



AgEcon SEARCH
RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

The World's Largest Open Access Agricultural & Applied Economics Digital Library

This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.

Help ensure our sustainability.

Give to AgEcon Search

AgEcon Search

<http://ageconsearch.umn.edu>

aesearch@umn.edu

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

EVALUATION OF RURAL UNDEREMPLOYMENT IN THE
VICINITY OF KISANGANI, ZAIRE

By

Muangu Bazola

A RESEARCH PAPER

Submitted to
Michigan State University
in partial fulfillment of the requirement
for the degree of

MASTER OF SCIENCE
(Plan B)

Department of Agricultural Economics

1976

ACKNOWLEDGMENTS

I wish to express my gratitude to all who helped with the completion of this study.

I am deeply appreciative of Dr. Warren H. Vincent's efforts as my major professor in guiding me in my graduate study. His encouragement, liberality of time and recommendation in preparation of this study are gratefully acknowledged.

I am expressing sincere thanks to Dr. Lester V. Manderscheid and Dr. Anthony Koo for their advice, help and suggestions for the first draft of this study.

I owe a debt to the Ford Foundation for its financial support which enabled me to complete a M.S. program at Michigan State University.

To Mrs. Lucy Wells who typed this study in its present form, to Mrs. Cheryl Angelich for typing an earlier draft of this manuscript and to Ms. Ruth T. Johnson for correcting my English. I express my appreciation.

Thanks to Laura Flanders and others in the Michigan State University Computer Center for their help in data calculation.

TABLE OF CONTENTS

	Page
I. INTRODUCTION	1
A. The Problem Setting in Zaire	1
B. Objectives of the Study	5
C. Literature Review on Underemployment	7
II. METHODOLOGY	10
A. The Productivity Method	11
B. The Farm Density or the Optimum Holding Method	12
III. SURVEY AND DATA PROCESSING METHODOLOGY	14
A. Population	14
B. Sampling	15
C. Inquiry Procedure	15
IV. RESEARCH RESULTS	19
A. Availability of Job Opportunities Within Rural Areas	20
B. Constraints to Increased Farm Production	25
C. Psycho-Sociological Blocking Factors to Inter- Tribal Co-operation	28
D. Preliminary Underemployment Evaluation	33
V. CONCLUSIONS WITH INTERPRETATIONS	44
BIBLIOGRAPHY	49
APPENDIX	50

LIST OF TABLES

Table	Page
1. Annual Indigenous Population Growth Rate and Agricultural Growth	3
2. Food Importations in Congo, 1955-1959	3
3. Willingness to Work Off-Farm by Age	22
4. Willingness to Work Off-Farm by Income Level	23
5. Non-Farm Activities Engaged in by Respondents Related to Farm Size	26
6. Non-Farm Activities Engaged in by Respondents Related to Income Level	27
7. Household Head's Perception of Constraints to Increased Farm Production by Age	29
8. Household Head's Perception of Constraints to Increased Farm Production by Farm Size	30
9. Household Head's Perception of Constraints to Increased Farm Production by Income Level	31
10. Psycho-Sociological Factors Blocking Inter-Tribal Cooperation	33
11. Hours Spent Per Day in Agricultural Production Activities by Age Group	35
12. Time Spent in Agricultural Production Activities by Farm Size	36
13. Hours Spent in Agricultural Production Activities by Income Levels	37

I. INTRODUCTION

A. The Problem Setting in Zaire

The Republic of Zaire has an area of more than 2.3 million square kilometers, ranking eleventh in the world (World Bank 1972). It lies astride the equator in the heart of Africa.

The total population in 1970 was estimated at 21.6 million persons of whom 20.7 million were Zairean and 0.9 million foreign born. The previous census, taken in 1958 when the country was a Belgian colony, showed Zairean and foreign population of 13.5 and 0.1 million respectively. This indicates annual growths of 3.9 percent for the total population and 3.6 percent for the native born.

Growth rates have been highest in the cities due largely to migration of people from rural to urban areas. While less than 6 percent of the total population in 1958 were living in the five major cities (Kinshasa, Lubumbashi, Kisangani, Kananga and Mbuji-Mayi), approximately 12 percent were concentrated there in 1970. The population of Kinshasa (the capital city) increased from 380,000 to 1,500,000 inhabitants in the fifteen year period from 1958 to 1973 (a 295 percent increase).

The out-migration from rural areas may be explained by fear and insecurity during the civil war and various rebellions that stroked the country during the early independence years (1960's), lack of economic opportunities and lack of educational and health

facilities in the country side, and typical urban attractions. Yet, no study has been taken to determine whether this out flow had any significant impact on the lag in production of food products.

During the colonial period subsistence agriculture was neglected. No investment was made in this subsector of agriculture. Food policy was mainly focused on an equilibrium between food production and food needs. On the other hand, subsistence agriculture was viewed as a source of funds in the form of a head tax for cultivators, and as a source of cheap food for non-agricultural workers and the urban populations. A policy of unfavorable agricultural terms of trade between agriculture, urban and industrial sectors was blindly pursued. In addition all adult males of ages 18 to 45 in rural areas were subject to fifty to sixty days out of the year of work without compensation. Regardless of market forces, that is, demand and relative prices of imposed commodities, compulsory cropping and acreage was also imposed.

If a compulsory cropping and acreage policy has the advantage to prevent cultivators, workers and urban populations from hunger by insuring a minimum diet for the body in the short-run, it, on the contrary, is without the necessary incentives to induce cultivators to pursue a pattern of food production which would benefit the non-rural population. Therefore, in the long-run it was a policy which encouraged cultivators to divert to the production of export crops that provide higher returns. Increased food importations will result from this policy. As a matter of fact, despite compulsory cropping and acreage policy, cultivators did divert from food production to

export production in the period 1956 to 1958 (Ndongala 1965). Tables 1 and 2 below illustrate the situation.

Table 1.--Annual Indigenous Population Growth Rate and Agricultural Growth

Year	Population Growth Rate	Food Production Growth Rate	Agricultural Export Production Growth Rate
1955	1.44	3.8	10.4
1956	2.33	7.0	23.8
1957	2.57	1.9	8.4
1958	2.77	1.8	15.7
1959	2.39	1.7	9.5

Source: Situation économique du Congo belge et du Ruanda-Urundi, 1958 et 1959.

Table 2.--Food Importations in Congo, 1955-1959 (R-U Excluded)

Year	1955	1956	1957	1958	1959
Quantities (tons)	116,868	142,268	145,734	211,246	188,357
% of increase from preceding year		22	2	45	-11
In terms of constant value (million of B.F.)	1,534	1,754	1,866	2,463	2,406
% increase in constant value from preceding year		14	6	32	-2

Source: Bulletin du Commerce extérieur du Congo belge et du R-U.

From these tables it is clear that since 1956 Zairean agriculture became a food deficit producer. Food importations steadily increased from 1955 to 1959 with a decline in 1959 compared to 1958, but higher than the three previous years.

An unfavorable and coercive food policy may in the short-run give the illusion of growth because the production may effectively increase. In the long run, government control becomes a brake to productivity improvement. Male cultivators will move from rural to urban areas. This out migration will increase the burden on women who perform most of the agricultural activities in traditional agriculture excepting heavy work such as field clearing, cutting wood, etc. As a consequence, food production will decrease.

The Zairean government inherited this day-by-day food policy from the colonial period. The early independence years, characterized by a civil war and various rebellions, climaxing an end of colonial authority and the birth of a free state was a period of declining food production.

In an attempt to increase food production, the year 1968 was proclaimed "Agricultural Year." A self sufficiency goal was set up in speeches, but no clear program materialized which would grant the wishes expressed in the speeches. Surprisingly, government expenditures in terms of agricultural ministry's share in current government budget and government budget declines from 1968 to 1971. The Ministry of Agriculture's share was 2.0 percent, 1.4 percent, 0.9 percent and 0.7 percent respectively for current budget of 1968, 1969, 1970 and 1971; 6.5 percent, 3.9 percent and 3.1 percent respectively for investment budget of 1969, 1970 and 1971 (World Bank 1972).

In 1973 agriculture was proclaimed "priority of the priorities." In November of that year the state took over foreign enterprises plus trade and service in agricultural sectors. It was hoped that, to some extent, the new owners (made up of Zairean bureaucratic petty bourgeoisie) would become more sensitive and conscious of the food problems and then would invest in that subsector of the agriculture. However, by virtue of the day-by-day food policy, and because of the lack of adequate managerial ability in the lucky new owners, the food crises got worse and bore social dissatisfactions which delayed needed government decisions on these enterprises. At the end of 1974 and the beginning of 1975, the polit bureau of the mouvement populaire de la Révolution (MPR) on its decision of December 30, 1974 and January 8, 1975 transferred ownership of these enterprises to the state and nominated their managers.

Despite a lack of a study of unemployment and underemployment in 1975, President Mobutu promised the Zairean people the end of unemployment and underemployment by the end of the year. Yet, urban and rural unemployment and underemployment continued to increase and the food crisis, became increasingly more acute. Social and political stability are linked to a solution of these problems.

B. Objectives of the Study

The study was conceived as research dealing, in part, with "The appraisals of rural underemployment and its impact on economic development in the upper Zaire region."

