzes the effects of rural and urban incomes, education, age, distance, etc. on the rate of rural-urban migration.

This brief review indicates the paucity of micro-level studies in rural areas of Sierra Leone. At the macro-level there have been few attempts to analyze basic structural changes in the economy. Saylor [1967] provides a useful description of the main sectors of the economy while Dixon-Fyle [1967] uses some basic indicators to analyze structure changes in the economy. There have been almost no studies addressing the overall employment problem. Unemployment is briefly treated by Cole and Davis [1969] but because the analysis rests on data on "registered" unemployment, the results are at best preliminary. In fact, Cole and Davis conclude that surprisingly little is known about employment and unemployment in Sierra Leone despite the magnitude of the problem.

#### The Objectives of the Njala Research Program

The foregoing review indicates that (a) increased agricultural output, incomes and rural employment are important and interrelated goals of Sierra Leone, and (b) little research has formerly been undertaken to provide policy guidelines to achieve these goals. The Njala rural employment research program is designed to provide the basic information for policy making. More specifically the goals are:

- (1) To provide comprehensive information on output, employment and incomes in rural areas.
- (2) To undertake micro-level studies on agricultural production, rural small-scale industries, migration, consumption and marketing-processing to analyze the factors determining the supply and demand for labor in rural areas and undertake tentative policy analysis on the basis of each study.

- 3) Through integration and aggregation of the micro-level studies to evaluate alternative national development strategies for meeting the goals of increased agricultural output, and increased rural incomes and employment and provide national policy guidelines to relevant government ministries for expanding agricultural and rural nonfarm production, increasing rural incomes and employment and reducing rural-urban migration.
- 4) To relate the methodology used and results obtained in Sierra Leone to similar studies in other African countries so as to be able to derive general policy implications and methodology for other African countries.
- 5) To contribute to the training of Sierra Leone Agricultural Economists and the development of the research and teaching programs of the Department of Agricultural Economics and Extension at Njala University College, University of Sierra Leone.

#### The Sampling Procedure

The data is being collected by an integrated twice-weekly enumeration of a sample of rural household over a period of twelve months. Data from the same sample is being used for all the micro-level studies, i.e., farm level, rural nonfarm, marketing, consumption and migration. The sampling procedure was as follows:

- 1) The country was divided into nine agricultural resource regions on the basis of Mitra's [1968] classification.
- 2) Three census enumeration areas (consisting of 80-100 households) were chosen at random from each resource region (but excluding urban areas).

- 3) Twenty households were chosen at random in each enumeration area to give a total sample of approximately 500 households in about twenty-five villages or enumeration areas.

#### Procedures for Data Collection and Micro-Level Policy Analysis

The integrated research program is divided into a number of integrated micro-level studies as follows:

- 1) The farm-level study.
- 2) The agricultural marketing and processing study.
- 3) The rural nonfarm study.
- 4) The rural consumption study.
- 5) The migration study.

Farm Level Study. The farm level study is being conducted over a twelve month period beginning in January 1974. The data collection methodology will follow the methodology developed by Spencer [1973] in his earlier study of rice production. Basic input-output information will be collected for all agricultural crops and any nonfarm activities such as tailoring that rural households may be engaged in. Attention is being given to labor utilization in various activities and particularly the allocation of labor between farm and nonfarm activities. A related issue is the decision to process and store rice on farm or to move rice off the farm to specialized processors. Finally, cash flows including loans and debts are being recorded to assess the extent of urban-rural remittances and farm debts.

The agricultural production study will be used to analyse the demand for labor under differing production systems and technologies using linear

programming models of the farm-firm. In particular, the impact of mechanical cultivation and new biological technologies including new rice varieties and fertilizer will be studied in detail in the areas where rural development projects have been established. This will provide specific information to government policy makers on production systems to be emphasized (e.g., upland vs. swamp rice), and types of mechanical and biological technologies to be promoted to increase agricultural output, incomes and employment. In addition some general macro-economic policies relating to credit and input and output pricing will be evaluated.

The Marketing and Processing Study. The marketing and processing study is designed to trace the forward linkages of the agricultural sector which are important both in indirect employment creation and in determination of producer and consumer prices. The flows of a few agricultural commodities from the farm level to the consumption centers will be described and alternative market channels and processes analyzed in order to design a marketing system for the future course of structural transformation in the rural economy, and which continues to provide a substantial source of employment.

Particular attention will be given to the flow of agricultural commodities from on-farm processing and storage to off-farm processing and storage. The aim is to model the decision to progressively eliminate on-farm marketing in favor of commercial off-farm marketing. The current research design focuses on a linear programming model with several different "processes" for each of the aspects of agricultural marketing--transportation, storage, processing, etc. The Sierra Leone agricultural marketing

industries will be surveyed from the farm level to the urban areas to obtain basic data.<sup>1/</sup>

For administrative reasons the marketing study will be divided into two areas: (a) a study of the private trade channels, and (b) a study of the government or quasi-government institutions (Rice Corporation, Sierra Leone Produce Marketing Boards, Cooperative Societies, Central Market places).

Policy recommendations will be made on the basis of potential bottlenecks that may arise in the marketing system with any attempt to increase agricultural output and rural employment. Moreover the greater specialization in off-farm marketing and processing has substantial implications for on-farm utilization of labor. Finally, the marketing study will provide policy guidelines for restructuring the marketing-processing system in light of the employment problem. For example, Rice Corporation officials are currently debating whether further investment should be made on large-scale rice processing mills or private small-scale mills encouraged. The planned L.P. analysis of processing along the lines of Timmer [1972] will provide important insights.

The Rural Nonfarm Study. The general analytical aspects of rural nonfarm sector research have been presented by Liedholm [1973]. The research in Sierra Leone will be divided into two phases. In the first phase a sample of market towns, stratified by population size,

<sup>1/</sup> Recently a foreign firm of consultants has completed a report on the marketing system. However, the results are severely limited by data problems. The present study there emphasizes primary data collection.

will be selected for complete establishment enumeration.<sup>1/</sup> Finally, to ensure that the urban-rural links are fully traced, an enumeration of nonfarm establishments will be undertaken in the urban areas including Freetown.<sup>2/</sup> In all of these surveys, enumerators will record the basic information about each establishment including: the type of activity, the number of employees, the type of workshop and the number of machines used. These data will provide a first census of small-scale industries in both rural and urban areas of any African country.

In the second phase of the project, a detailed survey of a stratified sample of firms drawn from this population will be undertaken. In particular, enumerators will be sent to selected firms (primarily in the "enumeration areas" and market towns) on a fortnightly to monthly basis to obtain information on the value and quantity of output, the value and quantity of inputs broken down by type and source (whether obtained from rural or urban areas) and the value and quantity of capital assets, including inventory. These data would be used to estimate the  $(a_{ij})$  parameters required for the analysis of the choice of technique and the input-output table as well as for estimating the parameters of the production functions of the rural establishments.

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<sup>1/</sup> Specifically, 100 percent of the 17 locations with populations from 5,000-20,000 and 50 percent of the 42 localities with populations from 2,000-5,000 will be completely enumerated. In addition, all of the non-farm establishments included in the farm level study will be surveyed in the 25 enumeration areas.

<sup>2/</sup> The Small-Scale Industries Division of the Sierra Leone Ministry of Trade and Industry has partially completed a census of small-scale industries in Freetown. This phase of the research will be conducted in close cooperation with Ministry officials.

The rural nonfarm study will provide general policy guidelines. For example the effect of factor prices on capital labor substitution will be investigated. Likewise the projections of the rural nonfarm sector will be made to determine those industries with the greatest potential for expansion of output and employment.

Specific problems of small-scale entrepreneurs such as access to credit and vocational training will be investigated.<sup>1/</sup> The small-scale industry study should also have wider application outside Sierra Leone in stimulating and providing the methodology for further work in this important but much neglected area.

The Rural Consumption Study. The extent and nature of the rural consumption study will be determined after further analysis of a household expenditure survey recently completed by the Central Office of Statistics. However, it is anticipated that a special consumption study will be undertaken in rural areas to (a) measure income elasticities of important commodities disaggregated by income class in order to relate the labor intensity of consumer goods to income and (b) measure the income elasticity of consumption disaggregated by the origin of the commodity, i.e., locally or rurally produced, urban produced or imported.

The rural consumption study will be integrated with both the agricultural production and rural nonfarm studies to provide accurate estimates of incomes and checks of expenditures on incomes. A sample of households from these studies will be chosen and enumerated over a period

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<sup>1/</sup> All data and results will be made available to the Small-Scale Industry Division of the Sierra Leone Ministry of Trade and Industry.

of one year to capture seasonal fluctua

The consumption study will be generally useful in integrating the various micro-level studies by providing income elasticities of demand for food staples and rural nonfarm goods to be used in demand projections. The results should also be useful to Sierra Leone planners since to date no national estimate of the income elasticity for the staple food crop, rice, is available.

