This is to certify that the

dissertation entitled

PERCEPTIONS BY FARMERS, EXTENSION AGENTS AND RESEARCHERS OF LINKAGES AMONG AND BETWEEN ORGANIZATIONS INVOLVED IN THE DEVELOPMENT AND DISSEMINATION OF AGRICULTURAL INNOVATIONS IN CAMEROON

presented by

Isaac Roger Tchouamo

has been accepted towards fulfillment
of the requirements for

Ph.d degree in
Agricultural & Extension Education

O. Donald Meaders

O. Donald Meaders
Major professor

Date August 3, 1987

PERCEPTIONS BY FARMERS, EXTENSION AGENTS AND RESEARCHERS OF LINKAGES AMONG AND BETWEEN ORGANIZATIONS INVOLVED IN THE DEVELOPMENT AND DISSEMINATION OF AGRICULTURAL INNOVATIONS IN CAMEROON

By

Isaac Roger Tchouamo

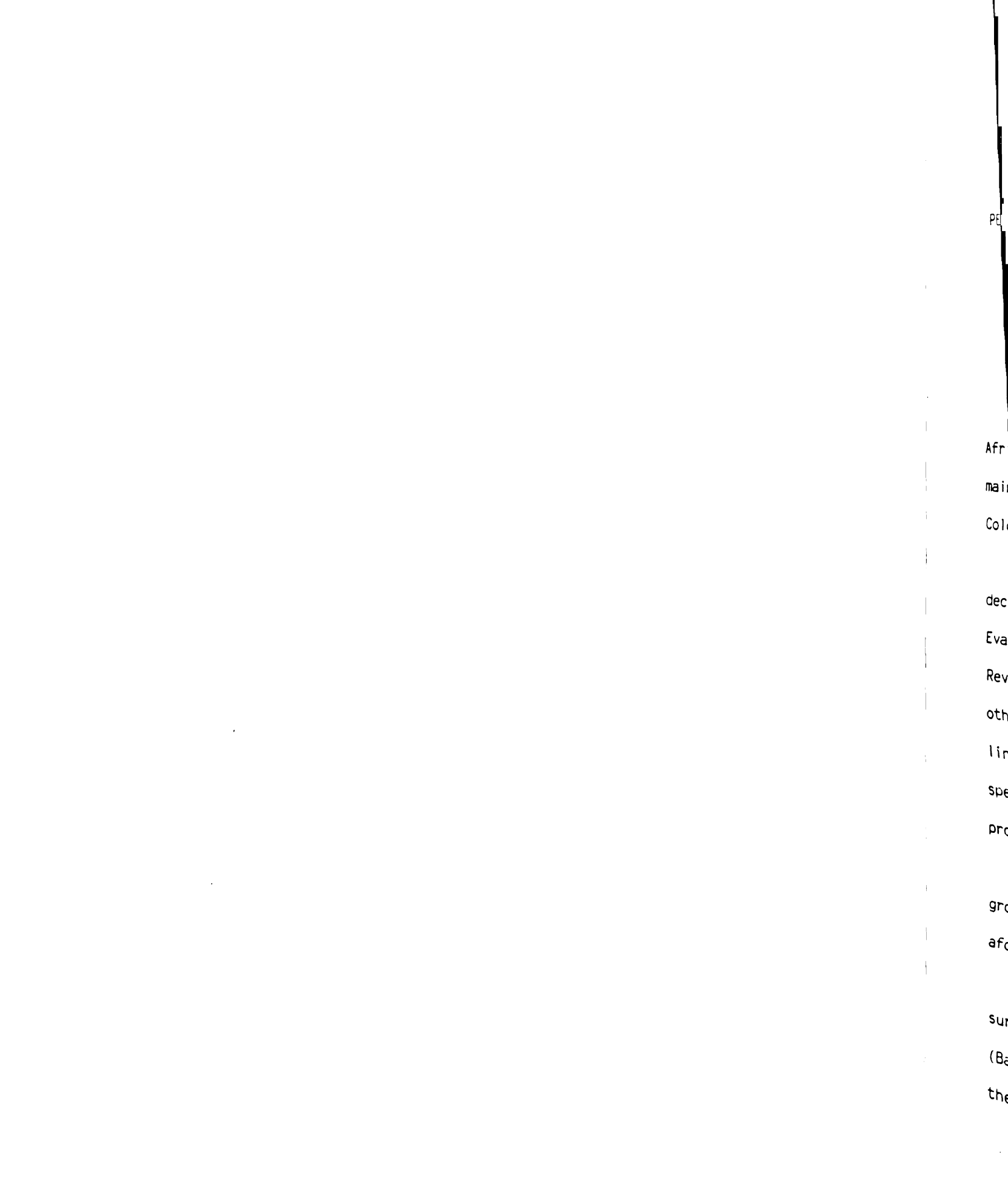
AN ABSTRACT OF A DISSERTATION

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

DOCTOR OF PHILOSOPHY

Department of Agricultural and Extension Education

1987



ABSTRACT

PERCEPTIONS BY FARMERS, EXTENSION AGENTS AND RESEARCHERS OF LINKAGES AMONG AND BETWEEN ORGANIZATIONS INVOLVED IN THE DEVELOPMENT AND DISSEMINATION OF AGRICULTURAL INNOVATIONS IN CAMEROON

By

Isaac Roger Tchouamo

Cameroonians are proud to be saved from hunger, the plight of many African and Third World Countries. This situation is probably due mainly to resources allocated to the agricultural sector by both the Colonial and Independent Governments.

Nevertheless, for the past decade there have been continuous decreases in the production of major export crops and some food crops. Evaluation of the agricultural system by Kelso & Gervais (1983) and Revol (1984) indicated that the decreases could be attributed among other factors to unworkable, weak, ineffective and often absent linkages between Cameroonian agricultural subsystems, and more specifically between agricultural research, extension services and production subsystems.

This study was designed to assess and examine three respondent groups' perceptions of the linkages between and among the three aforesaid agricultural subsystems.

Three groups were identified from within a strategically selected survey population in Cameroon: (1) Farmers from the West-Province (Bamboutos, Mifi and Nun divisions), (2) agricultural researchers of the Institute of Agronomic Research (IRA), and (3) extension workers

from the Ministry of Agriculture and the Rural Development Project of the West Province (PDRPO).

Two procedures were used to collect information from the survey population: (1) self-delivered questionnaire, and (2) personal structured and unstructured interviews.

On a five-point scale ("definitely should not" to "definitely should"), each of the respondents were asked to indicate the importance of linkages within their group and with each of the two other groups. In addition, they were asked to identify on a three-point scale ("often" to "never") how often such interaction took place. Moreover, on a five-point scale ("strongly disagree" to "strongly agree") respondents were asked to express their opinion about the integration of major agricultural subsystems in a larger administrative unit.