The study pursued four objectives:

- a. Describe the extent to which farm household heads engage in non-farm activities.
- b. Discover rural population viewpoint on market values attached to crops and constraints to increased farm production.
- c. Discover psycho-sociological factors which inhibit intertribal cooperation in terms of labor and land use.

The study did not embrace the entire upper Zaire region because with limited financial resources, the organization and conduct of a study covering the entire region was too ambitious for a single research worker. In addition, with the exception of a few localities with micro climates, the whole stretch of the upper Zaire region is subject to the same ecological conditions, and furthermore the same crops are cultivated almost everywhere.

- d. There was a fourth objective of the overall study which included an evaluation of rural underemployment for the purpose of formulating agricultural labor policies. However, for the immediate study, the sub-objective is to describe in a preliminary fashion the relationship between labor use and selected independent variables.

I therefore deliberately chose an area in the vicinity of Kisangani (with a radius of about 25 miles) because it satisfies the three following requirements:

- a. A list had been prepared by the government agronomist in the region for the 1970 world agriculture census and could be used for the sample frame. The cost of deriving my own frame of farmers was prohibitive.

- b. The proximity of the area to Kisangani would minimize the cost of the inquiry.
- c. The heterogenous population in the area includes cultivators from practically every locality in the region which could provide an opportunity to study the extent to which further cultural and habit mixing may be possible.

C. Literature Review on Underemployment

In the first half of the twentieth century, the concept of "disguised unemployment" or "underemployment" was used as an assumption in an attempt to formulate a theory of economic development for developing areas, especially in Asia (Nurkse). According to the assumption, the marginal product of agricultural labor is zero. Therefore, ceteris paribus, a transfer of the redundant rural labor to industries, trade and services will leave unchanged the agricultural output.

In 1936, Joan Robinson (1936) coined the words "disguised unemployment" to describe workers in developed countries who accepted inferior occupations as a result of being laid off from industries suffering from a lack of effective demand. She was referring to workers having a low rather than zero marginal product of labor.

Nevertheless, many other authors, including W. Arthur Lewis, T. W. Schultz, D. R. Gadgil, Leibenstein, Viner, Rosenstein-Rodan held to the equivalence of "disguised unemployment" with zero marginal labor productivity.

Lewis's article, "Economic Development with Unlimited Supplies of Labor," is the theoretical foundation of the disguised unemployment

in which the author analyzes the relationship between the subsistence and capitalist sectors within a developing country. Surplus labor is assumed available in both rural and urban areas, however, the rural surplus is disguised since some portion of it can be withdrawn and transferred to the capitalist sector, and output will not fall, the remaining workers will just work harder.

On a production function viewpoint, the assumption is wrong in the first place. In a subsistence agriculture either labor or land or both are the variable factors in producing output. Assuming that factors are optimally combined, and the *ceteris paribus* condition holds, it is obviously meaningless to argue that the output will not fall when the amount of the variable factor used is reduced. Indeed, reduce the amount of variable factor, *ceteris paribus*, you will shift from the current sub-production function to another one.

Some empirical data from India and Latin America caused T. W. Schultz to revise his position when he wrote, "I know of no evidence for any poor country anywhere that would even suggest that a transfer of some small fraction, say 5 percent of the existing labor force out of agriculture with other things equal, could be made without reducing its (agricultural) production" (T. W. Schultz 1956).

The study of African "disguised unemployment" as in other studies, has been much influenced by thought and research from other parts of the Third World. However, in recent years there has also been an emerging "indigenous" literature of African agricultural development which, while still related to theory and evidence from elsewhere, is increasingly based upon knowledge of African farming systems (Helleiner 1975).

Concerning one traditional question in the literature of agriculture and economic development there is now virtual unanimity in Africa. The marginal productivity of labor in agriculture is positive. Therefore, the concept of "disguised unemployment" is less important in African agriculture than is the peak seasonal labor which is typically the operative constraint in African farming systems. Hence, increasing off farm job opportunities in the non-critical labor periods in rural areas might enhance labor productivity in short-run in African farming systems.

II. METHODOLOGY

It is characteristic of the economics of the developing countries that there are very few persons who are wholly unemployed since people must work in order to survive. Many people appear to be working much less than they are capable of doing. At the same time those who appear to be working hard and for long hours nevertheless seem to be poverty stricken (DeRaj 1972).

It is very difficult to define precisely the concept of underemployment. There are many definitions of underemployment, also termed as "surplus" population. P. H. Mukherejee proposes four definitions:

1. The surplus population can be defined as the number which can be spared from agriculture under a given technique, a given level of productivity and a given population regardless of the existence or absence of alternative employment.
2. It can be defined as the number that cannot only be spared but can readily be absorbed by industry and commerce, i.e., by the secondary and tertiary sectors, without special measures or acceleration of development in these sectors.
3. The surplus can be defined as the number that could be spared from agriculture under specific assumptions of extension of cultivation, improvement in technique changes

in the demand for food and raw materials due to growth of population and increase in income, etc., i.e., the "potential surplus."

4. It can be defined as the maximum number that could be absorbed under a planned but practical program of industrialization. This is also a "potential surplus" (Mukherejee 1959).

From these definitions it is obvious that the problem of measuring "surplus" population must start by specifying the exact category that is desired. As Des Raj warns the problem is a complex one. Considerable experimentation is needed taking into account the social, economic and labor market conditions prevailing in the country. In some countries workers do not think in terms of work or pay by the hour; time has no relevance for them (De Raj 1972).

It is also clear that the number which can be regarded as excessive will be different according to the definition which is adopted.

Generally speaking two methods can be used to measure the under-employment.

A. The Productivity Method

According to the productivity method, the surplus population (underemployment) can be measured on a survey basis by using the labor utilization and the labor productivity approaches (Rosestein-Rodan 1957).

The labor utilization approach presents an inventory of what labor is used in the field or in other farm tasks as a percentage of the available supply.

The labor productivity approach examines the relationships between the quantity of labor used and/or available and the level of production.

On a strictly technical standpoint, this method is weak in the sense that any conclusion based on value productivity is likely to be seriously affected by changes in the relative prices or in terms of trade between the different sectors of the economy.

B. The Farm Density or the Optimum Holding Method

This method is an indirect one which relies on secondary data and contains three variants which measure:

1. The difference between the number of labor hours required to produce a given output and the number of labor hours available from the active agrarian population.
2. The difference between the density of population deemed adequate for a given type of cultivation and the actual density of population.
3. The difference between the number of acres or hectares required under a given type of cultivation for one person with a "standard income" in contrast to the number of available acres or hectares and available agrarian population.

As Mukerejee points out, this method is the most popular and widely used approach. However, a concept of optimum farm population density is of little value unless one assumes the perpetuation of the existing land and capital ratio. And the state of affairs in almost all backward countries is that they are over-populated only in relation

to capital supply, but under-populated in relation to natural resources. The concept of an optimum holdings, even under static assumptions, is dependent on so many variables--as for example, the average size of a family, quality of land, productivity of labour, degree of mechanization, income-value of crops, existence of subsidiary earnings, etc.--that the result will differ not only from country to country, but also from region to region or even from farm to farm (Mukherejee 1959).

This must serve as a warning to researchers to avoid precipitous generalizations or extrapolations such as the one made by Turin. "According to different surveys conducted in African rural areas farmers work only 80 to 120 days of eight hours per year" (Turin 1965). Since Turin does not say anything either on method(s) used or on the areas where these surveys were conducted his generalization must be taken with reservation. In addition, there is wide variation among individual farmers; farm jobs are also heterogenous therefore generalizations on the basis of an average can be misleading.

Because of a lack of economic opportunities in a traditional agriculture, it is more likely that farmers' productivity during slack periods will be low. However, farmers' productivity during peak periods will be certainly high.

Traditional agriculture relies on labor as input to produce the output. Therefore, *ceteris paribus*, a reduction of the numbers of workers, especially during peak periods will decrease the output.

III. SURVEY AND DATA PROCESSING METHODOLOGY

The data of this study were collected in one single visit. However, from these data it appeared that human energy, that is, labor is the most constraining factor to increased farm production. Even if the data do not provide information as to whether the data collection took place during peak or slack periods, however supports Joan Robinson's and Helleiner's assumptions on agricultural disguised unemployment; agricultural marginal labor productivity is low but not zero.

A. Population

The population for which the inquiry was intended comprises 2,956 cultivators of the vicinity of Kisangani, listed by the Regional Agricultural Service.

In terms of ethnic consideration, the population can be broken down as follows:

- a. Bakumu, representing 1,719 cultivators, about 58.15 percent of the population,
- b. Babeda, representing 689 cultivators, about 23.31 percent,
- c. Moslemized, representing 228 cultivators, about 7.71 percent,
- d. Balengola, representing 113 cultivators, about 3.82 percent,
- e. Bambole, representing 81 cultivators, about 2.74 percent,
- f. Babali, representing 73 cultivators, about 2.47 percent,

- g. Unemployed (various ethnics) representing 53 cultivators, about 1.79 percent.

In terms of location, the population is broken down in the following fashion:

- a. Balengola and Bambole, representing 194 cultivators, about 6.5 percent, are fluvial.
- b. Bakumu, Babali and Moslemized, representing 2,020 cultivators, about 68.3 percent, are non-fluvial.
- c. Babeda and the unemployed, representing 742 cultivators, about 25.1 percent, are mixed; they fall in both precedent groups.