The Migration Study. The migration study is designed to (a) describe the migrants and the migrant process, (b) analyze the key determinants of the decision to migrate, (c) measure the impact of migration on origin and destination regions, (d) analyze the impact of policies relating to rural and urban incomes, education, etc. on the rate of migration and urban unemployment and (e) measure rural-urban capital transfers embodied in migration. In rural areas, a survey of rural households in the previously chosen enumeration areas will be used to obtain data on age, sex, education, etc. and location of household members who have migrated. The agricultural production study will provide data on household members who have migrated. The agricultural production study will provide data on household incomes and remittances of migrants. From these rural areas migrants will be traced principally to urban locations and the diamond mining areas where they will be repeatedly interviewed over a period of from one to four months to obtain data on incomes, employment status, remittances, etc. This will provide a first comprehensive study of migration in Sierra Leone and will provide more detailed and accurate information on employment and incomes of migrants and non-migrants than has been undertaken elsewhere in Africa.

In the migration study some key policy issues will be analyzed. The impact of urban minimum wage policies on the rate of rural-urban migration will be quantified. Moreover, the effects of rural education will receive special attention as it affects the monetary returns to migration or alternatively aspirations for urban jobs.<sup>1/</sup> Finally, the capital flows embodied in migration will be computed as the difference between rural investment on education and net urban-rural remittances. This will be used in analyzing total rural-urban capital transfers in the aggregate policy analysis.

#### Development of a Model of the Rural Economy for Policy Analysis

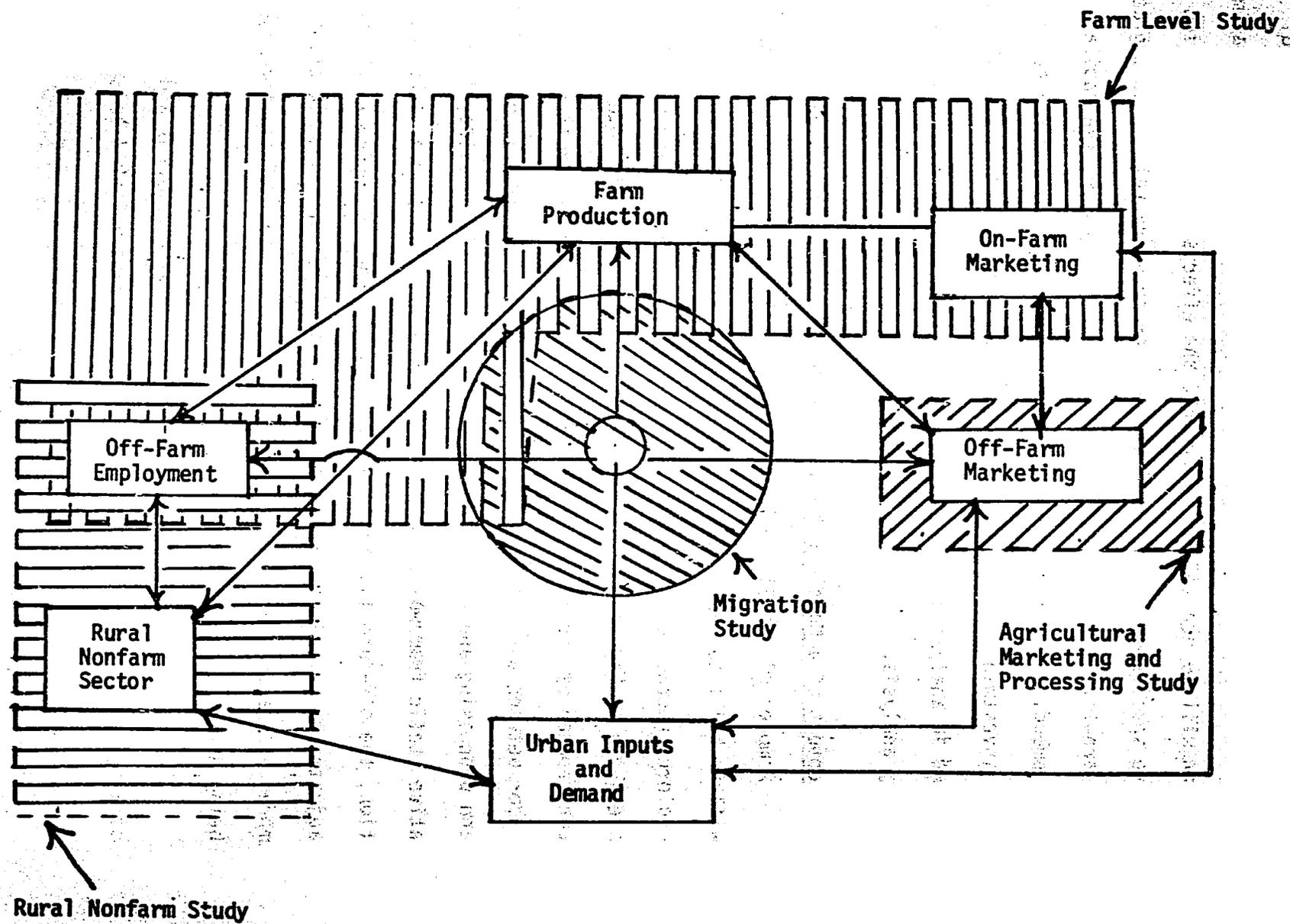
A model of the Sierra Leone economy emphasizing the rural economy, will be built to synthesize results of the various micro-level studies and explore interactions between sectors. The types of linkages to be explored are shown in Figure 6. As a first step a micro economic model will be constructed of the rural farm household to analyze the decision to allocate labor between agricultural production, off-farm employment, on-farm marketing and processing and rural-urban migration. This will provide, in a comparative static framework, some general insights into seasonal labor allocation, the off-farm labor supply schedule to rural and urban areas and adjustments in the firm household accompanying rural-urban migration. The model will also provide an empirical test of a theory of the firm-household being developed by Liedholm.

For a general equilibrium analysis of rural employment and development strategies, an aggregate model of the rural economy linked to the urban

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<sup>1/</sup>As a byproduct this will provide an estimate of the private costs and returns to education and hence the demand for education.

**Figure 6. Schematic Representation of Integrated Research on Employment Problems in Sierra Leone, including the Relationships and Linkages Between Proposed Projects**



economy will be developed.<sup>1/</sup> Tentatively this will consist of four basic sectors following Byerlee and Eicher [1972]--agriculture and rural nonfarm sectors modeled in detail, and urban small-scale and urban large-scale sectors modeled at a more aggregate level. The agricultural and rural nonfarm sectors will use aggregate LP techniques to model the supply curves of output and demand for labor of these sectors. Intersectoral linkages would then be captured through an input-output table. The model will then be "rounded" out through a consumption component disaggregating demand by rural and urban areas and income class, and a migration/demographic component to provide labor supply. As discussed in Section II, this model will combine elements of Spencer's model of the rice industry and Byerlee's macro-economic model.

The policy instruments to be evaluated in the model will include agricultural production policies--particularly the introduction of mechanical and biological technologies by region--policies specific to the rural nonfarm sector such as credit and extension and overall macro-economic policies such as rice pricing and imports, marketing board taxes on export crops, minimum wage policy, monetary and trade policy and government intersectoral budget allocations. These policies will be evaluated with respect to certain performance indicators, tentatively identified as GNP, rural incomes and employment, rice self-sufficiency, inter-regional income distribution and rural-urban migration and urban unemployment.

A tentative rural economy model will be developed by the Njala research team and discussed at the 1974 Network Conference in Ethiopia.<sup>2/</sup> Three considerations will determine the ultimate form of the model. First,

<sup>1/</sup>Dr. Hartwig deHaen of the University of Bonn will serve as a consultant on this phase of the study.

<sup>2/</sup>This allows time for incorporating additional data requirements suggested by the model into field work.

the policy instruments and goals to be investigated will be determined in close cooperation with government officials particularly the Ministries of Development, Agriculture, Labor and Trade and Industry, who are the ultimate users of the results. It is expected that both the primary data generated and the policy guidelines provided by the model will be important inputs into future planning exercises. Second, the model will be constructed on the basis of preliminary analysis of data to determine what regional disaggregation is needed. Finally, the model must be adaptable to the limitations of computational capacity projected for Sierra Leone.

#### Research Team and Plan of Operation

The Njala Rural Employment Study is under the direction of Dr. Dunstan S. C. Spencer, Lecturer in the Department of Agricultural Economics, Njala University College. Other members of the research team and their area of research are shown in Table 1. It includes two other Sierra Leoneans--Mr. I. I. May-Parker, Lecturer in Agricultural Economics at Njala University College and Mr. Joseph Tommy, currently a graduate assistant at Ohio State University who plans to return to Njala in June, 1974. In addition, Dr. Derek Byerlee, Assistant Professor in Agricultural Economics and Mr. Enyinna J. Chuta, graduate assistant in Agricultural Economics--both at Michigan State University--joined Njala University College as research fellows in March, 1974 for an eighteen-month period. Consultants will be utilized as requested by Dr. Spencer. Currently Carl Liedholm will spend about four months in Sierra Leone in 1974-75 and Vernon Sorenson and James Shaffer of MSU will spend April/May, 1974 in Sierra Leone as consultants on the marketing phase of the study.