Each respondent group positively perceived that interaction among peers and between groups was important for the development and dissemination of agricultural innovations. Such intra-group and inter-group was perceived to be a means for improving services to potential users and to the professions.

The three respondent groups generally perceived that integrating the major components of the agricultural system in one administrative unit would lead to a better utilization of scare resources, improve the services currently offered by subsystems in separate units, and boost the country's agricultural and rural development.

Committees, workshops, planning and conducting on-farm trials could be used to strengthen the interaction within, between and among researcher, extension worker and farmer subsystems.

Additional insights could be gained about the linkages within the agricultural system by studying the key groups in other (e.g. marketing, governance) subsystems.

Age
tec

res
Uni
enc

res
mad
hop
int
Cam

fac
for
Ext
of

ACKNOWLEDGEMENTS

The University Centre of Dschang (UCD) and the United States Agency for International Development (USAID) provided financial and technical support for this study.

Appreciation is extended to Rene' Owona and Dr. Joseph Djoukam, respectively Director General and Deputy Director General at the University Centre of Dschang for providing support and personal encouragement to the author during the entire study.

To the many farmers, extension workers and agricultural researchers who answered questions and provided useful information that made this dissertation possible, the author offers his thanks. He also hopes that benefits accrued from it will help in the improvement of interaction, relations, and linkages between stakeholders of the Cameroonian agricultural system.

Special thanks are extended to the Guidance Committee members, faculty staff and colleagues who have offered suggestions and comments for improving the author's knowledge in the field of Agricultural and Extension Education. To the following, the author owes a special debt of gratitude:

- Dr. O. Donald Meaders, who served as dissertation advisor and mentor to the author during the study. The visit he paid to

for
ana
rea
owe
Edu
Der
Un
an

Cameroon in the early stage of data collection was significantly helpful, and accelerated the speed of the study.

- Dr. Maxine Ferris, whose support, guidance, advice and continuous encouragement were highly helpful in many respects (professional and academic). The author owes her another special thanks for volunteering to edit the final document. Dr. Ferris, your assistance is invaluable.
- Dr. Fred J. Peabody, first mentor to the author at Michigan State University, who decided to continue to provide fruitful inputs to the study, despite early retirement for health reasons.
- Dr. S. Joe Levine, whose pragmatism helped the author in the research design and problem formulation.

Grateful recognition goes to Dr. Roger E. Steele and Kaji Shrestha for initiating the author in the use of Statpac for the study's data analysis.

Dr. Frank Bobbitt also deserves a special tribute for his readiness to help in the data analysis process. A debt of gratitude is owed to Dr. Ajaga Nji, Chairperson of the Department of Agricultural Education at the University Centre of Dschang and Sandi Bauer from the Department of Agricultural and Extension Education (Michigan State University) for providing support and management of project finances and equipment.

Wam

con

Uni

Dav

supp

duri

coll

(1)

Vic

Chr

Hen

Sin

Edw

hel

sel

the

sta

qua

Ski

The author would like to thank Drs. Eddie A. Moore, Carroll (Jake) Wamhoff, Michael Doyle, Harrison Gardner and Mr. Kirk Heinze for their constant concern about the student's progress.

A recognition is also due to the following colleagues at the University Centre of Dschang: Drs. Francois Kamajou, James E. McGuire, David Nelson, Francois Tchala Abina and Joseph Tchoumboue for their support, encouragement, supply of appropriate and useful documents during the entire study and more specifically during the field data collection.

Following research and extension staff deserve a special tribute: (1) Drs. Ayuk Takem, Felix Monthe', and Samuel Nzietchueng; (2) MM. Victor Ahoupe, Francois Dongmo, Martin Kengne, Pascal Motemo, Christophe Nana, Pierre Ngameni, Edward Ngon Nassah, Mamouda Njoya, Henri Nkoue Nyam, David Nkoundjo, Joseph Pfeudie, Gilblas Piepdie Sinkam, Pierre Tawatieu, Martin Luther Tchundjo, Martin Tchuenkam, Edward Mezazem, Donatien Tuekam, Abraham Tabuebou. All were very helpful in leading the author to their colleagues and farmers who were selected to be interviewed.

While the author assumes responsibility for its imperfections, the suggestions the above mentioned scholars, research and extension staff and farmers gave him added materially to the dissertation quality.

Grateful recognition goes to typist Joanne Lewis for excellent skills in word processing.

A special tribute is offered to the author's wife, Micheline Mamgaing, for her love, encouragement and patience that made the completion of such a study worthwhile.

The author dedicates this study to:

- The memory of late father Djepang Saasseu, called by the Lord on December 21, 1975.
- The late Dr. Pacal Fotzo Tagne, colleague and friend, who was a passenger on a Brazilian airlines flight which crashed following take-off from Abidjan (Ivory Coast) on January 4, 1987.
- Mamans Evodie Megaptche and Monique Djouomo for their love and dedication. The author hopes they have not been disappointed by their son's achievements. Their contribution to the author's mental and physical development is invaluable.
- Sime Tchouamo Arielle Annick and Nana Tchouamo William Brice who eagerly waited for their father to complete training on the opposite shore of the Atlantic Ocean. They are commended for their patience and strength.
- Megueptchie Tchouamo Steve Arthur who never saw his father until the age of 21 months.

TABLE OF CONTENTS

IRA

GDP

MIN

FAO

USA

SOC

UCC

PDI

FOI

ha

Km

ON

CE

MI

SOI

MI

SOC

NWC

SEC

DGR

ABBREVIATIONS

IRA	Institute of Agronomic Research
GDP	Gross Domestic Product
MINAGRI	Ministry of Agriculture
FAO	Food and Agricultural Organization
USAID	United States Agency for International Development
SODEBLE	Societe' de Developpement du Ble
UCCAO	Union Centrale des Cooperatives Agricoles de l'ouest
PDRPO	Project de Developpement Rural de la Province de l'ouest
FONADER	Fonds National De Developpement Rural
ha	hectare
Km^2	Kilometer Square
ONCPB	Office National de Commercialization des Produits de Base
CENADEC	Centre National de Developpement des Entreprises Cooperatives
MIDEVIV	Mission de Developpement des Cultures Vivrieres
SODECAO	Societe' de Developpement du cacao
MIDENO	Mission de Developpement du Nord-Ouest
SODECOTON	Societe' de Developpement du coton
NWCA	North West Cooperative Association
SECAM	Societe d' Etudes Camerounaises
DGRST	Delegation Generale A la Recherche Scientifique et Technique

MESRES	Ministere de l'Enseignement Superieur et de la Recherche Scientifique
IMPM	Institut de Recherches Medicales et d'etudes des Plantes Medicinales
IRGM	Institute of Geological and Mineral Research
IRZ	Institute of Animal Research
IHS	Institute of Human Sciences
MAB	National Commitee for Man and Biosphere
CNDT	National Committee for the Development of Technologies
SIP	Societes Indigenes de Prevoyance
SAP	Societes Africaines de Prevoyance
SEM	Secteurs de Modernisation
TLU	Training and Liaison Unit
USA	United States of America
UCRIHS	University Committee on Research Involving Human Subjects
ANOVA	Analysis of Variance
SAFEL	Societe Africaine des Fruits et Legumes

LIST OF TABLES

Fi

1.