B. Sampling

The cultivators, previously grouped in terms of location were numbered from 1 to 2,956. The numbers were put in a basket, then randomly a child of 4 years old drew 10 percent of them who constituted my sample.

C. Inquiry Procedure

1. Preliminary and General Inquiry

There is a serious lack of farm level data in Zaire. No data were available which would help fulfill the research objectives. The need was for micro-level farm data. Interview schedules were prepared and pre-tested on a few cultivators drawn by chance from the sampling. From this experience, it appeared that general information could be easily supplied by any cultivator from the area of the study.

Nevertheless, the information obtained from the pre-testing warned me of some critical points.

- a. It is very difficult for cultivators to recall accurately the amount of time spent on tasks they performed during the week before the interview. Therefore visits should be scheduled on a twice a week basis as a minimum, from the time of land preparation to the time of crop harvest in a given year. This is needed to identify the peak labor requirement periods.
- b. Based on this conclusion and because of time and resource constraints, the sample would need to be reduced in size. In addition, the number of women should be increased in the sample since they perform almost all light tasks in a traditional agriculture.
- c. I suspected that the list was established on a per capita tax basis. The majority of females in rural areas are not subjected to a per capita tax. This could explain the low numbers of females in the sample: 31 females against 248 males. Since women perform almost all of the light tasks in traditional agriculture, I was led to the conclusion that for the sub-sampling to follow, the proportion of females in the sample should be increased.
- d. In addition, attention should be paid to the potential urban attraction on cultivators to improve the ability to extend results for this sample to the rest of the region.
- e. The number of questions relative to non-agricultural activities should be increased in order to get more complete

information on the cultivator's use of daylight time.

2. Specialized On-going Study

Because of the above conclusions, a sub-sample of about 50 was drawn from the 279 to include all 31 females and about 10 percent of the males.

For this subsample a specialized questionnaire which took in consideration weakness of the preliminary and general inquiry was written and administered to the subsample on a twice weekly visit basis from January to December 1973. I directed this study until my departure from Zaire in September.

Because of the particular problems involved in an agricultural inquiry, namely sound knowledge of the customs, habits and mentalities of the cultivators, plus language obstacles, I chose to use an enumerator from the region in order to attenuate my inadequacy in this domain.

However, it should be kept in mind that it is not enough to know the customs and habits of cultivators and the language of the region to be able to accomplish effectively the task of an enumerator. For this reason, I subjected my enumerator to intensive training sessions to improve his knowledge of the terminology in use as well as to overcome possible difficulties in carrying out his job. These sessions also emphasized the need for respect of and patience with the cultivator, and the necessity to keep an open mind. I stressed patience because I did not want the enumerator, through haste, to irritate the respondents or to suggest answers or supply answers in the place of correct information. With this training it was hoped that the enumerator, would minimize the possibility of the respondent falsifying responses.

Keeping in mind that the data collected in the period January through December 1973 will not be analyzed until my return to Zaire, we turn our attention now to the findings from the preliminary inquiry conducted in the period October to December 1972. The analysis to follow is restricted to the 248 males in the initial sample.

IV. RESEARCH RESULTS

African traditional agriculture in the typical household is diversified in products produced and the activities of household members. In the course of the day eight to twelve even more, different activities may be pursued. The multiplicity of activities compounds the difficulties in their measurement.

In attempting to evaluate the rural underemployment, one should take into account not only time spent at work, also other activities which make claims on the labor supply. Otherwise, some social activities such as music and dancing will be foregone. Empirical studies have proved that these activities are both sources of income and satisfactions (David W. Ames 1967).

Measurement of how peasants use their time is difficult. As Professor William O. Jones pointed out, "The peasant cultivator has his own microscale of time associated with the hours of the day, related to conditions of light, temperature and moisture, which influence on the one hand, the physical discomfort of the laborer and, on the other hand, the amount and kind of work permitted by the condition of the fields" (William O. Jones 1968).

It is obvious that the more intensive the work effort, the shorter the daily work period is. Therefore, it appears that "any study of how adults spend their time obviously requires some evolution of their general health and of the debilitating effects of endemic disease and parasites, as well as some sort of standard physiological

allowance for rest even for healthy adults" (Jones 1968).

Indeed, on one hand, a chronic illness may reduce the effectiveness of a laborer and, on the other hand, reduce the time he feels able to work.

The research results which follow are from a survey given once to a sample of 248 males and 31 females in the vicinity of Kisangani (Zaire).

It is understood that it is extremely difficult to gather high quality data in order to evaluate underemployment in one single visit. The rural world is complex. Maintaining socio-economic equilibrium is very important to rural people. Therefore, any outsider to the group is at first in suspect. It takes time to build up a rapport between them and an outsider. Clearly some questions even if they are fundamental to the researcher must be avoided at the beginning of the research otherwise a climate of mistrust and suspicion will develop.

I am aware that the data collected in the initial study are inadequate to make final conclusions. The reader must treat the results as rough estimates. As a minimum, the findings should serve to help raise appropriate questions for future research and identify important points on which additional attention and effort could be focused. Further insights will be gained when the data collected subsequently are analyzed.

A. Availability of Job Opportunities Within Rural Areas

In general, pay jobs are almost unknown in a traditional agriculture. Therefore, it appears to be unimportant to talk about job

opportunities in this context. Yet, it is clearly understandable that even if pay jobs are unknown in a traditional agriculture, cultivators' perception of job opportunities or willingness to work off-farm could be a clear indication that they will choose among these opportunities if they were offered to them. The knowledge of these opportunities is important not only in terms of job creation, but also in terms of bottle necks in a traditional agriculture which may be easily solved or avoided in order to increase farm production or size and consequently cultivators' productivity.

Generally speaking older farmers in a given community would be expected to hold to traditional and conservative views than would be the case for young people. Hence, one would expect to find negative correlation between age and willingness to work off-farm.

Ceteris paribus, on one hand, cultivators with a large farm size bear higher opportunity costs than the ones with a small farm size. Therefore, one would expect to find a negative, or at least, a very low positive correlation between farm size and willingness to work off-farm.

On the other hand, cultivators with high income may be more inclined to take the risk of moving from one job to another than do the ones with low income. I expect to find in the area of study a positive correlation between income level and willingness to work off-farm. It is also more likely that cultivators with high income will have a much better job opportunity perception than the ones with low income.

Tables 3 and 4 help to visualize these relationships.

Table 3.--Willingness to Work Off-Farm by Age*

Age	Responses		
	Unwilling	Willing	Total
21-29	(5)=17.2 2.0	(24)=82.8 9.7	(29)=100.0 11.7
30-38	(7)=11.9 2.8	(52)=88.1 21.0	(57)=100.0 23.0
39-47	(12)=21.1 4.8	(45)=78.9 18.1	(57)=100.0 23.0
48-56	(29)=56.9 11.7	(22)=43.1 8.9	(51)=100.0 20.6
57-65	(11)=44.0 4.4	(14)=56.0 5.6	(25)=100.0 10.1
Unknown	(14)=51.9 5.6	(13)=48.1 5.2	(27)=100.0 10.9
TOTAL	(78) 31.5	(170) 68.5	(248) 100.0

*Numbers in parentheses are frequency distributions. The right side of equality sign bears percentages of distributions in terms of each group and numbers below the frequency distributions are overall percentages.

Table 4.--Willingness to Work Off-Farm by Income Level*

Age	Responses		
	Unwilling	Willing	Total
<14Z	(23)=36.5 9.3	(40)=63.5 16.1	(63)=100.0 25.4
14-27Z	(30)=31.9 12.1	(64)=68.1 25.8	(94)=100.0 38.0
28-41Z	(11)=23.9 4.4	(35)=76.1 14.1	(46)=100.0 18.5
42-55Z	(10)=38.5 4.0	(16)=61.5 6.5	(26)=100.0 10.5
56-69Z	--	(8)=100.0 3.2	(8)=100.0 3.2
>69Z	(4)=36.4 1.6	(7)=63.6 2.8	(11)=100.0 4.4
TOTAL	(78) 31.5	(170) 68.5	(248) 100.0

*Numbers in parentheses are frequency distributions. The right side of equality sign bears percentages of distributions in terms of each group and numbers below the frequency distributions are overall percentages.

Table 3 shows clearly that the older cultivators are less inclined to work off-farm than the younger ones, as expected. However, cultivators of the age group 57-65 do not meet the expectation. They have a higher percentage willing to work off-farm than the ones of the age group 48-56. Since the age unknown group displays a higher percentage than that of the age group 48-56, it is reasonable to suppose that cultivators of the age group 57-65 may have overestimated their age or the "age unknown" group may have some cultivators who should be counted into the age group 48-56. By adjusting their age, it is likely that the discrepancy would disappear. Thus, the group may meet the expectation.

Table 4 visualizes the willingness of cultivators to work off-farm in terms of income level.

Although all income levels have high percent of willingness to work off-farm, contrary to the expectations, the level of income is neither correlated to the willingness to work off-farm nor to the unwillingness to work off-farm.