Table 1. The Njala Rural Employment Research Team

Project Director: Dr. Dunstan S. C. Spencer

Type of Study	Research Personnel	Consultants
I. Farm Level Study	Dr. Dunstan Spencer Mr. James Kamara Research Assistant 1 Field Supervisor 25 Enumerators	
II. Marketing Study	Mr. I. I. May-Parker Mr. Olu Williams Research Assistant 2 Field Supervisors 4 Enumerators	Prof. James Shaffer Michigan State Uni. Prof. Vernon Sorenson Michigan State Uni.
III. Rural Nonfarm Study	Mr. Enyinna J. Chuta Research Assistant 4 Enumerators	Prof. Carl Liedholm Michigan State Uni.
IV. Migration	Mr. Joseph Tommy Dr. Derek Byerlee 1 Field Supervisor 4 Enumerators	
V. Rural Consumption	Dr. Derek Byerlee 1 Field Supervisor	
VI. Rural Economy Model for Policy Analysis	Dr. Dunstan Spencer Dr. Derek Byerlee	Prof. Carl Liedholm Michigan State Uni. Prof. Hartwig deHaen University of Bonn

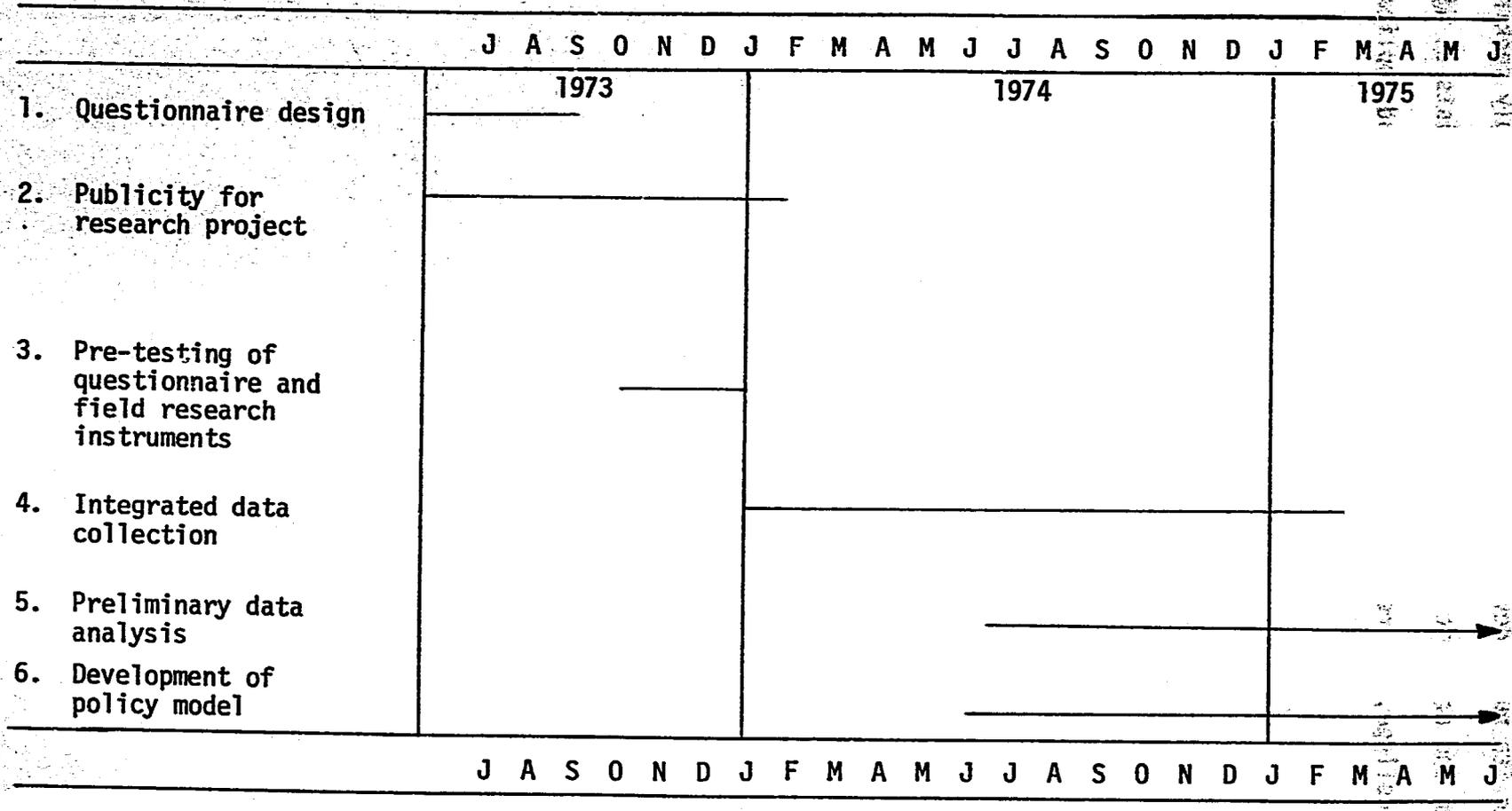
The Plan of Operation is shown in Figure 7. The major part of the field research is already in progress and will be completed in March of 1975. Preliminary data analysis will be undertaken in Sierra Leone, but because there is no computer in Sierra Leone, much of the analysis will be undertaken at MSU during 1975-76.

### Contributions of Sierra Leone Research

The Njala Rural Employment Research Study will make both general contributions to knowledge of rural employment in Africa and specific contributions to socio-economic research in Sierra Leone. At the general level, advances in theory of firm-household labor allocation and rural-urban migration will be subjected to rigorous empirical testing. In addition, the integrated methodology developed for data collection has wide relevance for research in rural areas. Finally the countrywide analysis of employment problems within a general equilibrium framework, but based on a solid empirical base, will be an important methodological contribution to sector analysis.

Within Sierra Leone, the Njala research will be a major step toward improved policy analysis. The data generated will provide comprehensive information on production, incomes, and labor utilization for the entire rural economy, which can be utilized for future planning at both the local and national levels and for improved estimates of national accounting variables. In addition, the study will produce a wide spectrum of policy implications, ranging from guidelines for mechanization and agricultural research, specific measures to promote nonfarm employment and reduce rural-urban migration, to general macro-economic policy recommendations such as rice pricing policies and trade policies. As the Sierra Leone government is

**Figure 7. Plan of Operation for Integrated Research on Rural Employment in Sierra Leone**



expanding its rural development program and is increasingly seeking information and economic analysis from agricultural economists at Njala University College, the research results will have widespread application.

## Nigerian Research Program

### The Problem Setting

The Nigerian economy has experienced a favorable growth rate since independence, growing at a rate of 6 percent annually between 1959 and 1966 and considerably more rapidly in the period following the end of the civil crisis in 1970. Within the agricultural sector, the primary engine of growth has traditionally been exports. However, in recent years, there have been rapid increases in food prices leading to more attention to food crops. In fact, the Third Five Year Plan now being formulated places major emphasis on expanded food crop production.

Despite the relatively rapid growth of the economy, unemployment and income disparities have been increasing, leading to a growing interest in these problems by policy makers (Essang [1971]). Open unemployment is widespread in urban areas and averages over 10 percent of the labor force. In addition, there is substantial underemployment in the traditional urban sectors where the labor force is growing at about 10 percent annually. The reasons for urban unemployment have been briefly reviewed by Diejomah and Orimalade [1971] and Byerlee [1973] but can be largely attributed to high rates of rural-urban migration and low growth of employment in the modern sector. In both cases high urban wages have been a contributing factor.

Only recently has there been any empirical estimates of income disparities in Nigeria. Teriba and Phillips [1971] provide evidence of significant skewness of distribution whether incomes are disaggregated on a regional, functional or personal basis. Essang [1971] also notes surprisingly large income disparities among cocoa farmers of Western

Nigeria (Gini Coefficient of 0.7). Finally using indirect measures of income distribution, Byerlee [1973] projects increases in income disparities unless greater attention is given to agricultural development.

In summary, available evidence indicates that high rates of rural-urban migration, urban unemployment and income distribution are serious problems that are beginning to concern policy makers and researchers in Nigeria. However, to date there has been relatively little research on these problems and almost no micro-level research to assess the effects of alternative agricultural technologies on employment and incomes in rural areas and the determinants of out-migration. The rural employment research program on Nigeria addresses this critical need. Moreover this research is being conducted within the context of important national agricultural policy issues, particularly the accelerated food production campaign.

#### Objectives of the Nigerian Research

The specific objectives of the Nigerian research program are:

- (1) To develop and apply methodology for generating primary data on output, employment, and incomes in rural areas with particular emphasis on food producing regions.
- (2) To analyze the determinants of rural employment and rural-urban migration and provide policy recommendations to Nigerian planners for increasing rural employment within the context of accelerated food production.
- (3) To facilitate the development of the research capacity of Nigerian agricultural economists.

- (4) To facilitate the development of a Master's degree in agricultural economics at the University of Ibadan through provision of policy relevant research opportunities for graduate students.