2.

3.

4.

5.

6.

7.

8.

9.

10.

11.

12.

13.

14.

15.

16.

17.

18.

LIST OF FIGURES

CHAPTER I

INTRODUCTION

Although organizations (e.g. Institute of Agronomic Research, Extension Service, etc.) involved in the development and dissemination of agricultural innovations in Cameroon have common objectives (e.g. an increase in the production and productivity of agricultural producers, especially small farmers), the lack of close and effective linkages between them often limits their ability to help farmers effectively and to positively contribute to agricultural and rural development. Lionberger and Gwin (1982), Kelso and Gervais (1983), Cerna, Coulter and Russell (1985), all stressed the need for effective two-way linkages between agronomic research, agricultural extension and farmers. According to these scholars, researchers from the Institutes of Agronomic Research must have contact with farmers in order to be directly acquainted with their production conditions, technological requirements, social, cultural and economic patterns. Similarly, agricultural extension agents have little, if anything, to offer farmers in the long run without research inputs. Existing farmer and extension knowledge and practice is a closed system that is unsustainable without input from research. Despite this mutual dependence of agricultural extension and research, and farmer subsystem, in Cameroon like in many other countries of the World, linkages between them are weak, ineffective and often unworkable. Unless two-way linkages are reinforced and sustained between the

Institute of Agronomic Research, the Extension and Farmer subsystems, their contribution to national goals, stated in the Five-Year Development Plans (1961-1966, 1966-1971, 1976-1981, 1981-1986, and 1986-1991), is likely to be vitiated, and indeed jeopardized.

The Research Problem

The research attempted to look at the current formal and informal linkages between individuals within three subsystems in agriculture: Institute of Agronomic Research, the Extension Service, and the farmers. The research involved measures of perceptions about such linkages and also looked at possible correlations with selected characteristics of the respondents.

Linkages between the IRA, the Extension Service and the Production Subsystem are areas that can be used to enhance agricultural and rural development, and, therefore, contribute to the improvement of agricultural production and productivity, and farmers' standards of living: the main goals of the Government expressed in the Five-Year Development Plans.

Three groups were identified from a strategicially selected population in Cameroon to provide their perceptions and other information on a hand-delivered questionnaire. Perceptions on various aspects, problems and conditions related to linkages among and between the Institute of Agronomic Research, the Extension Service and Farmer Subsystem were assessed. Descriptive statistics were used to present

and analyze data, in order to provide answers to the four research questions identified on page 15.

Background of the Study

The 1976 general population census indicated that 71.4% (Fifth Five-Year Plan, 1981, p. 33) of Cameroonians lived in rural areas and found their livelihood from agriculture, animal husbandry and related activities. The 1984 agricultural census also revealed that there were 1,555,500 farm operators (1984 Agricultural Census, Table 12) in the country.

The small family farm prevails and provides 93% of national agricultural production. The remaining 7% comes from the large industrial plantations.

In the fiscal year 1979-1980, the agricultural sector's share of the Gross Domestic Product (GDP) was 34.8% (Fifth Five-Year Plan, 1981, p.1). Kamajou (1983) indicated that since the 1960s the agricultural sector constantly contributed about 30% of the Gross National Product (GNP) (p. 13).

The rural sector, source of manpower, market for agricultural and industrial products, and inputs (raw materials for other sectors of the economy) is vital for the Cameroon. The key roles of the agricultural and rural sectors to the country's economy are often reaffirmed by officials in public speeches. Because of their importance to the daily life of the nation, the Cameroonian Governments (Colonial and independent) always have paid close attention to the agricultural and rural sectors. From 1946 to 1959, two development plans were

initiated by the Colonial Government. The main objectives of these plans of development were to improve the transportation networks in the country, and therefore link the Port of Douala to the main agricultural producing areas.

From 1960 to 1986, five Five-Year Development Plans were carried out in the country. All of them indicated that substantial support was to be provided to the agricultural and rural sectors. So much so that the areas under both food crops for local consumption but also exported to other countries and cash crops intended for export have been increasing. But, for the past several years, the production of major export crops (i.e. coffee and cocoa) has been falling.

All the five completed development plans and the sixth under execution (1986-1991) have given priority to agricultural and rural development. The second focused exclusively on the improvement of the social and economic conditions of rural dwellers. It was even labeled "Plan du Paysan." It was decided that during the execution of the Fifth (1981-1986):

> A Supreme Council for rural development will be set up. It was supposed to play at the national level, a role in conceiving, guiding, sustaining and harmonizing the activities of public authorities in the entire rural sector (p. 62).

The reader should be reminded that in Cameroon:

> Agricultural policy is only an important subsystem of the larger system of rural development policy, which, apart from other productive activities such as cattle rearing and forest exploitation, also includes all other factors that are prerequisites for its development, namely marketing, price

policy, supply, maintenance, and training (Fifth Five-Year Plan, 1981, p. 62).

The rural development of the 1980s has intended to pursue the following major objectives:

- establishment of a new framework of relations between the administration and farmers;
- determine agricultural price policy, that will take into account not only the interests of the nation and urban consumers, but also of the farmers' earnings;
- generalize and intensify the training and the organization of refresher courses for those officials of the rural sector, reorganize the training of farmers so that it is simpler and more efficient;
- give highest priority to increase productivity in the agricultural sector" (Fifth Five-Year Plan, 1981, pp. 62-65).

In addition to the above stated goals, the Government placed emphasis on meeting the country's food demand in the 1990s. So, a heavy stress was to be put on:

- priority given to the distribution of high yield seedlings;
- effective stabilization of the prices of some very important products (i.e. maize and sorghum) together with the provision of adequate storage facilities;
- intensification of research and experimentation for cereals and legumes in order to supply potential adopters with high yielding plant materials;
- agricultural research will also concentrate on testing the most adequate systems of production (Fifth Five-Year Plan, 1981, pp. 65-66).