Unless a measurement error of data collection would sufficiently explain why the result did not meet the expectation, two possible explanations can be made. First, my expectation could be wrong. Second, rural, especially traditional, life is characterized by a community style of life. Without being equal, however, everybody is afraid to be too much different from the others in the community because the ones who fall into this category are treated as witches. They are viewed as being responsible for all evils which may hit members of the community. Therefore, it is possible that individuals,

irrespective of income level, may have a similar behavior toward job opportunity.

Tables 5 and 6 show the distributions of cultivators' non-farm activities respectively in terms of farm size and income level.

From these tables it appears that non-farm activities engaged in by farmers are neither correlated to farm size nor to income level. This is contrary to the expectation. To understand this discrepancy one should keep in mind that investment in a traditional agriculture is almost negligible. In addition, the area of study is located within the equatorial zone where it rains almost every day. Since house construction techniques do not use durable materials, it is possible that this might have an impact on cultivators' job opportunities conception. Because of the time spent on repairing houses during peak periods, cultivators have little or not enough time for non and agricultural activities.

As Tables 5 and 6 show it is obvious that among 248 cultivators there are 37.5 percent either in terms for farm size or income level point out building or repairing house as the main non-farm activity engaged in by farmers.

B. Constraints to Increased Farm Production

In a traditional agriculture the land is left to Nature for its reconstruction, so it cannot be taken as a capital good. As a matter of fact, in many areas of Zairean territory, especially in the area of study, land that cannot be worked beyond the limits of available labor is left idle. Human energy appears to be the principal factor limiting increased farm production or farm size.

Table 5.--Non-Farm Activities Engaged in by Respondents Related to Farm Size*

Farm Size (in square meters)	0	1	2	3	4	5	6	Total
<1000	1	2	3	3	1	1	1	12
	2.7	7.6	4.6	3.2	5.6	20.0	25.0	4.8
	8.3	16.6	25.0	25.0	8.3	8.3	8.3	
1000-1999	10	--	1	3	--	--	--	14
	27.0	--	1.5	3.2	--	--	--	5.6
	71.4	--	7.1	21.4	--	--	--	
2000-2999	7	--	2	2	2	--	--	13
	18.9	--	3.1	2.1	10.5	--	--	5.2
	53.8	--	15.4	15.4	15.4	--	--	
3000-3999	2	4	5	9	1	--	--	21
	5.4	15.4	7.8	9.6	5.6	--	--	8.4
	9.5	19.0	23.8	42.8	4.7	--	--	
4000-4999	13	3	2	19	--	4	2	43
	35.1	11.5	3.1	20.4	--	80.0	50.0	17.3
	30.2	6.9	4.6	44.2	--	9.3	4.6	
5000-5999	4	13	36	41	13	--	1	108
	10.8	50.0	56.2	44.0	68.4	--	25.0	43.5
	3.7	12.0	33.3	37.9	12.0	--	0.9	
6000-6999	--	--	5	3	--	--	--	8
	--	--	7.8	3.2	--	--	--	3.2
	--	--	62.5	37.5	--	--	--	
>6999	--	4	10	13	2	--	--	29
	--	15.4	15.6	13.9	10.5	--	--	11.6
	--	13.7	34.4	44.8	6.8	--	--	
TOTAL	37	26	64	93	19	5	4	248
	14.9	10.4	25.8	37.5	7.6	2.0	1.6	100.0

*The first numbers are frequency distributions, the second are column percentages and the third are row percentages.

0 = none or don't know

1 = hunting, make traps

2 = fishing, make nets

3 = house, road repair or construction

4 = crafts

5 = judiciary/political

6 = making alcohol

Table 6.--Non-Farm Activities Engaged in by Respondents Related to Income Level*

Income Level	0	1	2	3	4	5	6	Total
<14%	2		9	37	5	--	--	53
	5.4		14.0	39.7	26.3	--	--	
	3.7		16.9	69.8	9.4	--	--	21.3
14-27%	3	11	35	36	6	1	4	96
	8.1	42.3	54.6	38.7	31.5	20.0	100.0	
	3.1	11.4	36.4	37.5	6.2	1.0	4.1	38.7
28-41%	26	10	14	14	5		--	69
	70.2	38.4	21.8	15.0	26.3	--	--	27.8
	37.6	14.4	20.2	20.2	7.2		--	
42-55%	6		2	4	3	4	--	19
	16.2	--	3.1	4.3	15.7	80.0	--	7.6
	31.5		10.5	21.0	15.7	21.0	--	
56-69%	--	2	2	1	--	--	--	5
	--	7.6	3.1	1.0	--	--	--	2.0
	--	40.0	40.0	20.0	--	--	--	
>69%		3	2	1				6
	--	11.5	3.1	1.0	--	--	--	2.4
		50.0	33.3	16.7				
TOTAL	37	26	64	93	19	5	4	248
	14.9	10.4	25.8	37.5	7.6	2.0	1.6	100

*The first numbers are frequency distributions, the second are column percentages and the third are row percentages.

0 = none or don't know

1 = hunting, make traps

2 = fishing, make nets

3 = house, road repair or construction

4 = crafts

5 = judiciary/political

6 = making alcohol

Given the above consideration, one would expect to find a high correlation between human energy and farm production or farm size.

Tables 7, 8, and 9 show the household head's perception of constraints to increased farm production respectively by age, farm size, and income level corroborate the expectation. Indeed, 76.6 percent of reasons given the cultivators point out limited human energy as the main constraint to increased farm production. Except for the income levels, limited human energy as a constraint is positively correlated to age and farm size groups. Income level groups are not positively associated with limited human energy constraint because non-farm activities supplement farmers' income.

Other factors, such as lack of government encouragement, lack of market and bad roads are also pointed out as constraints to increased farm production, but not as important as human energy. With regard to other constraints lack of government encouragement was listed 25.8 percent, bad roads by 10.0, and lack of market by 5.6 percent.

C. Psycho-Sociological Blocking Factors
to Inter-Tribal Co-operation

The reader should be reminded that the upper Zaire region was the bloodiest theater of the Zairean civil war in the early years of the 1960's.

In order to heal the region of all past remembrances Zairean government is determined to build plants, roads, schools, hospitals, and so on in the region. However, it is more likely that if overt or latent psycho-sociological factors capable of blocking intertribal

Table 7.--Household Head's Perception of Constraints to Increased Farm Production by Age*

Age	Constraints								
	0	1	2	3	4	5	6	7	8
21-29 [29]	10	18	4	--	--	2	1	--	20
	55.5	9.4	50.0	--	--	8.0	7.1	--	31.2
	34.5	62.0	13.8	--	--	6.9	3.4	--	68.9
30-38 [57]	5	39	1	--	2	5	--	7	15
	27.7	20.5	12.5	--	100.0	20.0	--	87.5	23.4
	8.7	68.4	1.7	--	3.5	8.7	--	12.8	26.3
39-47 [57]	2	42	3	4	--	10	--	1	8
	11.1	22.1	37.5	33.3	--	40.0	--	12.5	12.5
	3.5	73.6	5.2	7.0	--	17.5	--	1.7	14.0
48-56 [53]	--	47	--	3	--	6	9	--	--
	--	24.7	--	25.0	--	24.0	64.2	--	--
	--	88.6	--	5.6	--	11.3	16.9	--	--
57-65 [25]	--	24	--	2	--	--	4	--	5
	--	12.6	--	16.6	--	--	28.5	--	7.8
	--	96.0	--	8.0	--	--	16.0	--	20.0
Unknown [27]	1	20	--	3	--	2	--	--	16
	5.5	10.5	--	25.0	--	8.0	--	--	25.0
	3.7	74.0	--	11.1	--	7.4	--	--	59.2
TOTAL (248)	18	190	8	12	2	25	14	8	64
	7.2	76.6	3.2	4.8	0.8	10.0	5.6	3.2	25.8

*First numbers are frequency distributions; second numbers are column percentages; third numbers are row percentages.

[] refers to the numbers of farmers in each age group.

0 = none or don't know

1 = human energy

2 = state of tools or technology

3 = low agricultural prices

4 = excessive transportation costs

5 = bad roads

6 = lack of market

7 = witchcraft

8 = lack of government encouragement

Table 8.--Household Head's Perception of Constraints to Increased Farm Production by Farm Size*

Farm Size (square meters)	Constraints								
	0	1	2	3	4	5	6	7	8
<1000 [12]	9	2	--	1	--	--	--	--	--
	50.0	1.0	--	8.3	--	--	--	--	--
	75.0	16.6	--	8.3	--	--	--	--	--
1000-1999 [14]	--	6	--	--	--	--	--	--	8
	--	3.1	--	--	--	--	--	--	12.5
	--	42.8	--	--	--	--	--	--	57.1
2000-2999 [13]	--	10	--	--	--	--	--	--	3
	--	5.2	--	--	--	--	--	--	4.6
	--	76.9	--	--	--	--	--	--	23.0
3000-3999 [21]	4	15	1	--	--	1	--	--	--
	22.2	7.8	12.5	--	--	4.0	--	--	--
	19.0	71.4	4.7	--	--	4.7	--	--	--
4000-4999 [43]	5	33	--	--	--	--	3	1	2
	27.7	17.3	--	--	--	--	21.4	12.5	3.1
	11.6	76.7	--	--	--	--	6.9	2.3	4.6
5000-5999 [108]	--	90	1	6	2	10	10	1	28
	--	47.3	12.5	50.0	100.0	40.0	71.4	12.5	43.7
	--	83.3	0.9	5.5	1.8	9.2	9.2	0.9	25.9
6000-6999 [8]	--	7	2	--	--	4	--	1	3
	--	3.6	25.0	--	--	16.0	--	12.5	4.6
	--	87.5	25.0	--	--	50.0	--	12.5	37.5
7000 & more [29]	--	27	4	5	--	10	1	5	20
	--	14.2	50.0	41.6	--	40.0	7.1	62.5	31.2
	--	93.1	13.7	17.2	--	34.4	3.4	17.2	68.9
TOTAL [248]	18	190	8	12	2	25	14	8	64
	7.2	76.6	3.2	4.8	0.8	10.0	5.6	3.2	25.8

*First numbers are frequency distributions; second numbers are column percentages; third numbers are row percentages.