#### Accelerated Food Production and Employment in Kwara State

In the face of rising food prices, the Federal Ministry of Agriculture and Natural Resources has recently launched an "accelerated food production campaign" in cooperation with AID/Lagos who have been asked to provide nine technicians to assist in implementation of the program. However, as there is relatively little economic research on food crops in Nigeria vis a vis export crops, there is a need for detailed micro-level studies of food production systems to assess potential for expanded food output through introduction of new technologies. Both mechanical and biological technologies have implications for rural employment which need to be considered.

A team of Nigerian researchers, Dr. S. O. Olayide (Project Leader), Dr. O. Ogunfowora, Dr. S. Essang and Dr. F. Idachaba in the Department of Agricultural Economics, University of Ibadan, is conducting a detailed study of food production and rural employment in Kwara State under an MSU subcontract and a grant from Rockefeller Foundation. Kwara State is located in an important food producing region and has considerable potential for increasing food production for shipment to the major urban areas of Lagos and Ibadan immediately to the South.

A major thrust of the Kwara State research project is the generation of micro-level data for policy analysis and planning. Thirteen villages

have been selected throughout the state and data are being collected at weekly intervals from March 1973 to March 1974. The methodology of data collection is built upon earlier studies by Norman [1973]. This data generation phase aims to provide information on labor utilization by crop, season, and nonfarm activity, other farm inputs, outputs, prices, etc. to be used in an analysis of the demand for labor and supply of output under the traditional production system. It is also planned to assess the impact of new biological technology (i.e., seeds and fertilizer) as a means of contributing to expanded rural employment and food production. The situational survey of Kwara State has been analyzed (Ogunfowora, et. al. [1973]) and the data collection will be completed in March 1974. Because Olayide, Ogunfowora, Essang and Idachaba are all intimately involved in constructing the Third Five Year Plan, it is expected that the results of the Kwara State research will have an important impact on future policy decisions.

#### Employment in Large-Scale Farming

Closely associated with the Kwara State program is a study of large-scale farming in Western Nigeria by Essang. As one strategy for increasing food production, the Nigerian government is promoting large-scale farming--both privately and publicly owned. For comparative purposes, Essang and an M.S. student from the University of Ibadan are also surveying large-scale farming in the Cameroons and Ghana. This will provide information to enable comparison of the economics of large-scale farming to smallholder production. Preliminary analysis suggests that large-scale farming is capital intensive and considerably reduces total labor

input per acre. Essang suggests that distorted factor prices have encouraged highly mechanized large-scale farming operations.

#### Effects of Export Crop Taxes on Employment

A controversial policy issue in Nigeria is the taxation of agriculture through Marketing Board taxes on export crops. To date, research on Marketing Board taxation has focused on the output, income, foreign exchange and price stabilizing effects of these taxes. However, none of these studies has analyzed the effect of export crop taxes on resource utilization. This is particularly important for labor which may be displaced from agriculture to urban areas through these taxes.

Idachaba [1973] develops a production function framework for examining the effects of taxes on land and labor utilization in Nigerian agriculture. Theoretically he shows that taxes have diminished the level of labor employed on farms in northern Nigeria. Within this framework he empirically estimates output-labor elasticities and hence the amount of subsidies required to keep labor employed from declining with an increase in taxes. Results in Table 2 show that subsidies required would have to be quite high to "compensate" the taxes. Fertilizer which is only sparsely used would have to be heavily subsidized to keep agricultural employment from falling.

**Table 2. Required Subsidy on Labor for a One Percent Decrease in the Price of an Export Crop-- Employment Held Constant**

Export Crop	Percentage Subsidy on Labor
Cotton	1.702
Groundnuts	1.570
Guinea Corn/Groundnuts	3.025
Millet/Guinea Corn/ Groundnuts	2.800
Cotton/Cowpeas/Potatoes	2.166

Source: Idachaba [1973], p. 24.

### Determinants and Impacts of Rural-Urban Migration

Demographic statistics from Western Nigeria demonstrate the high rate of out-migration among school-leavers in Western Nigeria. To assess the factors contributing to this out-migration and provide policy recommendations for dealing with the problem, Essang and Mabawonku [1973] undertook a study of rural-urban migration from rural areas to major urban areas of western Nigeria. A sample of households was randomly selected from six villages and a survey conducted to determine the social and economic characteristics of households from which migrants originate. The migrants identified were then traced to urban areas and interviews conducted in destination areas. This study is one of the first to demonstrate the feasibility of a methodology that includes (a) interviewing in both rural and urban areas and (b) tracing migrants to urban areas. In addition a major effort was made to measure rural incomes although the authors treat this result with caution.

The basic regression equation explaining the rate of rural-urban migration is:

$$Y_i = 4.0 + .58 A_i + .19 E_i - .15 D_i + .13 I_i + .22 R_i + .15 U_i$$

(.08)
(.06)
(.05)
(.05)
(.08)
(.16)

where  $Y_i$  is the rate of migration for the  $i^{\text{th}}$  household,  $A_i$  is the average age,  $E_i$  is average education,  $D_i$  is distance,  $I_i$  is the expected rural-urban income differential,  $R_i$  is a dummy variable for urban relatives and  $U_i$  is an index of urban amenities. All variables, except the index of urban amenities, are statistically significant at the .05 percent level. The lack of significance to urban amenities tends to discredit the "bright lights" theory. The authors note that the positive relationship of migration to the expected income differential supports Todaro's theory of migration.

The migration study also attempts to identify the impact of migration on rural areas. Tentative evidence indicates that rural-urban migration is associated with increasing per capita farm size and income, but the precise cause and effect relationship is not well established. However, the study does show that the average age of the rural population has increased substantially with rapid out-migration. Finally the results indicated substantial rural-urban capital flows embodied in migration. Thus investment in education constitutes a high proportion of total private investment in rural areas. Also net remittances of cash and kind were found to be from rural to urban areas as opposed to the results of Caldwell and others who find a net urban-rural remittance transfer. Essang and Maba-wonku conclude that government policy should be directed toward increasing rural incomes to reduce the rate of out-migration.

### Output and Labor Utilization in Traditional Agriculture

Norman's [1973] village studies in northern Nigeria are noteworthy both in the development of data collection methodology and also in providing the most comprehensive picture of rural labor utilization and the rural labor market in traditional African farming. Through surveys of 15 villages a methodology has been developed which has wide application in village studies (Norman [1973]). Furthermore, he provides some of the first information on participation in off-farm activities and the relationship between the MVP of labor, wages and seasonality. His results are also disaggregated by small and large farms to show some of the factors determining income distribution. More detailed follow-up research on income distribution is being pursued by Matlon [1973] who is studying the interrelationship between such factors as farm size, participation in off-farm activities, adoption of new technology and employment and income distribution in rural areas of Kano State.

Finally, Norman provides insights into the farmers' goals of profit versus security--a potentially important factor determining labor allocation in rural areas. This is complemented by the study of Hedley and Zuckerman of IITA in Western Nigeria who devote major attention to analyzing the decision-making process in smallholder farming systems. This work is being further pursued by Flinn to develop a farm-firm growth model, to analyse changes in cropping systems with improved technology.

### Indirect Employment and Income Distribution Effects of Agricultural Strategies

At a more aggregate level, Byerlee [1973] has analyzed the indirect effects of alternative food and export promotion strategies in Nigeria using a ten sector simulation model of the Nigerian economy. The various strategies tested by the simulation model all produced significant increases in agricultural output. The largest increase in agricultural value added resulted from a balanced food and export promotion strategy, suggesting that Nigeria should give relatively more emphasis to increasing food production to meet expanding population and incomes than it has in the past. In the nonagricultural sectors, the export promotion strategies in particular, produced large increases in value added as a result of the backward and forward linkages of agriculture, and increases in consumption and investment induced by higher agricultural incomes. In all the agricultural strategies, the earnings in nonagricultural small-scale sectors increased significantly. This result is important in indicating less unemployment and underemployment in urban areas. Significant too, is the fact that the balanced strategy of food and export promotion which produces the largest increase in GDP also produces the largest increase in earnings in small-scale sectors.

In addition, all strategies excluding food promotion alone, result in reduced out-migration from agriculture with the largest reduction in the case of a food and export promotion strategy combined with lower non-agricultural wages. However, even in this case the nonagricultural labor force is only reduced by 3.0 percent by 1983.

In summary, the results of the simulation analysis indicated that more emphasis should be given to food production than in the past through a

balanced strategy of food crop and export crop production. At present, effective demand limits a full scale shift in priorities to food production. A balanced food and export promotion strategy not only produces the largest increase in GDP, but also the largest increase in earnings in non-agricultural small-scale sectors and the most equal distribution of income.<sup>1/</sup> These results suggest that the multiple developmental objectives of output, income distribution and employment are complementary within the current Nigerian economic structure, although more concrete theory and empirical information is required to substantiate and generalize from this conclusion.

#### Continuing Research in Nigeria in 1974-75

The research program in Nigeria during 1974-75 will be a continuation of projects described above. More specifically the following is planned.