Despite the above planned positive measures and supports to the agricultural sector, figures indicate a decrease in the total

production of such major export crops as cocoa and coffee (Cameroon in Figures, 1985, p. 13; Cameroon Agriculture No. 1, 1986; p. 12; Cameroon Agriculture No. 2, 1986, pp. 13-14).

Figures 14-18 of Appendix B show the decreasing trends, at the national, provincial (UCCAO's production figures) and divisional levels (coffee and cocoa production figures of the Nun Division, one of the selected zones of the study). Since the production of Arabica coffee and cocoa started falling in the mid 1970s, many reasons have been suggested for the decline. Among the prominent ones:

- aging of farms and farmers
- drought
- pests
- price paid to producers

Recently, scientists and all those concerned with agricultural and rural development added another reason to those usually offered by officials as the main cause of the decrease of major export crops: weak and unworkable linkages between organizations involved in the development and dissemination of agricultural innovations (Kelso & Gervais, 1983; Revol, 1984).

Effective linkages between and among these subsystems are critical elements in agricultural and rural development. Farmers must have access to a continuous supply of technology that fits their social, economic, political, cultural, religious and physical environment, if they are to increase and sustain agricultural production and productivity. Researchers, on the other hand, must have continuous contact with producers so that they may be acquainted with their

production conditions. Extension agents, in this context, serve as bridges between farmers and researchers.

Major Area of Concern and Precedent Studies

Linkages between subsystems of the holistic agricultural system have been identified as a major factor in its effectiveness by many scholars, among which are the following:

1. At the World level: Axinn and Thorat (1972), Axinn (1978), Lionberger and Gwin (1982); Clausen (1984); Cerna, Coulter and Russell (1985).
2. At the Cameroonian level: Kelso and Gervais (1983); Revol (1984).

The following organizations have financed and directed studies that assessed the importance of process linkages between components of the agricultural systems: (1) The Food and Agricultural Organization "FAO" (e.g.: Revol's Evaluation of the Cameroonian Extension System, 1984); (2) The United States Agency for International Development "USAID" (e.g.: Kelso and Gervais, 1983); (3) The World Bank [e.g.: Clausen (1984); Cerna, Coulter and Russell (1985)].

The above mentioned studies indicated that in most countries of the World, researchers tend to be isolated from farmers and extension workers (Clausen, 1984, p. 32; Kelso and Gervais, 1983, p. 34; Cerna, Coulter and Russell, 1985, pp. 1, 6, 7, 165).

The isolation of researchers from farmers and extension agents does not leave room for an easy observation of the direct results and relevance of agricultural research. Also, it has been shown that at the national levels, in many priority areas, research results have not

been adequately disseminated. In many countries, weak linkages between researchers, farmers and extension workers, associated with an inadequate dissemination of innvoations, or the lack of linkages, have contributed to a slow-down of agricultural growth. Also, in those countries, the weak linkages between these subsystems have persisted as critical constraints on research and extension support services and on the promotion of agricultural and rural development in general.

So, the Cameroon Fifth Five-Year Plan (1981-1986) noted that:

> In the last twenty years, average agricultural production has hardly progressed. It is known however, that only a steady increase in productivity will in the future raise production (p. 64).

This may not happen unless research develops innovations that could be used in farms and the extension service is revitalized. The latter is said to be inefficient and slow in disseminating research materials (seeds, plants) to potential adopters. This is why officials indicated in the Fifth Five-Year Plan that:

> the delays that have been registered in agronomic research, . . . cannot be caught up with in less than a decade; . . . we cannot therefore count on making any noteworthy progress in agricultural production during this period (p. 62).

Figures 14-18 (See Appendix B) of the evolution of the production of major export crops at the National, Provincial and Divisional levels confirm the official concerns.

Can the decreases depicted by figures be attributed to the agricultural research's inability to produce positive research results

or to a lack of dissemination of research results? Or are other factors at fault? Kelso and Gervais (1983) noted that:

> There is very little evidence that any serious effort is being made to effectively utilize the Institute of Agronomic Research "IRA" information in the Ministry of Agriculture "MINAGRI" educational programs (p. 34).

This leaves people, including officials as already stated, with an impression that:

> Nothing new has been added during the last ten years in the technical package for export crops and that nothing has yet been developed for domestic food crops (Kelso and Gervais, 1983, p. 34).

It is evident that the interpretation of the Cameroonian situation is related to the weak or unworkable linkages between agricultural researchers and extension workers, and farmers. So, Kelso and Gervais (1983) stressed that:

> In reality the formal channel of communication is unworkable between an "agricultural" chief of Post and the research personnel of an "IRA" station. If an informal relationship is not developed, there is no linkage between research and extension personnel. This problem becomes a serious constraint when a research station staff cannot officially invite local extension personnel to their station for seminar or demonstration, or when a Minagri Provincial Delegate has no contact with research stations located in the same province (p. 34).

This is in contradiction with the objectives of agronomic research in Cameroon (See Chapter II) and the attributions of the national chief of the extension service (See Chapter II), and the objectives of page 64 of the Fifth Five-Year Plan.

The bureaucracy does not allow horizontal communication, thus, linkage between extension workers and researchers is missing. So, their linkages, if any, are established through their hierarchical bosses. That is why Kelso and Gervais (1983) also indicated:

> The formal channel of communication for a chief of agricultural post to obtain information from an IRA research station located nearby would be to write a letter of request which must traverse the Minagri sub-division, division, and provincial delegates up to the Minister of Agriculture, then to the Minister of Higher Education and Scientific Research and down to the Director of IRA, then to the research centre and finally to the research station (p. 33).

And the feedback will follow the same channel back to the chief of agricultural post. How long does it take from one stage to the next? Such a linkage mechanism between research and extension stifles agricultural development. Baldwin (1970) said that:

> The rate of agricultural development has been raised to be dependent on the degree of effectiveness of the various components in the rural social system, and on the degree to which they function as an integrated system (p. 7).

In fact, in rural social systems, the effectiveness of any one component is related to the effectiveness of all the other components, and the effectiveness of the linkages between and among components can be a limitation on the effectiveness of other components. The capacity of linkage between two or more components of the agricultural system will regulate the ways in which one component can effect the other and thus the overall system. Axinn (1978) reported that:

> If the linkage between the extension/education component and the production component is such that information about

> agricultural innovations does not flow with sufficient efficiency and effectiveness, then the chances are that the production component will not take advantage of these innovations. Similarly, if researchers in the research component discover a high yielding variety, resistant to present diseases and do not have sufficient linkage with the production component--either through an extension/education component or directly--to pass on to the production component the information they have produced, then their contribution to the effectiveness of the total system is lessened" (p. 177).