[] refers to the numbers of farmers in each farm size.

0 = none or don't know

1 = human energy

2 = state of tools or technology

3 = low agricultural prices

4 = excessive transportation costs

5 = bad roads

6 = lack of market

7 = witchcraft

8 = lack of government encouragement

Table 9.--Household Head's Perception of Constraints to Increased Farm Production by Income Level*

Income Level	Constraints								
	0	1	2	3	4	5	6	7	8
<14Z [53]	10	34	2	--	1	4	1	--	7
	55.5	17.8	25.0	--	50.0	16.0	7.1	--	10.9
	18.5	64.1	3.7	--	1.8	7.5	1.8	--	13.2
14-27Z [96]	2	75	3	12	--	16	9	1	36
	11.1	39.4	37.5	100.0	--	64.0	64.2	12.5	56.2
	2.0	78.1	3.1	12.5	--	16.6	9.3	1.0	37.5
28-41Z [69]	2	60	2	--	--	3	2	--	8
	11	31.5	25.0	--	--	12.0	14.2	--	12.5
	2.9	86.9	2.9	--	--	4.3	2.9	--	11.5
42-55Z [19]	4	15	--	--	1	2	1	1	7
	22.2	7.8	--	--	50.0	8.0	7.1	12.5	10.9
	21.0	78.9	--	--	5.2	10.5	5.2	5.2	36.8
56-69Z [5]	--	3	1	--	--	--	1	4	2
	--	1.5	12.5	--	--	--	7.1	50.0	3.1
	--	60.0	20.0	--	--	--	20.0	80.0	40.0
>69Z [6]	--	3	--	--	--	--	--	2	4
	--	1.5	--	--	--	--	--	25.0	6.2
	--	50.0	--	--	--	--	--	33.3	66.6
TOTAL [248]	18	190	8	12	2	25	14	8	64
	7.2	76.6	3.2	4.8	0.8	10.0	5.6	3.2	25.8

*First numbers are frequency distributions; second numbers are column percentages; third numbers are row percentages.

[] refers to the numbers of farmers in each income level.

0 = none or don't know

1 = human energy

2 = state of tools or technology

3 = low agricultural prices

4 = excessive transportation costs

5 = bad roads

6 = lack of market

7 = witchcraft

8 = lack of government encouragement

co-operation are not identified, any government effort could be hampered. This could, in fact, happen either because of a lack of co-operation among tribes due to bad remembrances of the civil war or because of a lack of agreement on the location of a plant, school, hospital, etc. which could result in a refusal to use facilities built for these tribes.

To discover these factors is, however, a hazardous task in the sense that it is both sensitive and political risk. Any misjudgment on the appraisal of these factors could yield serious consequences and thus jeopardize chances for further investigations. Indeed, informants may have the impression of being spied upon and consequently may take a defensive attitude by willingly giving wrong information.

On the other hand, it takes time for the outsider in peasants' community to be trusted and have access to their confidence.

Since the data were collected in one single visit no one would expect to discover much of these psycho-sociological factors.

Table 10, however, does show some indications about these factors. 59.3 percent of the informants point out the custom (and habits) as the main limiting factor to inter-tribal co-operation. Quarrel, distribution problem, free rider, fight and political reason are pointed out respectively for 12.5 percent, 12.1 percent, 10.1 percent, 4.0 percent and 2.0 percent, as other psycho-sociological blocking factors to inter-tribal co-operation.

From these meager results no definite conclusion can be drawn. But it is likely that any attempt to organize inter-tribal co-operation must pay attention to the above psycho-sociological factors if this type of research is to be replicated in other areas.

Table 10.--Psycho-Sociological Factors Blocking Inter-Tribal Cooperation

Reasons	1	2	3	4	5	6	Total
Opposed	(27)	(10)	(25)	(147)	(30)	(5)	(244)
	10.9	4.0	10.1	59.3	12.1	2.0	98.4
Not Opposed	(4)*						(4)
	1.6						1.6
TOTAL	(31)	(10)	(25)	(147)	(30)	(5)	(248)
	12.5	4.0	10.1	59.3	12.1	2.0	100.0

*They are not opposed to inter-tribal cooperation, but quarreling is inevitable.

- 1 = quarrel
- 2 = fight
- 3 = free rider
- 4 = custom
- 5 = distribution problem
- 6 = political reasons

D. Preliminary Underemployment Evaluation

Given the state of technology and the lack or absence of specialization in Zairean traditional agriculture, one would expect to find in the area of study a high positive correlation between the farm size and the time spent in agricultural work as well as between the age of the cultivators and the time they spend in agricultural work.

On the other hand, the transportation system, especially unpaved roads which link producers and consumers is not in good condition for the whole year. On the other hand, there is a lack of market organization for agricultural products (mainly food). One would then expect

to find negative correlation or, at least, a very low positive correlation between the income level and the time spent in agricultural activities. This may be explained because cultivators may feel that the rewards for additional effort will be reaped by the middlemen and not by themselves because of a government interference in market functions and by virtue of the government's low food price policy for political purposes. In either case cultivators may be aware of the situation and experience negative utility of their marginal effort in farming. Therefore, they may decide to supplement income in slack farming periods by engaging in such activities as fishing, hunting or making fire wood.

In order to evaluate the data with regard to the relationship between time spent in agricultural production activities to selected independent variables, I used multiple regression analysis. Chi-square analysis was used to test the degree of association of selected variables with time spent in agricultural activities.

Tables 11 to 13 show the distribution of cultivators by time spent in farming in terms of age, farm size and income level respectively.

Table 11 shows the distribution of cultivators by time spent in agricultural work in terms of age.

- a. For cultivators of the age group 21 to 29 in terms of the overall cultivators in the sample 2.5 percent, 1.7 percent, 3.0 percent, 2.5 percent and 1.7 percent devote respectively 4, 5, 6, 7 and 8 hours in agricultural work per day.
- b. For cultivators falling into the age group 30 to 38: 1.3 percent, 5.9 percent, 8.1 percent, 3.0 percent, 5.5 percent,

Table 11.--Hours Spent Per Day in Agricultural Production Activities by Age Group*

Age Groups	Hours of Work												Total
	4	5	6	7	8	9	10	11	12				
21-29	(6)	(4)	(7)	(6)	(4)								(27)
	2.6	1.7	3.0	2.5	1.7								11.5
30-38	(3)	(14)	(19)	(7)	(13)	(1)				(2)			(59)
	1.3	5.9	8.1	3.0	5.5	0.4				0.8			25.1
39-47	(2)	(9)	(21)	(13)	(8)								(53)
	0.8	3.8	8.9	5.5	3.4								22.5
48-56	(4)	(22)	(11)	(10)	(1)								(49)
	1.7	9.4	4.7	4.2	0.4					0.4			20.8
57-65	(1)	(1)	(12)	(2)	(3)	(2)	(1)						(22)
	0.4	0.4	5.1	0.8	1.3	0.8	0.4						9.4
Unknown	(2)	(5)	(6)	(10)	(2)								(25)
	0.8	2.1	2.5	4.2	0.8								10.6
TOTAL	(14)	(37)	(87)	(49)	(40)	(3)	(2)	(3)	(3)				(235)
	5.9	15.7	37.0	20.8	17.0	1.3	0.8	1.2	1.2				100.0

*Numbers in parentheses are frequency distributions; others are overall percentages.