- (1) The data collected in the first year in Kwara State will be analyzed during 1974 and results presented to the 1974 conference of the Network. Attention will be given to designing policies for use in the National Plan, as well as providing guidance to the Kwara State government. Furthermore, additional data will be collected during 1974-75 to fill gaps which are identified in the analysis of the 1973-74 data.
- (2) The large-scale farming study will be completed and results written up during the summer of 1974 and presented at the 1974

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<sup>1/</sup>All policy runs of the model showed a reduction in income disparities as measured by the Gini ratio with the balanced food and export promotion strategy providing the largest reduction in income disparities compared to the base run.

conference. Major attention will be given to analyzing policy alternatives, including an analysis of the output and employment implications of large-scale farming and smallholder production.

- (3) The research on rural-urban migration will be extended to Mid-western State and other areas of Nigeria using methodology developed by Essang and Mabawonku [1974]. This will provide a comparative perspective within Nigeria and with other studies in Sierra Leone and Ghana.
- (4) David Norman's research will include the first stage of a "guided change" project. Various seed distribution, credit and extension programs will be launched in selected areas of northern Nigeria and time series data collected to assess the impact on output, incomes and employment of various "package" programs. Close communication will be maintained with the Ada District researchers in Ethiopia to provide exchange of methodology and results.
- (5) Peter Matlon will collect data on employment and income distribution in groundnut production in northern Nigeria during the 1974 cropping season. He aims to evaluate the effect of a groundnut production campaign on total output, labor utilization and income distribution in the region.

Ethiopia: The Ada Rural Development Program

The Institute of Development Research (IDR) of Haile Sellassie I University was established in the spring of 1972. Dr. Assefa Mehretu, a geographer at HSIU, replaced Dr. Robert West as the Director of the IDR in the fall of 1972. The IDR is committed to a wide range of studies in rural areas.

Over the past 18 months the IDR and MSU have evolved a division of labor which will assist the IDR in the development of the capacity to carry out agricultural economics research in Ethiopia, as well as contribute to MSU's objectives under AID/csd 3625. The following steps have been taken:

- (a) a memorandum of agreement (subcontract) has been developed which will permit the IDR and MSU to jointly undertake the ADA research. A revised draft of the memorandum was discussed with Dr. Assefa when he visited MSU on April 20, 1974. It is assumed that the memorandum of agreement will be signed in early May and will become effective on June 1, 1974.
- (b) Dr. Tesfai Teclé completed his Ph.D. in agricultural economics at Cornell University and joined the IDR in October 1973. Dr. Tesfai will work full-time on the Ada research.
- (c) Ethiopians have been interviewed for graduate training in agricultural economics in the United States. Ato Girma Begashaw of HSIU has been awarded an AID scholarship to pursue graduate training in agricultural economics at MSU beginning in September, 1974. It is anticipated that financing can be secured to enable one additional HSIU agricultural economist to start his graduate training in the U.S. beginning in September, 1974.

- (d) MSU is recruiting two agricultural economists to assist IDR in undertaking the Ada research. One of the two MSU agricultural economists will direct the Ada project for at least the first two years.
- (e) Carl K. Eicher will spend three months or longer in Ethiopia during the July 1974-June 1975 period. He will spend July 1-31 and September 20-October 19, 1974 and April 1-30, 1975 in Ethiopia.
- (f) Professor Kenneth Parsons of the University of Wisconsin will serve as a short-term consultant on land tenure aspects of the Ada research. Professor Parsons will arrive in Ethiopia on June 3, 1974 for a two-week period. It is assumed that Professor Parsons will continue his association as a consultant on the project over the next two to three years of the project.
- (g) Dr. Dunstan Spencer of Sierra Leone and Professor Warren Vincent of MSU's Department of Agricultural Economics have agreed to serve as short-term consultants on the Ada project over time. Their skills as production economists will represent a valuable input in the research design. Also, Professor Vincent has agreed to work with Ethiopian graduate students at MSU who return to Ada to collect data for their dissertations.
- (h) An Ethiopian Ph.D. candidate in agricultural economics at the University of Wisconsin--Ato Gebremichael Menghitu--will return to the Ada District in late 1974 for 12 months to collect data for his dissertation as a member of the IDR/MSU research team. It is assumed that MSU will finance Ato Gebremichael's data collection under its AID/csd 3625 contract.

- (1) The African Rural Employment Research Network will hold its 1974 Annual meeting at Debre Zeit, Ethiopia from September 29-October 4. The research design for the Ada project will be discussed during two days of the conference.

The attached Memorandum of Agreement between MSU and the IDR describes the ADA research objectives, linkages, training component, etc.

Revised Draft  
April 30, 1974

MEMORANDUM OF UNDERSTANDING BETWEEN  
MICHIGAN STATE UNIVERSITY, CONTRACTOR - CONTRACT NO. AID/csd 3625  
(RURAL EMPLOYMENT IN TROPICAL AFRICA: A NETWORK APPROACH)  
AND  
HAILE SELASSIE I UNIVERSITY  
INSTITUTE OF DEVELOPMENT RESEARCH

This Memorandum of Understanding is entered into effective June 1, 1974 between Michigan State University, Contractor for the Rural Employment Study in Tropical Africa (hereafter referred to as RETA) with its principal office at Michigan State University, East Lansing, Michigan and Haile Sellassie I University, Institute of Development Research (hereafter referred to as IDR), with its principal office at Addis Ababa, Ethiopia.

Contract AID/csd 3625, a contract between the A.I.D. and RETA encourages the conduct of cooperative research studies by RETA and African institutions.

Therefore in furtherance of the purposes of such an understanding, Michigan State University, Contractor for the Rural Employment Study in Tropical Africa and Haile Sellassie I University, Institute of Development Research mutually agree as follows:

I. Scope

A. Need for study

The IEG and US/AID consider research and evaluation to be an important and essential component of a rural development project in the ADA District of Ethiopia. However, given the multiple objectives of the ADA Project and the lack of a standard methodology for tracing the impact of the project on output, incomes, employment and income distribution, a small but highly skilled research team is required to develop a methodology and study the impact of the project on these variables over time and present the resultant information in appropriate formats for utilization in the planning, development and operation of this and other rural development projects.

The research results will be of use to the management of the ADA Project as well as the Ministry of Agriculture and the Central Planning Office. In addition, the methodology developed by the ADA research team will be useful in the Ministry of Agriculture's overall evaluation of agricultural projects. Since there is a critical shortage of Ethiopian agricultural economists, it is essential that the ADA research contribute to the development of local capacity for undertaking policy oriented research on rural development.

## B. Objectives

1. Develop a conceptual framework for analyzing the socio-economic impact of the ADA Project over the 1974-79 period, including production, income, employment and income distribution.
2. a. Undertake micro-level studies in the ADA District including:
  - i. Demand for labor in alternative production systems.
  - ii. Demand for labor in off-farm rural activities.
  - iii. Determinants of seasonal and permanent migration.
- b. The results of the micro-level research will be aggregated in order to evaluate the effects of alternative policies on production, income, employment and income distribution over the 1974-79 period.
- c. From the results of (a) and (b) assist the Ministry of Agriculture in developing national strategies and policies for dealing with problems of rural employment and income distribution.
3. Assist in providing an improved theoretical and empirical basis for incorporating labor into project, sub-sector, sectoral and macro-planning models and rural development evaluation techniques which can be used by the Ministry of Agriculture and the Planning Commission Office.
4. Contribute to the training of HSIU economists and agricultural economists through research experience for undergraduate and graduate students.
5. Facilitate the development of a community of African researchers through the African Rural Employment Research Network which links Ethiopians with researchers in other African countries in order to exchange information on alternative approaches to research on problems of rural development, unemployment, and income distribution in Africa.
6. Contribute to the development of the capacity of the IDR of HSIU to carry out policy oriented research on rural development.

### C. Plan of Operation

The research will use the HSIU/IDR baseline survey in selected areas of the ADA District as a point of departure. The MSU/IDR study will evaluate and determine the seasonal demand for labor and farm incomes under alternative production systems, and mechanical and biological technologies. The MSU/IDR team will have joint responsibility in developing adequate data as needed to meet the requirements of the plan of operation. Specific data related to agricultural production activities will include:

1. Production systems, traditional versus improved, as specified in items 1 through 4 following in this section, including rotation, timing of planting, harvesting, etc.
2. The seasonal demand for labor by each activity.
3. Technical input-output data relating yields to fertilizer use, new varieties, mechanical techniques, etc.
4. Expenditures,
5. Decision-making.

The data will be analyzed with budgeting and programming techniques to determine substitutability and/or complementarity between factors of production.

Particular attention will be devoted to exploring the opportunities for efficient labor intensive technologies on farms through an analysis of data collected by the research team and of the following production systems, including the institutional delivery systems for inputs:

1. Traditional system using only ox power, traditional implements, labor and indigenous seeds as inputs.
2. Traditional system plus extension services, fertilizer and improved seeds.
3. A system using traditional and improved ox power, combined with improved plow and harrow, plus inputs in 2 above.
4. A system utilizing extension services, fertilizer, improved seeds and alternative sizes of tractors and related equipment which are being utilized by farmers in the project area.

The final step will be to analyze the effects on private and social profitability of alternative government policies which alter the relative prices of capital and labor.