Because of weak linkages with other components, the effects of the research subsystem on the Cameroonian agricultural system have not been observed for the past decade. The evident results are indicated by the decrease in production of major crops (i.e. cocoa and coffee) and probably a slow down in agricultural development in general. Axinn (1978) indicated:

> The absence of adequate linkages among related but separate services often renders ineffective the independent service of each; and coordinated integrated programs are necessary to support rapid agricultural development (p. 178).

Fully aware of the aforesaid problem, Cameroonian officials have attempted among other solutions to improve and sustain linkages between subsystems of the country's agricultural system.

In its Fifth Five-Year Economic, Social and Cultural Development Plan, it was proposed that:

1. All farmers should have access to agricultural innovations . . . In the respect, a major network will be set up comprising "Service Centers" and "Support Centers." The network will use facilities provided by agricultural research stations.

2. In agronomic research, priority will be given to increasing the productivity of small holdings and emphasis will be laid on: crop research, the setting up of support research programs, and the popularization of experimental farms.

> Support Centers ought to provide a working framework for research services and an opportunity for agricultural extension services to establish an efficient link with agronomic research (pp. 64-65).

Researchers and extension workers sought avenues for cooperation and collaboration. So, on individual initiatives informal linkages have been established between them and farmers. Informal linkages are based on friendships, appointment in the same location, i.e. Province; same cultural background, i.e. same major language such as French or English. Also, Kelso and Gervais (1983) noted in their report:

> In a majority of provinces, there are good informal relations between the Minagri Provincial Delegates and the Chiefs and Directors of IRA Centers and Stations (p. 34).

Despite the informal linkages that might be developed between members of the subsystems of the agricultural system, the degree of utilizing such relations to develop effective coordination of research, extension and other activities is limited, and can do little to boost the agricultural development of a country such as Cameroon.

So, another action was taken by the Government on December 16-19, 1985. During the period, a National Seminar on Extension and Intervention in the rural area brought to Yaounde for the first time of the country's history:

- Farmers
- Agricultural extension workers (personnel from the administrative, supervisory and operational levels of the extension service)
- Agricultural researchers

- Teachers in agriculture and Administrators of the agricultural training institutions

- Administrators from the Ministry of Animal Husbandry and Fisheries

- Experts from the following International organizations:

  * Banque Africaine de Développement (BAD)
  * Bureau Pour Le Développement de la Production Agricole (BDPA)
  * Food and Agricultural Organization (FAO)
  * Caisse Centrale de Coopération Economique (CCCE)
  * Mission d' Aide et de Coopération (MAC)
  * United Nations Development Programme (UNDP)
  * United States Agency for International Development (USAID)
  * World Bank

The main objective of the seminar as stated by the Minister of Agriculture was:

> L' analyse concertée des voies, et moyens suceptibles d' améliorer l' éfficacité des interventions, en milieu rural, du Gouvernment et de ses Services, afin d' aider les agriculteurs en particulier a' Produire plus et mieux, et, ce, faisant améliorer leurs revenus. (Final Report, National Seminar on Extension and Interventions in the Rural Area, 1985, p. 7).

> To analyze alternatives by which Government interventions in rural areas could be improved, so much so that farmers would be able to produce more, and hereby increase their incomes.

Specific objectives of the seminar included:

- "Linkages between agricultural research and extension
- Farmers' needs
- Training of young farmers
- Utilization of communication media in information dissmenination
- Extension Services and their perspectives
- Needs in personnel of rural production."

Weak linkages between subsystems of the Cameroonian agricultural system, along with others, have been significant factors of the decline in the country's agricultural production for the past decade. Attempts

to strengthen the linkages are undertaken by the Government, and stakeholders of agricultural and rural development.

The FAO (1984), USAID (1983) and World Bank (1982) evaluations of the Cameroonian agricultural system, all indicated that, current linkages between agricultural researchers, extension workers, and farmers were unworkable, weak and ineffective.

Purpose of the Study

This study focused on one of the identified problems: linkages among and between subsystems involved in the development and dissemination of agricultural innovations, seeds of any increase in production and productivity. The study did not deal with all factors that have contributed to the decline in Cameroon's agricultural production for the past decade.

Because previous studies (Kelso and Gervais, 1983; Revol, 1984) indicated weak and unworkable linkages between the Institute of Agronomic Research (IRA), the Extension Service (Ministry of Agriculture and others) and the Production subsystem, the purposes of this study were to:

- assess the current formal and informal linkages among and between subystems involved in the development and dissemination of agricultural innovations;
- examine perceptions by farmers, extension agents and researchers of the linkages between the Institute of Agronomic Research "IRA," the Extension Service and the Production subsystem.

Research Questions

In the study, the author sought to answer four basic questions:

1. What are the selected personal and situational characteristics of the survey population, members of the three groups under study?

2. What is the current state of linkages among and between agricultural subsystems involved in the development and dissemination of innovations as perceived by farmers, extension agents and researchers?

3. Are there significant differences between response means for members of subgroups within each of three survey populations, identifiable by personal or situational characteristics, on selected individual perception statements and/or conditions about linkages among and between agricultural subystems involved in the development and dissemination of agricultural innovations in Carmeroon?

4. Are there significant differences between response means by population groups on selected individual perception statements and selected terms and/or conditions about linkages among and between subsystems of the Cameroonian agricultural system involved in the development and dissemination of agricultural innovations?

Theoretical Framework of the Study

The theoretical framework upon which the study was based provided the context in which it was conducted and the foundation for deriving research questions. It also served as a basis of assessing and understanding linkages among and between subsytems of a social system such as the Cameroonian agricultural system. The conceptual framework is thus derived from the Social System Theory. Loomis and Beegle (1950), Loomis (1960), Loomis and Loomis (1965), Parsons (1951, 1964, 1977) defined a social system as: "a set of interrelated units that are engaged in joint problem solving to accomplish a common goal."

The common goals of the units (subsystems) of the Cameroonian agricultural system are:

- increase production and productivity in order to ensure and sustain food self-sufficiency;
- increase in foreign exchange earning for developmental purposes;
- improvement of farmers' standards of living and rural development in general.

Katz and Kahn (1966), Havelock and Benne (1967), Axinn and Thorat (1972), Axinn (1978) indicated that, any social system could be said to have major functional components.

Katz and Kahn (1966) have identified six functional components within the complex social system. They identified each subsystem as "structures." Following are Katz and Kahn's structures:

1. "The technical or productive subsystem grows around the major type of work that gets done.
2. The maintenance subsystem insures the survival of organizational forms through the socialization of new members and the use of sanctions in rule enforcement.
3. The supportive functions of procurement and disposal are directed at transactions with agencies in the external environment.
4. The Institutional subsystem carries the critical task of relating to the larger society and of legitimizing the part played by the organization.
5. The adaptive subsystem with its research and planning activities carries on the anticipation of changing forces which may affect the organization.
6. The managerial structure which adjudicates the activities of the subsystems both in relation to one another and to external World" (p. 456).