Table 12.--Time Spent in Agricultural Production Activities by Farm Size*

Farm Size (in Square Meters)	Hours of Work													Total
	2	3	4	5	6	7	8	9	10	11	12	13		
<1000	(1) 0.4	(1) 0.4	(3) 1.3	(2) 0.8	(4) 1.7	(2) 0.8	(4) 1.7	(2) 0.8	(2) 0.8	(1) 0.4	(1) 0.4	(1) 0.4	(12) 5.1	
1000-1999	(1) 0.4	(1) 0.4	(1) 0.4	(2) 0.8	(2) 0.8	(1) 0.4	(1) 0.4	(1) 0.4	(1) 0.4	(1) 0.4	(1) 0.4	(1) 0.4	(4) 1.7	
2000-2999	(1) 0.4	(1) 0.4	(1) 0.4	(1) 0.4	(1) 0.4	(1) 0.4	(1) 0.4	(2) 0.8	(1) 0.4	(1) 0.4	(1) 0.4	(1) 0.4	(6) 2.5	
3000-3999	(3) 1.3	(3) 1.3	(3) 1.3	(8) 3.4	(8) 3.4	(4) 1.7	(4) 1.7	(1) 0.4	(1) 0.4	(1) 0.4	(1) 0.4	(1) 0.4	(20) 8.4	
4000-4999	(1) 0.4	(4) 1.7	(4) 1.7	(6) 2.5	(6) 2.5	(3) 1.3	(3) 1.3	(5) 2.1	(3) 1.3	(5) 2.1	(3) 1.3	(5) 2.1	(19) 8.0	
5000-5999	(2) 0.8	(8) 3.4	(10) 4.2	(10) 4.2	(48) 20.3	(27) 11.4	(11) 4.6	(11) 4.6	(1) 0.4	(1) 0.4	(1) 0.4	(1) 0.4	(108) 45.6	
6000-6999	(10) 4.2	(10) 4.2	(10) 4.2	(10) 4.2	(4) 1.7	(4) 1.7	(7) 3.0	(7) 3.0	(4) 1.7	(7) 3.0	(2) 0.8	(2) 0.8	(33) 13.9	
7000 & More	(5) 2.1	(11) 4.6	(11) 4.6	(6) 2.5	(6) 2.5	(12) 5.1	(12) 5.1	(1) 0.4	(1) 0.4	(1) 0.4	(1) 0.4	(1) 0.4	(35) 14.8	
TOTAL	(2) 0.8	(14) 5.9	(37) 15.6	(87) 36.7	(49) 20.7	(49) 20.7	(40) 16.9	(40) 16.9	(3) 1.3	(2) 0.8	(3) 1.3	(3) 1.3	(237) 100.0	

*Numbers in parentheses are frequency distributions; others are overall percentages.

Table 13.--Hours Spent in Agricultural Production Activities by Income Levels

Income (1z = \$2.00)	Hours of Work						Total
	2-3	4-5	6-7	8-9	10-11	12-13	
<14z	(1)	(13)	(32)	(11)	(2)	(4)	(63)
	0.4	5.3	13.1	4.5	0.8	1.6	25.7
14-27z		(17)	(62)	(14)		(1)	(94)
		6.9	25.3	5.7		0.4	38.4
28-41z		(15)	(22)	(7)	(1)		(45)
		6.1	9.0	2.9	0.4		18.4
42-55z	(1)	(5)	(17)	(3)			(26)
	0.4	2.0	6.9	1.2			10.6
56-69z		(1)	(1)	(4)			(6)
		0.4	0.4	1.6			2.4
>69z			(7)	(4)			(11)
			2.9	1.6			4.5
TOTAL	(2)	(51)	(141)	(43)	(3)	(5)	(245)
	0.8	20.8	57.6	17.6	1.2	2.0	100.0

1z = U.S. \$2.00 during the time the survey was administered.

0.4 percent and 0.8 percent devote respectively 4, 5, 6, 7, 8, 9 and 12 hours in farming activities per day.

- c. In the age group 39 to 47 there are: 0.8 percent, 3.8 percent, 8.9 percent, 5.5 percent and 3.4 percent who spend respectively 4, 5, 6, 7 and 8 hours in agricultural work per day.
- d. For cultivators of the age groups 48 to 56: 1.7 percent, 9.4 percent, 4.7 percent, 4.2 percent, 0.4 percent and 0.4 percent who daily farm respectively 5, 6, 7, 8, 10 and 12 hours.
- e. For cultivators falling into the age group 57 to 65: 0.4 percent, 0.4 percent, 5.1 percent, 0.8 percent, 1.3 percent, 0.8 percent and 0.4 percent who daily devote respectively 4, 5, 6, 7, 8, 9 and 10 hours.
- f. Finally for those cultivators falling into the age unknown group: 0.8 percent, 2.1 percent, 2.5 percent, 4.2 percent and 0.8 percent who daily spend respectively 4, 5, 6, 7 and 8 hours in agricultural work.

In terms of all age groups there are 5.9 percent, 15.7 percent, 37 percent, 20.8 percent, 17 percent, 1.3 percent, 0.8 percent and 1.2 percent who daily devote respectively 4, 5, 6, 7, 8, 9, 10 and 12 hours in farming activities.

Table 12 visualizes the distribution of cultivators by time spent in agricultural work in terms of farm size. In terms of the overall cultivators interviewed:

- a. For cultivators who have a farm of less than 1,000 square meters, 0.4 percent, 1.3 percent, 0.8 percent, 1.7 percent

and 0.8 percent daily spend respectively 4, 5, 6, 7 and 8 hours in agricultural work.

- b. For those falling into the farm size 1,000 to 1,999 square meters, 0.4 percent, 0.4 percent and 0.8 percent daily devote respectively 4, 5 and 6 hours in farming activities.
- c. Cultivators falling into the farm size 2,000 to 2,999 square meters, 0.4 percent, 0.8 percent, 0.4 percent and 0.4 percent daily work respectively 5, 7, 8, 9 and 10 in agricultural activities.
- d. In the farm size 3,000 to 3,999 square meters, there are: 1.3 percent, 1.3 percent, 3.4 percent, 1.7 percent, 0.4 percent and 0.4 percent cultivators who daily devote respectively 4, 5, 6, 7, 8 and 9 hours in agricultural work.
- e. Cultivators falling into the farm size 4,000 to 4,999 square meters, 0.4 percent, 1.7 percent, 2.5 percent, 1.3 percent and 2.1 percent who daily spend respectively 4, 5, 6, 7 and 8 hours in agricultural work.
- f. Those falling into the farm size 5,000 to 5,999 square meters, 0.8 percent, 3.4 percent, 4.2 percent, 20.3 percent, 11.4 percent, 4.6 percent, 0.4 percent and 0.4 percent daily work respectively 3, 4, 5, 6, 7, 8, 9 and 12 hours in agricultural activities.
- g. For cultivators having a farm size 6,000 to 6,999 square meters, 4.2 percent, 4.2 percent, 1.7 percent, 3.0 percent and 0.8 percent daily devote respectively 5, 6, 7, 8 and 12 hours in agricultural work.

h. In the farm size 7,000 square meters and more, there are: 2.1 percent, 4.6 percent, 2.5 percent, 5.1 percent and 0.4 percent who work respectively 5, 6, 7, 8 and 10 hours per day in agricultural activities.

In terms of all farm sizes, there are 0.8 percent, 5.9 percent, 15.6 percent, 36.7 percent, 20.7 percent, 16.9 percent, 1.3 percent, 0.8 percent and 1.3 percent cultivators who daily spend respectively 3, 4, 5, 6, 7, 8, 9, 10 and 12 hours in agricultural activities.

Table 13 displays the distribution of cultivators by time spent in agricultural work in terms of income levels. According to the overall cultivators of the sample:

- a. For cultivators having an income level less than 14Z, 0.4 percent, 5.3 percent, 13.1 percent, 4.5 percent, 0.8 percent and 1.6 percent daily spend respectively 2 to 3, 4 to 5, 6 to 7, 8 to 9, 10 to 11 and 12 to 13 hours in agricultural work.
- b. In the income level 14 to 27Z, there are: 6.9 percent, 25.3 percent, 5.7 percent, 0.4 percent cultivators who work respectively 4 to 5, 6 to 7, 8 to 9 and 12 to 13 hours per day in agricultural activities.
- c. In the income level 28 to 41Z there are: 6.1 percent, 9.0 percent, 2.9 percent and 0.4 percent who daily spend respectively 4 to 5, 6 to 7, 8 to 9 and 10 to 11 hours in agricultural work.
- d. Those who fall into the income level 42 to 55Z: 0.4 percent, 2.0 percent, 6.9 percent and 1.2 percent who daily work

respectively 2 to 3, 4 to 5, 6 to 7 and 8 to 9 percent in farming activities.

- e. For farmers falling into the income level 56 to 69Z, 0.4 percent, 0.4 percent and 1.6 percent daily devote respectively 4 to 5, 6 to 7 and 8 to 9 hours in agricultural work.
- f. And finally in the income level greater than 69Z, there are 2.9 percent and 1.6 percent who daily spend respectively 6 to 7 and 8 to 9 hours in agricultural work.

In terms of all income levels, 0.8 percent, 20.8 percent, 57.6 percent, 17.6 percent, 1.2 percent and 2.0 percent of cultivators daily spend respectively 2 to 3, 4 to 5, 6 to 7, 8 to 9, 10 to 11 and 12 to 13 hours in agricultural work.

Two-hundred and eleven male cultivators of 248, that is 85.1 percent who estimated the daily time they spend in agricultural work devote, on the average, 6.40 hours. The other 37 did not remember how much time they daily devote to farming activities.

On the average, a male cultivator in the area of study has a farm of 5,090 square meters.

Ceteris paribus, on the average a male cultivator in Kisangani vicinity devotes 292 days of 8 hours per year in agricultural work, that is, $365 \text{ days} \times 6.40 \text{ hours} / 8.00 \text{ hours}$. However, the ceteris paribus condition may be misleading. It is not clear whether the single visit took place during peak periods or slack seasonal activities. But somehow in order to make the underemployment evaluation picture complete, the time spent in non-agricultural work and of rest or illness as well as the time spent in agricultural work must be taken into account either because in terms of labor distribution

they always compete with it, as is the case for all other non-agricultural occupations or in terms of sources of income or in terms of nutrition they are complementary to agriculture, such as hunting, fishing or making firewood. In terms of effectiveness of cultivators, a standard allowance for rest, even for healthy cultivators plays a determinant role in the productivity of the cultivator.