## II. Research Linkages

Since there is a need to expand the capacity of local researchers and research organizations to carry out policy oriented research on rural development, the ADA research will be undertaken by MSU and HSIU under the following guidelines:

- A. The research shall be carried out as an integral part of the research program of the IDR of HSIU. However, MSU will retain primary responsibility for work undertaken within the terms of this memorandum of understanding.
- B. The IDR Research Committee (Team) for the ADA Project shall strive to strengthen HSIU institutes and departments through opportunities for both students and staff to participate in the design and execution of the research.
- C. The research results will be presented at least annually at a meeting of the IDR Advisory Committee for ADA Research.
- D. The MSU/IDR researchers will be linked through annual conferences, meetings, etc. with the network of researchers who are pursuing similar research in Sierra Leone, Nigeria and other African countries under the aegis of the African Rural Employment Research Network.

## III. Administrative Arrangements

- A. The Director of IDR and the Director of the African Rural Employment Research Network will collaborate and jointly agree on a Research Committee (team). This Committee (team) will be called the IDR Research Committee for the ADA Project. This Committee (team) will be charged with the design, organization and execution of the ADA research.
- B. The Research Coordinator for the first two years of the ADA Project will be an MSU faculty member who will occupy a temporary position as a visiting faculty member in IDR. The ADA Research Coordinator will be responsible to the IDR Director.
- C. Members of the IDR Research Committee (team) for the ADA Project will develop a detailed work plan within 45 days after the arrival of the Research Coordinator.
- D. The Board of Advisors of the IDR will review and approve the annual work plan, staffing plans, and budget for the ADA research.

- E. A Steering Committee for the ADA research will be composed of the Director of the IDR, General Manager of ADA (ADDU), Research Coordinator for the ADA Project, Planning Commission Office, and the Director of the African Rural Employment Research Network at Michigan State University. The Steering Committee will meet annually to review the progress of the research and the plan of work for the coming year and may request involvement of other government agencies if necessary.
- F. HSIU/IDR will provide office space for the ADA Research Committee (team) at the Debre Zeit Experiment Station and the IDR offices on the HSIU campus. (The HSIU/IDR will charge its customary 20 percent overhead rate on the total local costs under the MSU/HSIU Memorandum of Agreement to cover the cost of office space, utilities, furniture, library services, and general administrative support.)

#### IV. Project Financial Administrative Operations

##### A. Advance

- 1. \$7,500 of the first year's budget for IDR will be advanced by Michigan State University in 1974.
- 2. The \$7,500 (U.S. dollars) advance will be accounted for by applying it towards the reimbursement request in the fourth quarter of the first twelve months of this agreement.

##### B. Financial and Administrative Operations

- 1. The following provisions apply to HSIU/IDR for reimbursement under the terms of this agreement.
  - a. Services rendered under this agreement shall commence no later than June 1, 1974 and will continue to June 30, 1975 or as dictated in later amendments.
  - b. HSIU/IDR will submit itemized statements supported by written confirmation of expenses incurred under this agreement in requesting reimbursement for expenses, a total which shall not exceed \$113,569 (U.S. dollars) for the period June 1, 1974 through December 31, 1975, and for the period January 1, 1975 through June 30, 1975, the termination date of Contract AID/csd 3625. In the event of the extension of Contract AID/csd 3625 an additional amount of \$37,843 (U.S. dollars) will be provided and may be reimbursed to HSIU/IDR for the period of July 1, 1975 through December 31, 1975.

- c. Reimbursement requests should be sent to the Director, Research Contracts Division, Michigan State University, East Lansing, Michigan 48824, as often as deemed necessary but not more than once a month.
- d. The Director of IDR will be responsible for the allocation of the budget and reporting of the expenditure of funds.

### C. Vehicles

Two vehicles will be provided through the ADA Project by USAID/E to the IDR for the execution of the research. The vehicles will become the property of the IDR.

## V. Budget and Staffing

### A. Budget

1. The attached budget is projected until June 30, 1975. This date is also the termination date of Contract AID/csd 3625 from which the monies to support this agreement is funded. The monies budgeted from July 1, 1975 to December 31, 1975 can be made available only upon the extension of Contract AID/csd 3625. Michigan State University will not be responsible for monies expended for this period unless Contract AID/csd 3625 is extended and this agreement is modified and extended under a future amendment.
2. The attached budget shall be considered a part of this agreement.

### B. Staffing

1. The IDR will provide an increasing share of the research staff as the project evolves over time. During the initial period of this agreement, MSU will provide two faculty researchers and consultants to the ADA Research Committee (team) and HSIU will provide students and several faculty members on a part- or full-time basis. It is assumed that the IDR will provide an increasing share of the staff required for the project over time while MSU will provide one full-time staff member, selected consultants and graduate students for field work in the ADA areas, data processing and facilities which may not be available in Ethiopia, and assistance in linking the ADA researchers with researchers on similar problems in other parts of Africa.

## 2. HSIU/IDR Staffing

HSIU and the IDR will provide:

- a. One agricultural economist of faculty rank,
- b. Two to three part-time faculty researchers.
- c. Two graduate research assistants or their equivalent.
- d. Six enumerators,
- e. One secretary,
- f. One office boy,
- g. Two drivers.

These personnel shall be supported under the provisions of this agreement.

## 3. Director of the African Rural Employment Research Network

The Director of the African Rural Employment Research Network at MSU will allocate up to three months of time on the ADA Project in 1974. In subsequent years, his work allocation to this phase of AID/csd 3625 will be decided in light of requirements as outlined in the annual review.

## 4. MSU Staff Members

MSU will provide two staff members for the purposes of this agreement. The qualifications of the two staff members are spelled out below. The MSU staff members may serve an initial period of less than two years in line with the present June 30, 1975 terminal date of the Contract AID/csd 3625. If Contract AID/csd 3625 is extended, the two MSU staff members will continue their work in Ethiopia for a period of time consistent with contract objectives. Furthermore, if AID/csd 3625 is extended, it is assumed that at least one MSU staff member will be resident in the ADA District until the termination date of the extended period.

The experience and training qualifications of the MSU employed researchers to be stationed in Ethiopia will as nearly as possible meet the following specifications:

- a. **Agricultural Economist (Research Coordinator)**-  
Agricultural economist with a Ph.D. and at least five years of research experience, including experience in designing and carrying out rural economist surveys in developing countries. Researcher should have the ability to organize a research team, collect and analyze data, train research associates and contribute to improved capacity of local research institutions to undertake policy-oriented research on rural development.
- b. **Agricultural Economics Researcher** - Agricultural economist with a Ph.D. and at least two years professional experience in developing countries. Researcher should have the capacity to design and carry out rural economic surveys, train counterpart research associates and contribute to the development of Ethiopian research institutions.
- c. **Consultants**
  - i. **Consultant on Land Tenure** - Specialist in land tenure problems in developing countries.
  - ii. **Consultant in Macro-Economics** - Specialist in economic development, economic planning and the interactions between micro and macro policies as they affect agricultural development.
  - iii. **Consultant on Rural Social Change** - Specialist in rural social sciences, diffusion of innovations, migration, and nonformal educational processes.
  - iv. **Consultant on Rural Nonfarm Employment and Small Scale Industry** - Experience in designing studies of labor absorption in rural nonfarm employment.
  - v. **Consultant on Marketing.**

**Note:** The above disciplines are those which are anticipated to be most needed in the first two years of the study. Should other disciplines be considered more appropriate at a future date, substitutions may be made.

## Other Contractual Matters

### A. Data

All data collected in the execution of this agreement shall be retained at MSU/IDR. MSU will be provided with an identical set of all data on computer cards, tapes or alternative formats. The cost of providing such data to MSU will be covered under Contract AID/csd 3625.

### B. Reports

Progress reports will be provided by the Research Coordinator of the ADA Research Committee and submitted to the Board of Advisors of IDR through the Director of the African Rural Employment Research Network at the end of the first twelve months of the project. The final report will be due thirty days after the termination of this agreement.

### C. Financing MSU Staff Members

MSU will pay salaries, allowances and international travel of faculty members and consultants provided by MSU.

### D. Logistic Support

HSIU/IDR will pay for all local salaries, allowances and all research costs including the local travel of MSU faculty members and consultants provided under this agreement.

### E. HSIU/IDR agrees to the relevant provisions of Contract AID/csd 3625.

### F. Publications

1. All publications shall give due credit to the contribution of both parties, unless such credit is not desired by a contributing party.
2. Neither party shall publish any article referring to information obtained or developed pursuant to the Contract without giving thirty (30) days notice to the other party of its intention to publish, together with a copy of the proposed article.

Either party reserves the right to disclaim endorsement or disassociate itself from publication of such data obtained under the terms of the Contract. In the event either party exercises its rights to disclaim endorsement or disassociate itself from the publication, the party publishing such data or article shall be notified in writing, which shall contain an appropriate statement of disclaimer or

disassociation which shall be inserted in the publication. The notification of disclaimer must be received within thirty (30) days after notification of intended publication.

The results of the research carried out under this agreement will be published in IDR monograph series as well as in the African Rural Employment Paper series with each unit bearing the costs of the publication in the respective institutions under the joint imprimatur of HSIU/IDR and the Department of Agricultural Economics of Michigan State University.