Katz and Kahn's functional components of a social system find parallel in Havelock and Benne's "administrative structure" of the social system. They have isolated five aspects. Although there are probably more of the administrative structure of the social system, these are: "(1) education, (2) financial support, (3) legal or administrative control, (4) protection, and (5) growth or change maintenance" (p. 51).

Havelock and Benne (1967) also suggested the analogy between the functioning of a social system and the nervous system in the human body:

> The nervous system is supported, supplied, built and rebuilt, protected, and to some extent controlled by other organs and subsystems within the total body system (Havelock, 1971, p. 2-29).

The same way, the process linkage within a social system such as the Cameroonian agricultural system is supported, controlled and sustained by many groups and individuals in the greater society who are not primarily or necessarily agriculturalists.

Axinn and Thorat (1972) identified six subsystems in any typical rural social system. They are: (1) production, (2) marketing, (3) governance, (4) research, (5) education/extension, and (6) supply.

Axinn (1978) suggested that in addition to the six aforementioned functional components, a typical social system should include: (7) personal maintenance, and (8) health care.

It is not the number of functional components of a social system which is important. All have agreed on the existence of subsystems

within a social system. Similarities between subsystems will be drawn in the next chapter.

It is also admitted that each subsystem has its own set of sub-components and linkages. The system has an internal network of linkages connecting with each other subsystem, and at least one major external linkage from each particular component. The external linkages are with other units that are related in some way to that subsystem's function. Subsystems are embedded in the social, political, economic, cultural, religious and physical environment.

Loomis (1960) created a taxonomy of key concepts that are basic to social system. He identified elements and processes of the social system. He defined an element as: "one of the constituent part of some larger whole" (p. 5). Basic elements of social systems include: (1) beliefs, (2) sentiments, (3) end, goal, or objective, (4) norm, (5) status-role (position), (6) rank, (7) power, (8) sanctions, and facility.

He also indicated that:

> elements that stand in a given relation to each other at a given moment do not remain in that relation for any length of time. The processes mesh, stabilize and alter the relations between the elements through time (p. 6).

Processes of the social system, identified by Loomis (1960) are: (1) socialization, (2) social control, (3) institutionalization, (4) boundary maintenance, (5) communication, and (6) linkage. Processes are key tools through which the social system may be understood as a dynamic functioning continuity.

In addition to Loomis' outstanding contribution to the understanding of the social system, Talcott Parsons (1951, 1964, 1969, 1977) had delineated the characteristics or distinguishing attributes of the social system. They are: (1) goal achievement, (2) adaptation, (3) integration, and (4) tension management.

Elements, processes and characteristics are useful tools for studying and understanding social systems. This study will consider the agricultural system to have six major components: (1) production, (2) marketing, (3) governance, (4) research, (5) extension/education, and (6) supply.

Because of limited resources (e.g. time), the past experiences and future perspectives of the author, focus will be on process linkage between and among three subsystems of the Cameroonian agricultural system: production, research, and extension/education. Nevertheless, because of the interrelationships between agricultural subsystems, it was very difficult during the entire study to isolate research, extension/education and production subsystems from other Cameroonian agricultural subsystems. The achievements of the Cameroonian agricultural system depend on the support and protection it gets from its subsystems and from other systems within the entire Cameroonian and world community just as the achievements of the nervous system depend on the support, protection and control it gets from other organs and subsystems within the total body system.

Importance of the Study

In previous studies, linkages between subsystems of the Cameroonian agricultural system were only a minor aspect of the global problems addressed. Because of the complexity of the system, it seemed necessary to go deeper, and close to those who in fact, ensure the operational linkages between the three subsystems, which were the focus of the study: research, extension and production. The 1983 USAID study conducted by Kelso and Gervais dealt with extension workers at the administrative levels (Central and Provincial administrations). It did not go far enough (that was not the main purpose of the study) to address and meet with front line agents' (supervisory and operational levels) concerns. It also failed to get the farmers' point of view of major issues of the Cameroonian agricultural system.

The 1984 FAO report, along with the 1983 USAID's were limited to the extension component of the Cameroonian agricultural system. This study included two other subsystems, namely production and research. It went to the grassroots of the system to meet with the front line actors (farmers, agricultural monitors, researchers) of the development and dissemination of agricultural innovations in Cameroon as it attempted to:

- identify the linkage problem and bring together the problem and possible solutions;
- assess the current linkages between research, extension and production subsystems as perceived by researchers, extension workers, and farmers;
- contribute to the understanding of the current situation;

-

by

int

in

con

pre

Mai

Cam

of

pro

pro

Cam

p.

cof

coc

corp

etc.

divi

Nort

1984

- make recommendations that might help stakeholders of the Cameroonian agricultural system improve linkages between research, extension and production subsystems.

Arabica coffee and maize provided the focal points on perception by farmers, extension agents and researchers of linkages and interrelationships among and between agricultural subsystems involved in the development and dissemination of agricultural technologies.

In the following, justification of the choice of the two commodities (Arabica coffee and maize), major foci of the study will be presented.

Maize

Maize (Zea Mays L.) is an important stable cereal crop in Cameroon. It is one of the few food crops grown in all ten provinces of the country. About 550,000 tons (Ayuk Taken, 1985, p. 8) were produced in 1985 in the country and over 70% were produced in the two provinces of North-West and West, which occupy less than 7% of Cameroon's total land area of 475,000 km^2 (Cameroon in Fugures, 1985, p. 5). It is generally grown in association with other crops such as coffee (Arabica and robusta), yams, cassava, solanum, potatoes, beans, cocoyams, etc.

Most of the maize is produced by small farmers (82%); while state corporations like Societe' de Developpement du Ble' "SODEBLE," Westcorn etc. do produce 18% of the annual maize tonnage. The leading producing divisions are: (1) Mezam (73,090 tons) and Bui (50,100 tons) in the North-West, (2) Noun (49,740 tons), and Mifi (28,140 tons) [Table 91, 1984 Agricultural Census] in the West Province. Mean yields from small

farm

farm

prod

hect

vari

may

I
p
p
F

the

O
r
t
Y

zones

-
-
-

A

consum

cattle

farmers' fields are usually low (below 100t/ha) and this group of farmers accounts for more than 82% of the total maize crop being produced in the country.