Contrary to my expectations, from these tables it appears that neither the farm size nor the income level nor the age are correlated to the time spent in agricultural work. There are two possible explanations for this situation: First, data were collected in one single visit, therefore they may have measurement errors, either in terms of age, income and farm size or time estimations, since cultivator's memory is not a reliable source for events or activities which occurred in a period of more than three weeks. Second, agricultural activities may not be the most important source of traditional cultivator's income, other seasonal activities, such as hunting, fishing or making firewood may contribute for a higher part in their income than do agricultural activities.

To test whether or not time spent is associated with age, farm size and income level respectively, the data were regrouped for Chi-square analysis.

The following age, farm size, income and time intervals are used to compute the Chi-square:

- a. Age intervals: 20 to 29, 30 to 39, 40 to 49, 50 to 59, 60 to 69.
- b. Farm size intervals: 0 to 999, 1,000 to 2,999, 3,000 to 4,999, 5,000 to 6,999, greater than 6,999 square meters.

c. Income intervals: less than 14Z, 14 to 29, 30 to 45, 46 to 61, greater than 61Z.

d. Time intervals: less than 5 hours, 5.0 to 5.9, 6.0 to 6.9, 7.0 to 7.9, greater than 7.9 hours.

Each variable is plotted against time spent in agricultural work.

A Chi-square of 5 x 5 is computed. The three Chi-square computed are:

- a. 29.47531 with 16 d.f. for age against time,
- b. 16.07825 with 16 d.f. for farm size against time,
- c. 26.91958 with 16 d.f. for income against time.

These Chi-square results indicate that at 5 percent level of significance, only farm size is associated with time spent in agricultural work. The result is quite consistent with the state of Zairean traditional agriculture. As a matter of fact, Zairean traditional agriculture lacks modern technology, capital and specialization. Thus, *ceteris paribus* the larger the farm is the more time required to get agricultural work done.

V. CONCLUSIONS WITH INTERPRETATIONS

A. The following conclusions were drawn from the analysis.

I. Non-farm labor activities of farm household heads.

1. Generally speaking pay jobs are almost unknown in traditional agriculture.

2. In general, farmers are traditional and conservative. Older farmers are less mobile than the younger ones, that is, they are less inclined to work off-farm than the younger ones. It follows that the age is negatively correlated to the willingness to work off-farm.

3. Income is neither correlated to the willingness to work off-farm nor to the unwillingness to work off-farm. Income level is more closely associated with the extent to which farm income is supplemented with non-farm income activities.

4. Traditional style of life may be a blocking factor to improved family income. An individual may work less than he should to avoid too much differences with the other members of his community in terms of wealth or innovation acceptance.

II. Constraints to increased farm production.

1. Human energy, that is, the labor, appears to be the more limiting factor to increased farm production in a traditional

agriculture. This limiting factor may be overcome by introducing modern technology (biological and chemical) and improved tools. In addition, improved health and nutrition would contribute to increased labor efficiency.

2. Other factors, such as a lack of government encouragement, a lack of market, bad roads, witchcrafts, etc. may play a limiting role to increased farm production. However, the data do not permit conclusive evidence as to the weight that can be attached to each factor.

III. Psycho-sociological blocking factors to inter-tribal cooperation.

1. Custom and habits are still very strong blocking factors to inter-tribal cooperation for labor and land use.
2. Quarrels, distribution problems, the free rider problem, fights and political reasons are other blocking factors to inter-tribal cooperation. Since the data collection was done in one single visit, it is difficult to evaluate the extent to which these psycho-sociological factors impede inter-tribal cooperation.

IV. Underemployment evaluation.

1. Farmers in a traditional agriculture devote on the average less than eight hours a day for the whole year. However, during peak periods they may work more than ten hours a day. Whereas during slack seasonal activities they may work less than six hours a day. However, the data do not permit me to draw a definite conclusion. These issues are to be examined in the subsequent study of the sub-sample.

2. Farm size is correlated to the time required for agricultural work. Land that cannot be worked beyond the limits of available labor may be left idle. Hence, labor is the effective limiting resource.
3. Age and family income level are not correlated to time spent in agricultural work. This is because family income includes income from non-agricultural sources. Because non-farm activities supplement farm income. Farmers engaged in non-agricultural activities have higher income than those engaged only in farming.

B. Implications for future research.

1. Since Zairean traditional agriculture in the typical household is diversified in products produced and the activities of household members, a farmer is assumed to perform, besides agricultural work, all other seasonal activities. Therefore, future research should take into account the time spent in non-agricultural work as well as the time spent in farm. The accounting should also consider time lost due to illness.
2. Farmer's activities are multiple and heterogenous. With this in mind, research is needed to improve the measurement of labor realizing that in traditional agricultural societies, time measurement is little concern to the people.
3. A farmer's memory is not a reliable source to recall activities or things done a week or more before the interview.

Therefore, the researcher should evaluate the possibility of data collection scheduled on a twice weekly visit basis during a full year so that peak periods and slack seasonal activities can be counted and measured more accurately.

4. Research is needed on the role of women in rural society and how this role relates to issues of agricultural labor unemployment.
5. The following hypotheses are not derived from the data. However, they could be tested for future research and serve to formulate policy implications.
 - a. Cultivators, including females are motivated to save for tax payment. Fear of penalty for non-payment of tax combined with the general feeling that the rural population does not benefit from taxes, causes people to save grudgingly. An evaluation of the relationship between tax policy and incentives for increased food production should be made.
 - b. The overall ratio between man and land is very low in Zaire, about 8 to 10 persons per square kilometer. The implications of agricultural mechanization on raising crop yields and the absorption of rural underemployment should be studied.
 - c. Food crises in cities and towns are acute in Zaire. An evaluation of the impacts of specific projects on marketing and transportation improvement is needed.

d. The modernization of a traditional agriculture implies the introduction of technology (biological and chemical) as well as managerial abilities. This implies an increasing need of public capital. Therefore, an evaluation of an agricultural credit policy is needed.

BIBLIOGRAPHY

- Ames, David W., Patterns of work among the musicians of Zazzau, Northern Nigeria, in Social Science Research Council, Vol. 22, No. 1, March 1968, p. 3.
- De Raj, The Design of sample Surveys, Ed. by McGraw-Hill New York, 1972, pp. 229 and 230.
- Helleiner, G. K., "Smallholder Decision Making: Tropical African Evidence," in Agriculture in Development Theory, Ed. by L. G. Reynolds, Yale University Press, 1975, pp. 27-28.
- Jones, William O., "Labor and Leisure in Traditional African Societies," in Social Science Research Council, Vol. 22, No. 1, March 1968, p. 4.
- Mukherejee, P. H., Economic Surveys in Underdeveloped Countries. A Study in Methodology, ed. by Asia Publishing House, 1st ed. Bombay, 1959, pp. 98 and 102.
- Ndongala, E., "La Production de subsistence," in Inflation Developpement Economique, ed. by IRES-Mouton, Paris, 1965, pp. 750-751.
- Robinson, J., "Disguised Unemployment," Economic Journal, Vol. 46, pp. 225-237, June, 1936, cited in "Agriculture in Economic Development," ed. by Carl K. Eicher and Lawrence W. Witt, McGraw-Hill, 1964, p. 129.
- Rosenstein-Rodan, P. N., "Problems of Industrialization of Eastern and South-Eastern Europe," Economic Journal, Vol. 53, pp. 202-211, June-September, 1943, cited in "Agriculture in Economic Development," ed. by Carl K. Eicher and Lawrence W. Witt, McGraw-Hill, 1964, p. 135.
- Schultz, T. W., "The Doctrine of Agricultural Labor of Zero Value," Transforming Traditional Agriculture, Yale University Press, New Haven, Conn., 1964, p. 61.
- Turin, L. Combat pour le Développement, ed. Ourrières. Paris, 1965, p. 46.
- World Bank, A Survey of Zairean Economy, tome III on Agricultural Sector, June 19, 1972, pp. 1 and 9.

APPENDIX

Preliminary questionnaire concerning Agricultural work/time patterns
in the sub region of Kisangani (Republic of Zaire).

- I. Identity of Farmer (informant) "Name."
1. Age
 2. Level of Education
 3. Agricultural occupation. Specify.
 4. Other occupation. Specify.
 5. Member of a cooperative?
 6. Is the informant satisfied with the cooperative's services?
 7. Has the informant ever been a salaried employee?
 8. In what capacity?
 9. What were the reasons for which the informant left this occupation?
 10. How long has the informant spent in urban centers?