In witness whereof, the parties hereto have caused this agreement to be enacted as of this date.

\_\_\_\_\_  
Vice President for  
Business and Development  
Haile Sellassie I University

\_\_\_\_\_  
Date

\_\_\_\_\_  
Vice President for Finance  
Michigan State University

\_\_\_\_\_  
Date

\_\_\_\_\_  
Director  
Institute of Development Research  
Haile Sellassie I University

\_\_\_\_\_  
Date

### Plans for Data Analysis and Writeup, 1975/76

With the exception of Ethiopia, field work will be completed by June of 1975. It is planned that the 12 months from June 1975 to June 1976 will be spent analyzing data, making the model of the Sierra Leone rural economy operational and writing up results. Thus, Sierra Leone researchers, Spencer, May-Parker and Tommy will spend various periods of time at MSU working with MSU scholars and consultants on the Sierra Leone part of the program. Nigerian researchers from the University of Ibadan will also participate in the preparation of the final report.

Several book/monographs will be prepared during the 1975/76 period. These will include (a) the final report of the Njala Rural Employment Study for Sierra Leone, (b) a monograph synthesizing the various studies on migration being conducted by Network researchers, (c) a monograph on employment generation in small-scale industries in Sierra Leone: theory and policy analysis, and (d) final report drawing on the country studies and related research in other countries. The final report will summarize theoretical and methodological contributions, as well as general and specific policy recommendations.

Related Research in Other Countries  
Not Financed Under AID/csd 3625

The purpose of this section is to briefly review research on employment in Africa by Network researchers outside of the three concentration countries--Sierra Leone, Nigeria and Ethiopia. All research reported in this section is not financed under AID/csd 3625.

Zaire

In Zaire, a Belgian researcher--Eric Tollens--collected primary data on economics of smallholder cotton production and labour utilization in the main cotton producing areas over the 1971-73 period. Tollens' research has been financed by the Ford Foundation. Tollens will return to MSU for five months beginning in July, 1974 to process the data and complete all requirements for the Ph.D. in agricultural economics at MSU. While at MSU, Tollens will interact with two Zairois graduate students--Messrs. Bazola and Dimandja--and help them prepare preliminary proposals for their thesis research. Tollens will return to Zaire in late 1974 to resume his position as Acting Head, Department of Rural Economics, National University of Zaire, Kisangani Campus. Tollens' review of agricultural economics research priorities in Zaire will appear in a forthcoming African Rural Employment Paper. Tollens will undertake a study of the economics of smallholder rice production when he returns to Zaire in late 1974.

Dean Linsenmeyer, a Ph.D. candidate in the Department of Agricultural Economics at Michigan State University, has been awarded a Foreign Area Fellowship to pursue 18 months of data collection in the major maize producing area of Zaire--the Kasai Oriental Province. (Mr. Linsenmeyer spent two and one-half years in this part of Zaire as a volunteer.) Mr. Linsen-

meyer has consulted with Mr. A. Gayoso of AID/Washington, Don Winkelman of CIMMYT and Gerald Neptune of AID/Kinshasa in the development of the proposal in order to ensure that his research can contribute to the Ministry of Agriculture's maize production program in Zaire which is being assisted by a team from CIMMYT.

### Ghana

In Ghana, Fred Winch has recently completed a two-year study of the economics of rice production in northern Ghana. Winch has been employed, by the Ministry of Agriculture over the past two years under an AID contract with the Near East Foundation. Winch will spend the July, 1974 - June, 1975 period at MSU analyzing data and completing his Ph.D. dissertation in agricultural economics at MSU. Winch's study of rice in Ghana will complement the Njala study of rice production and Tollens' proposed study of rice production in Zaire and should contribute to an improved understanding of smallholder rice production in West Africa.

John Nabila's research on migration of the FraFra in Ghana will be reported in a forthcoming African Rural Employment Paper. Nabila will return to the Department of Geography at the University of Ghana in September, 1974. Nabila will be linked to the ongoing research on migration in Sierra Leone, Nigeria and Kenya.

### Tanzania

Over the past two years, Marjorie Mbilinyi of the Faculty of Education, University of Dar es Salaam has conducted a wide range of studies of the decision to educate in rural Tanzania. (Dr. Mbilinyi completed her Ph.D.

at the University of Dar es Salaam in 1973.) Dr. Mbilinyi has submitted a paper on "The Decision to Educate in Rural Tanzania," for consideration as a paper in the African Rural Employment Paper series.

Thomas Zalla, Research Fellow, Economic Research Bureau, University of Dar es Salaam, has spent the past three years collecting detailed data on the economics of smallholder dairy production in Tanzania. Zalla has devoted special emphasis to the trade-offs between labor allocation in coffee and dairy production. He has also collected data on the role of dairying in improving the nutrition of smallholder families engaged in dairy production. Zalla's research has been financed through a Foreign Area Fellowship and a grant from the Rockefeller Foundation. Zalla will spend six to nine months at MSU beginning in July, 1974 processing his data and completing his Ph.D. dissertation in agricultural economics at MSU.

Both Mbilinyi's and Zalla's research will provide insights into the supply side of labor markets, as well as being of direct relevance to the Bureau for Africa's concern for adding education and nutrition components to rural development projects.

#### IV. OVERALL CONTRIBUTION TO CONTRACT OBJECTIVES

The four general and six specific objectives of the research contract are spelled out on pages 3 and 4 of this Working Paper. These various objectives can be grouped into three general categories. The progress achieved under contract AID/csd 3625 to date and the research outlined in the plan of work through June 30, 1976 will ensure that the contractor will contribute to:

- (1) the development of a research network which links African and U.S. scholars engaged in research on a common problem--employment,
- (2) an improved conceptual framework and data base for carrying out micro studies of rural employment and for aggregating the results into regional and national policy models, and
- (e) the development of policy recommendations for governments of Sierra Leone, Nigeria, and Ethiopia and other countries in Africa and the implications of these recommendations for donor agencies.

We shall now outline how the research will contribute to each of these three categories of objectives.

##### Development of a Research Network

The evolution of the research network has been discussed in some detail on pages 5-13. The Network has demonstrated that it can:

- (a) encourage local scholars to develop the organizational and administrative capacity to provide research leadership through sub-contracts,

- (b) contribute to the development of improved methodology which transcends national boundaries,
- (c) guide agricultural economics graduate students in American universities to Ph.D. dissertation research on current problems in selected African countries,
- (d) speed up the flow of library materials to researchers in Africa,
- (e) stimulate an intellectual exchange among researchers in other regions of the world who are focusing on similar problems, and
- (f) encourage the financing of research on employment problems in Africa by other donors such as the Rockefeller Foundation, the Population Council, etc.

#### Improved Conceptual Framework and Data Base

The agricultural data base in most African countries consists of scattered information on acreage, yields and numbers of livestock. The African Rural Employment Papers have pointed out the need to invest in primary data collection in order to go beyond the superficial analysis of the employment problem allowed by secondary data available in African countries. Consequently, considerable effort has been directed to refining the methodology for collecting socio-economic information in rural areas of Africa. The farm management methodology used by Norman during the past eight years is reported in African Rural Employment Paper No. 8. Likewise, the methodology used by Spencer in Sierra Leone is reported in African Rural Employment Paper No. 3. The papers by Norman and Spencer have been reprinted and are widely cited as standard references for field research in West Africa. Likewise, Spencer's 50 page manual for the training of enumerators has been utilized by Network researchers in Ghana, Nigeria, Zaire and Ethiopia.

Turning to ongoing and projected research, the Network researchers focus on collecting information from farmers through frequent interviewing (once to twice weekly) over a twelve-month agricultural cycle. Although this method is time consuming and expensive, we are convinced that labor profiles cannot be developed over a twelve-month cycle unless farmers are interviewed once or twice per week.<sup>1/</sup>

Since migration is a key link in the interaction between rural and urban labor markets, the Network is encouraging the collection of primary data in both rural and urban areas. Byerlee's review of migration studies in Africa is reported in African Rural Employment Paper No. 2, "Research on Migration in Africa: Past, Present and Future". This paper has been reprinted and is in strong demand by researchers in Asia, Africa and Latin America. The Network research on migration in Sierra Leone by Tommy and Byerlee will attempt to serve as a model for future migration research in Africa. Tommy and Byerlee are interacting with other Network migration researchers: Essang and Mabawonku in Nigeria, Nabila in Ghana, Shem-Migot Adholla in Kenya. The Population Council and the Research Network have tentatively agreed to co-sponsor a conference on economic research on migration in Africa in the fall of 1975.

Liedholm's African Rural Employment Paper No. 5 points out the virtual absence of data on the rural nonfarm sector and the need for an improved conceptual framework for analyzing the problems of this sector. This framework is being used in the Sierra Leone study. Liedholm has been invited to interact with researchers at the University of Ife in Nigeria who are

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<sup>1/</sup>The World Bank has just completed a survey of 5,000 farmers in northeastern Brazil. One three-hour interview was used to collect basic socio-economic information, including questions which were designed to determine how much labor a farmer allocated per field over the previous twelve months.

pursuing similar research on small-scale industries in Nigeria.