According to the Fifth Five-Year Plan (1981), the low yield per hectare is attributed to the "lack of high yield species adapted to various ecological zones" (p. 66). There are concerns that the country may face serious deficits in the 1990s. Reasons being:

> Inadequate dissemination of high yielding varieties to potential adopters, and lack of storage facilities in the main producing areas: West, North-West and North Provinces (Fifth Five-Year Plan, 1981, p. 66).

In order to prevent the shortage of this important staple crop, the Government indicated that:

> One of the major problems to be tackled in priority is the research and dissemination of high-yielding varieties adapted to various ecological zones and the needs of users (Fifth Five-Year Plan, 1981, p. 66).

Research on maize is being conducted in three broad ecological zones:

- Highland (1,000 - 2,000m) zone
- Lowland (0 - 1,000m) zone
- Sudano-Sahelian zone

Attempts are made to prevent the shortage of this important crop, consumed not only by human beings, but also used as main ingredient in cattle, pigs and poultry feeds.

Arabica Coffee

Coffee (Arabica and Robusta) is the main export crop of the country. In the fiscal year 1984/85, coffee brought to Cameroon 111,201 million CFA francs of foreign exchange earnings. This amount was 22.45% of the country's total exchange earnings of 495,777 millions CFA francs (Cameroon in Figures, 1985, p. 18). With its 21,785 tons (Cameroon in Figures, 1985, p. 13), Arabica coffee's share to the country's foreign exchange earnings was 32,264 millions CFA francs (Cameroon in Figures, 1985, p. 20). These figures represented 6.6% of the total amount of foreign exchange earnings.

The return to Arabica coffee growers [10,742 millions CFA francs (Table 64, 1984 Agricultural Census, p. 83) out of the 32,264 millions CFA francs of foreign exchange earnings] represented 33.30% of the value generated by the sales of the output.

Arabica coffee is exclusively produced in the highlands of the West and North-West Provinces. In 1985, the West Province produced 14,071 tons (Cameroon Agriculture No. 2, mai-juin, 1986, p. 14) or 64.60% of the 21,785 tons national production. It is usually grown in association with other crops such as maize, cassava, fruit trees, etc. All farmers in the research area grew a multitude of crops in the same plot.

The research which gave birth to this study was conducted in the following divisions, producers of Arabica coffee.

Division	Rank by Arabica Coffee Production in the Nation
Bamboutos	2
Mifi	5
Nun	8
Menoua	1

(Source: Table 63, 1984 Agricultural Census, p. 82.)

Pretest was conducted in the Menoua Division, the first producer of Arabica coffee in the country. In general, production is decreasing as shown in the figures 14, 15, and 16 in Appendix B. According to the Fifth Five-Year Plan, 38,300 tons of Arabica coffee were expected in the fiscal year 1984/85 (p. 73), and only 21,785 tons were produced during that period (Cameroon in Figures, 1985, p. 13). Because of its important contribution to the foreign exchange earnings, officials are worried about the constant decline in production of Arabica coffee.

During the December 1985 Seminar on Extension and Interventions in Rural Areas, representatives of Arabica coffee farmers complained about the new tree innovation "Java variety" currently disseminated by the extension service in the West and North West Provinces. According to farmer representations:

> The maximum production life of a Java tree is four years. After that it decreases until plant's death. They called on researchers and extension agents, and other stakeholders to reinstate the old variety which had a production life time of twenty years (Rep. of Cameroon, 1985, p. 51).

If workable, effective linkages existed between farmers and researcher, the problem reported by the farmer would have been heard earlier. Instead, the researchers had a very different perspective:

> Although the Chief of Coffee Program at the Institute of Agronomic Research in Yaounde admitted the poor performance of the Java variety, he rather blamed farmers and extension workers for the failure. According to this high ranking official, the poor performance results from failure to follow the recommendation packages provided by his services. Farmers do not maintain their farms and grow the Java variety in association with other crops, which increases the competition for nutrients, while Java is recommended to be grown in monocultural system. He also blamed the extension workers for not trusting the researchers and their recommendations.

It just seemed that researchers' recommendations were not realistic. For instance, recommending a coffee monoculture in a densely populated areas such as the West and North West Provinces only indicated that a situational analysis was not carried out before the proposed recommendations.

This study found out that 54% of farmer respondents operated units of production ranging from 1 to 4 hectares. Only 3.1% of them had a farm of more or equal to 20 hectares. Most of them reported in the final comments that they were limited in the adoption of innovations by a shortage of land. The area is highly densely populated compared to the rest of the country. The Fifth Five-Year Plan indicated an average population density of 95.2 inhabitants per Km^2 in the region while the national average was said to be 21.0 (p. 34). den Ouden (1980, p. 42; 1981, p. 1) reported that the population density surpassed 300 inhabitants per Km^2 in certain areas of the high Bamileke plateau of the West Cameroon. Was it realistic to recommend in such an area a monoculture of a crop that only 33.30% of the fruits yielded are thrown to its producers? There was no doubt that the cultivation of coffee was in serious danger in the area where the study was conducted. There

seemed to be a general dissatisfaction among farmers, extension agents and even researchers to deal with that crop. Farmers complained about prices received for the crop. Extension agents and researchers were not very motivated because their recommendation packages were not followed by coffee growers.

The comments by the farmer, when compared with the statements by the researcher are additional evidence of the need to study the communication linkages between the three subystems.

Assumptions

The study relies on the assumption that agricultural and rural development depends upon a system of interrelated functions. As members of subsystems of the agricultural social system, farmers, suppliers of inputs (i.e. fertilizers and credit), marketers, agricultural researchers, policy makers and personnel of agricultural and extension education services are all related. Applied and basic research, efficient dissemination of agricultural innovations to potential adopters, efficient supply of inputs, marketing and strong supportive government policies are associated with expanding agricultural production, agricultural and rural development. Axinn and Thorat (1972) pointed out that the "secret ingredient" that makes agriculture of some countries scientific, efficient and highly productive is the integration of services relating to agricultural production. According to the same authors:

> the crucial input that converts the farmer from peasant to scientific business manager, that converts a nation from food deficit to food exporter, and that brings dignity to farm life,

> is the integration of research and agricultural and extension education with policy makers, suppliers, producers and marketers (p. 6).

Limitations of the Study

The study's scope and methodology give it a wide coverage of the Cameroonian agricultural system. Still, the study has built-in limitations. It covers essentially three population groups' perception of the linkages between subsystems of the Cameroonian agricultural system, that are involved in the development and dissemination of hybrid maize and/or Arabica coffee innovations.

The study's attention to the linkages between three subsystems (Research, Extension and Production) and how farmers, extension workers and researchers perceive them does not intend to establish this focus as the only or necessarily the most important problem of the Cameroonian agricultural system.