II. Methods of soil exploitation.

1. Customary system Yes/No
2. How do you conserve the soil?
 - a) no definite method;
 - b) fallowing;
 - c) fertilizer;
 - d) rotation;

- e) other;
 - f) indeterminate.
3. May a stranger to your clan or group cultivate the soil of your group?
 4. If yes; what are his obligations vis-a-vis your clan?
 - a) moral obligations. Specify.
 - b) material obligations. Specify. (eg. sharecropping, money, work, etc.
 5. "Mixed system." Specify.
 6. What are the methods of selection employed in the allocation of plots within your clan?
 - a) the authority of a chief
 - b) the distance between a village and the plots
 - c) no particular criteria
 7. How is agricultural work customarily divided among the following classes:
 - a) women
 - b) men
 - c) both
 - d) children
 8. Have you noticed any change in the above breakdown in your lifetime? If yes, what has been the reason?

III. Principal activities.

1. What are the principal agricultural activities you undertake?
 - a) products destined primarily for village consumption
 - b) products destined primarily for commercial market
 - c) a mixture of the above systems
 - d) animal husbandry.

2. What are the principal agricultural products in the region?
 - a) bananas (plantains, etc.)
 - b) coffee
 - c) cassava or manioc
 - d) tea
 - e) rice
 - f) sugar cane
 - g) rubber
 - h) cotton
 - i) palm nuts (oil)
 - j) fruit (oranges, lemons, etc.)
 - k) vegetables

3. What are the semi-agricultural projects you engage in during periods of low agricultural activity?
 - a) construction of housing (including repair)
 - b) building and repairing access or feeder roads
 - c) repair of main roads
 - d) hunting
 - e) art or handicrafts
 - f) fabrication of local tools (rope, nets, traps, etc.)
 - g) social/judicial functions (eg. funeral ceremonies oratory for manifestations, reconciliations, initiation rites, dowry questions etc.)
 - h) sale of artifacts or locally fabricated products in the market
 - i) nothing
 - j) indeterminate

4. Would you go to work for a third party outside the customary domain of your clan during periods of low agricultural activity?

a) yes

b) no why not?

5. Are you disposed toward becoming a salaried employee if someone were to create such work for you in your area?

Yes

No

In the area of another clan?

Yes

No

IV. Soil exploitation.

1. In which area is your plot found?

a) that of your clan?

b) that of another clan?

2. Do you have the right to cultivate the land of your clan?

Yes

No

3. Would you like to cultivate the land of other clans if you had permission to do so?

a) Yes

b) No

Why not.

4. Is there collective farming in the village, i.e., planting, cultivating and harvesting, etc. is done communally?

a) Yes

b) No

If yes, for what products?

a) bananas

Number of hectares

number of participants

b) coffee

"

"

c) manioc or cassava

"

"

	number of hectares	number of participants
d) rice		
e) sugar cane	"	"
f) cotton	"	"
g) others	"	"
h) indeterminate	"	"

Is there collective farming between two (or more) clans?

a) Yes

b) No

What are the obstacles impeding the formation of such inter-clan collectives?

- traditional order

- mystical order

- political order

- indeterminate

5. Would you be in agreement with a community farm?

- Yes

- No

By two or more clans?

- Yes

- No

6. Would you be in agreement with a proposal to relocate your village in order to better agricultural production?

a) Yes

b) No

Why not?

7. What are factors which prevent you from increasing the amount of arable land and increasing your productivity?

a) the obsolescent state of your tools

- b) social constraints. Specify.
 - c) traditional or mystical reasons
 - d) lack of encouragement and support on the part of the authorities.
8. What methods would you hope to have in order to better your production?
- a) agricultural materials and cultivating tools adapted for local use.
 - b) amelioration of the transport infrastructure.
 - c) assured market and price supports for products.
 - d) regulation and even suppression of traditional practices which are inimical to initiative and individual enterprise.
 - e) popularization cheap, modern of cultivating techniques and the results of basic, agricultural research.
9. What is the number of hectares given to the production of annual crops?
- a) bananas
 - b) manioc or cassava
 - c) rice
 - d) beans
 - e) indeterminate
- To perennial crops
- a) palm nuts (oil)
 - b) rubber
 - c) coffee
 - d) fruit (oranges, mangoes, lemons, etc.)
 - e) indeterminate

V. Appropriation of time devoted to agricultural work.

1. How much time do you devote each day to your agricultural activities?

- a) six hours
- b) eight hours
- c) ten hours
- d) all day
- e) indeterminate
- f) time to devote to nonagricultural pursuits

2. Are your plots far from the village?

- a) Yes estimate this distance
- b) No " " "
- c) No exactly How many kilometers would you say

3. How much time (in terms of months and days) must it take for you to perform the following agricultural activities?

- a) cutting underbrush
- b) felling trees
- c) burning and cleaning
- d) planting or staking out
- e) weeding
- f) cultivating
- g) harvesting
- h) drying (if applicable)
- i) transport
- j) marketing

4. Do you estimate that your family (e.g. wife and four children) is sufficient to help you to do this work?

- a) Yes
- b) No

If no, are you ready to take on third parties from your clan or strangers to your clan as hired hands?

Yes

No

VI. Savings in the rural milieu

1. Information concerning the informant

- a) what is the usefulness of savings for your family?
- b) what is the usefulness of savings for the country?
- c) how many minor children do you have in your care?
 - natural children
 - adopted children
- d) in your family, do you act as breadwinner?

2. Agricultural revenue and expenses

- a) among the agricultural activities listed below can you indicate in a useful order the relative annual economic importance, i.e., how much you made from each:

- a) annual crops
- b) fruit crops
- c) perennial crops
- d) animal husbandry
- e) fishing
- f) forestry
- g) hunting

3. How are revenues from crops divided amongst all "interested parties."

- a) the producer keeps all proceeds
- b) the producer keeps only a share of the proceeds
- c) who receives the rest?

4. Indicate types of expenses (all). Do not forget expenses for aiding members of the family.

a) personal

b) communal

c) family

d) Do these expenses completely exhaust your income or not?

5. Forms of savings

Is there a system of savings in your clan, group or village?

a) individual Specify.

b) communal

In the case of a communal savings system, who establishes the amount each contributes; how often?

What is the ultimate dispensation of this fund? (individual or collective)

Do you have an account at C A D E Z A or not? Why?

How do you yourself save money?

a) savings account

b) with a trusted friend

c) at home

d) others

e) what is the preferred method?

Kisangani November 28, 1972

B A Z O L A - M U A N G U

Zaire Farm Study

Variable Name	Data Range	Needed	Columns Assigned
Household Identification	001 to 248	3	1, 2, 3
Age	21 to 65	2	4, 5
Age Group: 1 = 21-29 2 = 30-38 3 = 39-47	1 - 5, 9	1	6
Job Opportunity Code: 0 = none 1 = Hunting, make traps 2 = Fishing, make nets 3 = House, road repair 4 = House, road construction 5 = Crafts 6 = Judiciary/political 7 = Ritual dance 8 = Make alcohol 9 = Don't know	0 to 9	1	7
Willingness to work off Farm Code: 0 = No response 1 = Unwilling 2 = Willing 3 = Depends on job	0 to 3	1	8
Inter-tribal Cooperation Code for Communal Land: 0 = Indifferent 1 = Opposed 2 = Not opposed	0 to 2	1	9

Variable Name	Data Range	Needed	Columns Assigned
Reason Code for Opposition (communal land)	0 to 9	1	10
0 = quarrel			
1 = fight			
2 = free rider			
3 = custom			
4 = distribution problem			
5 =			
6 =			
7 =			
8 =			
9 =			
Inter-tribal Cooperation Code for Tribal Land:	0 to 9	1	11
0 = Indifferent			
1 = Opposed			
2 = Not Opposed			
Reason Code for Opposition (tribal land)	0 to 9	1	12
0 = quarrel			
1 = fight			
2 = free rider			
3 = custom			
4 = distribution problem			
5 = political			
6 =			
7 =			
8 =			
9 =			

Variable Name	Data Range	Needed	Columns Assigned
Constraints to Increased Fram Production Code:			
0 = None or don't know	0 to 9	1	13
1 = Lack of human energy			
2 = Lack of technology			
3 = Low prices			
4 = Transport cost			
5 = Bad roads			
6 = Lack of market			
7 = Witchcraft			
8 = Lack of Gov't encouragement			
9 = Weather conditions			
Farm Size in square meters	<1000 to 7999	4	14,15,16,17
Farm Size Group Code:	1 to 9	1	18
1 = <1000			
2 = 1000-1999			
3 = 2000-2999			
4 = 3000-3999			
5 = 4000-4999			
6 = 5000-5999			
7 = 6000-6999			
8 = >7000			
9 = Don't know			
Time Spent in Ag Production Activities	>0 to >10	2	19, 20

Variable Name	Data Range	Needed	Columns Assigned
Time spent in Ag Production Activities Code			
0 = 0-1	0 to 6	1	21
1 = 2-3			
2 = 4-5			
3 = 6-7			
4 = 8-9			
5 = 10-11			
6 = 12-13			
7 =			
8 =			
9 = don't know			
Income			
Income Code: 1 = <14	0 to 83 Z	2	22, 23
2 = 14-27	1 to 6	1	24
3 = 28-41	1 to 7	1	25
4 = 42-55			
5 = 56-69			
6 = >69			
Income Source Code			
1 = aid from relatives			
2 = Farm Production			
3 = Hunting			
4 = Fishing			
5 = Crafts			
6 = Temp. Herd Agrl Labor			
7 = Judiciary/political			