We have already made the case that there needs to be improved conceptual framework for undertaking the individual micro-level studies mentioned above. However, we are convinced that an integrated approach to micro-level data collection is required for a comprehensive understanding of the employment problem. Therefore, the following studies are being pursued concurrently in Sierra Leone: (a) farm-level study, (b) agricultural marketing and processing, (c) rural nonfarm, (d) rural consumption study and (e) migration study.

### Policy Recommendations

The research is designed to provide policy recommendations for three countries: Nigeria, Sierra Leone and Ethiopia. In addition, we shall attempt to generalize our findings to other African countries and to offer guidelines to donors who want to incorporate equity objectives into project and sector lending programs.

The following discussion reports on how some of the present and projected Network research will contribute to improved policy analysis in Nigeria. Byerlee utilizes a macro-economic model, agricultural sector model and an employment-incomes model to trace the indirect employment and income distribution effects of alternative agricultural strategies in Nigeria (African Rural Employment Paper No. 9). His results reveal that the multiple objectives of growth employment and income distribution do not appear to be in conflict within the current structure of the Nigerian economy.

Essang and Mabawonku's study of 180 families in six villages in Western Nigeria and the 480 migrants from these 180 families who are living in urban

areas in Western Nigeria and Lagos is an attempt to develop migration research which is useful for policy analysis. The research pursued by Essang/Mabawonku should be repeated in a number of different locations in Nigeria in order to arrive at a comprehensive understanding of the determinants of out-migration and the impact of migration on the rural communities.

The results of Idachaba's research (African Rural Employment Paper No. 7) on the impact of marketing of boards on land and labor utilization in groundnut production are being carefully analyzed in the current debate on marketing board policy.

Large-scale farming is being pursued in Nigeria as a means of stepping up food production. Research by Essang and a Cameroonian M.S. candidate at Ibadan--Mr. Oben--will provide some of the first comparative data on output and employment in small-scale farming and large-scale farming in Nigeria, the Cameroons and Ghana.

Norman's eight years of data collection on small-scale farming in northern Nigeria provides the most comprehensive data on rural labor utilization and the rural labor market in traditional African farming. The findings of Norman and his colleagues at RERU are being utilized by the states in northern Nigeria and the World Bank as they plan \$60 million of rural development projects in Nigeria.

In Sierra Leone, the government is asking how to expand rice production, what can be done to provide more new jobs in rural areas, as well as increase the productivity of existing rural labor. Also, the government is seeking guidance on the efficiency and equity dimensions of the present small-scale processing as compared with large-scale processing mills, as well as expanding opportunities for small-scale industry in rural areas. The research in Sierra Leone as designed to answer these and a number of

other questions, as well as training up local researchers and planners to replace the U.K. planning team in Freetown.

The Njala rural employment study will provide comprehensive information on production, incomes and labor utilization for the entire rural economy which can be utilized for future planning at both the local, regional and national levels. Finally, the countrywide analysis of employment problems within a general equilibrium framework, but based on a solid empirical base, will be an important contribution to sector analysis and should be useful to a number of African governments and donor agencies.

In Ethiopia the research on the Ada project will provide a firm empirical base to determine the impact of an AID assisted package program on incomes, employment, output and income distribution in the Ada District. The Ada project should provide practical guidelines on how to reach small farmers. (There are an estimated 16,000 farmers in the Ada District, two-thirds of whom are tenant farmers.) The Ada research should also provide guidance to the Ministry of Agriculture and Planning Commission Office as they attempt to design agricultural strategies and institutional reforms to improve the lives of small farmers.

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## APPENDIX A

## NETWORK RESEARCHERS: NAMES, NATIONALITIES AND INSTITUTIONAL AFFILIATIONS

1. Assefa Mehretu (Ethiopian), Director, Institute for Development Research, Haile Sellassie I University, Addis Ababa, Ethiopia.
2. Derek Byerlee (Australian), Assistant Professor, Department of Agricultural Economics, Michigan State University, East Lansing, Michigan and Research Fellow, Department of Agricultural Economics, Njala University College, Njala, Sierra Leone.
3. Enyinna J. Chuta (Nigerian), Ph.D. Candidate, Department of Agricultural Economics, Michigan State University, East Lansing, Michigan and Research Fellow, Department of Agricultural Economics, Njala University College, Njala, Sierra Leone.
4. Carl K. Eicher (American), Professor, Department of Agricultural Economics, Michigan State University, East Lansing, Michigan.
5. Sunday Essang (Nigerian), Lecturer, Department of Agricultural Economics, University of Ibadan, Ibadan, Nigeria.
6. Habib Fattoo (Tanzanian), Graduate Research Assistant and Ph.D. Candidate, Department of Agricultural Economics, Michigan State University, East Lansing, Michigan.
7. John Flinn (Australian), Economist, International Institute of Topical Agriculture, Ibadan, Nigeria.
8. John Hanson (American), Professor, Department of Secondary Education and Curriculum and Professor, African Studies Center, Michigan State University, East Lansing, Michigan.
9. Kifle Negash (Ethiopian), Department of Agricultural Economics and Business, Haile Sellassie I University, Dire Dawa, Ethiopia.
10. Carl Liedholm (American), Professor, Department of Economics, Michigan State University, East Lansing, Michigan.
11. Dean Linsenmeyer (American), Graduate Research Assistant and Ph.D. Candidate, Department of Agricultural Economics, Michigan State University, East Lansing, Michigan and recipient of Foreign Area Fellowship for research in Zaire, 1974-75.
12. Adewale F. Mabawonku (Nigerian), Graduate Research Assistant and Ph.D. Candidate, Department of Agricultural Economics, Michigan State University, East Lansing, Michigan.

13. Peter Matton (American), Ph.D. Candidate, Department of Agricultural Economics, Cornell University, Ithaca, New York and Research Associate, Nigerian Institute of Social and Economic Research, University of Ibadan, Ibadan, Nigeria.
14. I. I. May-Parker (Sierra Leonean), Lecturer, Department of Agricultural Economics, Njala University College, Njala, Sierra Leone.
15. John Nabila (Ghanian), Ph.D. Candidate, Department of Geography, Michigan State University, East Lansing, Michigan and Department of Geography, University of Ghana, Accra, Ghana.
16. David Norman (British), Head, Rural Economy Research Unit, Ahmadu Bello University, Zaria, Nigeria.
17. O. Ogunfowora (Nigerian), Senior Lecturer, Department of Agricultural Economics, University of Ibadan, Ibadan, Nigeria.
18. S. O. Olayide (Nigerian), Professor and Chairman, Department of Agricultural Economics, University of Ibadan, Ibadan, Nigeria.
19. Merritt Sargent (American), Graduate Research Assistant and Ph.D. Candidate, Department of Agricultural Economics, Michigan State University, East Lansing, Michigan.
20. James Shaffer (American), Professor, Department of Agricultural Economics, Michigan State University, East Lansing, Michigan.
21. John Shields (American), Graduate Research Assistant and Ph.D. Candidate, Department of Agricultural Economics, Michigan State University, East Lansing, Michigan.
22. Vernon Sorenson (American), Professor, Department of Agricultural Economics, Michigan State University, East Lansing, Michigan.
23. Dunstan S. C. Spencer (Sierra Leonean), Lecturer, Department of Agricultural Economics, Njala University College, Njala, Sierra Leone.
24. Tesfai Teclé (Ethiopian), Research Fellow, Institute for Development Research, Haile Sellassie I University, Addis Ababa, Ethiopia.
25. Eric Tollens (Belgian), Acting Head, Department of Rural Economics, National University of Zaire, Kisangani Campus, Kisangani, Republic of Zaire and Ph.D. Candidate, Department of Agricultural Economics, Michigan State University, East Lansing, Michigan.
26. Joseph Tommy (Sierra Leonean), Ph.D. Candidate, Department of Agricultural Economics and Rural Sociology, Ohio State University, Columbus, Ohio and Research Fellow, Department of Agricultural Economics, Njala University College, Njala, Sierra Leone (effective July 1, 1974).

27. William Ward (American), Associate Professor, Department of Business and Economics, University of North Carolina, Wilmington, North Carolina.
28. Fred Winch (American), Ministry of Agriculture, Tamale, Ghana and Ph.D. Candidate, Department of Agricultural Economics, Michigan State University, East Lansing, Michigan.
29. Thomas Zalla (American), Ph.D. Candidate, Department of Agricultural Economics, Michigan State University, East Lansing, Michigan and Economic Research Bureau, University of Dar es Salaam, Dar es Salaam, Tanzania.

## APPENDIX B

## PUBLICATIONS OF THE AFRICAN RURAL EMPLOYMENT RESEARCH NETWORK

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<sup>1/</sup>Department of Agricultural Economics, Michigan State University, East Lansing, Michigan.

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- John Nabila, "Migration of the FraFra of Northern Ghana: A Case Study of Cyclical Labour Migration in West Africa," forthcoming 1974.
- Eric F. Tollens, "An Analysis of Research on Agricultural Economics, Rural Development and Unemployment in the Republic of Zaire," forthcoming 1974.

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