The study's focus on linkages between research, extension and production and their perception by farmers, extension workers and researchers does not constitute a complete description of the linkages between the Institute of Agronomic Research, the Agricultural Extension and Production subsystems. Farmers, extension agents, and researchers dealing with crops such as cocoa, cotton, roots and tubers may differently perceive the linkages between subsystems that are being observed in this study.

Moreover, the breadth of the study's scope inevitably raises concern over the "representativeness" of:

1. selected geographical-political areas of the study
2. selected crops (Arabica coffee and maize)
3. selected respondents (researchers, farmers and extension workers)
4. statements presented by interviewers that will be used in this study to describe the problem, explain it and make recommendations.

Definition of Terms

Adopter. One who accepts a new idea or practice.

Adoption. The act of accepting an innovation.

Belief system. An organized set of strongly held feelings, usually shared by selected others, that serve as measures for evaluating conditions and things encountered or experienced.

Change agent. Personnel of rural production, with administrative, supervisory and operational responsibility of consciously and deliberately providing useful and practical information to people, and thereby changing their attitudes or behavior. These might include agents at the national, provincial, divisional, sub-divisional, district and local levels.

Commercialization of innovation. Production, manufacturing, packaging, marketing, and distribution of a product that embodies an innovation.

Communication. The act of generating and assigning meaning by a communicator and a receiver.

Communication strategies. Means and methods of communication that people use to influence the thinking, action and feelings of others.

Development of an innovation. Process of putting a new idea (technology) in a form that is expected to meet the needs of an audience of potential adopter.

Diffusion. Process by which an innovation is communicated through channels over time among the members of a social system. This involves a sequence of events.

Dissemination. Process of communicating new information, ideas, practices to others.

Governance function. The act or process of exercising guidance, control or direction of an activity or a set of conditions.

Group. Two or more people who have special feelings of belonging together.

Farmer. A person who owns and/or operates a unit of maize and/or Arabica coffee production.

Innovation. An idea, practice, or object that is perceived as new in a given locality or by a group of people.

Input. Something needed that is delivered and used to achieve a purpose, usually on behalf of an individual or a group of people.

Integration. The act of putting diverse elements of a social system together.

Interrelationship. Mutual relations between subsystems of the whole social system.

Linkage. Cluster of channels that connect one subsystem with others in a social system and/or outside world.

Linker. A person or agency that joins two people or agencies together in a working relationship.

Linking roles. The kinds of things that a person or agency does to establish and maintain working relations between two individuals or agencies.

Mass medium. A device or mode used in putting together messages to use in the channels.

Norms. The rules or standards that develop in group associations which define what is right and proper.

Organization. Stable social system, organized for the attainment of a particular type of goal.

Perception. Personal inclinations to disregard some things, emphasize others, and putting meanings together in one's own way.

Researcher. Scientist of the Institute of Agronomic Research "IRA", involved in breeding, selecting and disseminating hybrid maize and/or Arabica coffee.

Role. Behavior pattern that individuals may exhibit to help achieve some purpose, or may be expected to follow because of the positions they hold, such as being a researcher, an agricultural extension worker or a farmer.

Social System. Set of interrelated units that are engaged in joint problem solving to accomplish a common goal.

Subsystem. Component of any size which is designed for and operates for a particular purpose, but which also must work in cooperating with other organizations to achieve larger joint objectives.

Dissemination subsystem. The organization or agency in which extension workers and others work to get innovation out to potential adopters.

Research subsystem. The one in which researchers operate to develop new knowledge.

Farmer (Production) subsystem. The one in which the potential adopter functions. This includes his family, his friends, and other social groups to which he belongs.

System. A set of components which act with and upon one another to bring about a state of balance, interdependence or wholeness.

TLU (Training and Liaison Unit). IRA research program designed to foster communication linkages between research (IRA) and extension (MINAGRI and Parastatal organizations) services, and to enhance the two-way flow of information between researchers, extension agents and farmers.

Value. Deeply held beliefs of people that serve as guides in evaluating the things they experience and become aware of.

Overview of the Dissertation

A frame of reference for the entire study is developed in Chapter I. A description of the background for the study is presented along with a statement of the research problem. The specific questions with which this research deals are stated and important terms are defined.

The theoretical basis for the study is presented in Chapter II. The discussion proceeds from a base of theory in the area of Social Systems.

The study design and procedures are described in Chapter III. Information is presented about the study survey population, the

instruments employed and the pretesting procedure followed. Data collection and analysis procedures are described.

Chapter IV contains a description of the findings based on an analysis of the data.

A summary of the study, the conclusions, and the implications for further research are presented in Chapter V.

CHAPTER II

REVIEW OF THE LITERATURE

This study intended to assess:

- The current formal and/or informal linkages between the Institute of Agronomic Research, the Extension Service and the Farmer Subsystem.
- The perceptions by farmers, extension workers and researchers of the current linkages between the aforementioned subsystems.

The theoretical foundation for this study emerged from a review of literature in the fields of social systems.

Loomis and Beegle (1950) believed that:

> Social System approach supplies an approach more adequate than others in meeting the demands of science, especially in regard to understanding, prediction, and control (p. 3).

In fact, many studies have shown that development and dissemination of (agricultural) innovations occur within a social system. It constitutes the limits within which a developed innovation diffuses.

Following are the main sections of the Chapter:

- Social Systems
- The Agricultural Social System
- Agricultural Innovation Development and Dissemination
- The Cameroonian Agricultural System
- Linkages between agricultural researchers, extension workers and farmers
- Summary

Social Systems

One generally thinks of social systems on two different levels, which do not often require differentiation. Loomis and Beegle (1950) indicated that the two levels are:

> First, "social system may be considered as concrete, or cooperative social structure such as a Farmer Cooperative (i.e. UCCAO), an extension service, an agricultural research organization, an agricultural training centre, . . . These organizations are composed of persons who interact more with members than with non-members when operating to attain their objectives"
>
> Second, "social system may be viewed as abstract, or one in which patterns of relationships prevail from generation to generation and from region to region. Viewed in this way, social systems consisting of elements or patterns that persist do not require that specific persons be considered as parts of the system" (p. 4).

The second concept of social system calls upon the following examples. A U.S.A. researcher from Michigan State University Experiment Station, can quite easily fit into or adjust to the research system in different parts of the world (i.e. Cameroon). A Cameroonian extension worker, posted in one division, often is transferred to other localities. They often fit into or adjust to their new positions.

Organizational theorists and social scientists increasingly tend to use a systems model in theorizing about the relationship of parts, one to another, and to the functioning of the whole (Getzels, Lipham, & Campbell, 1968). It is believed that the approach will help in understanding how subsystems of the Cameroonian agricultural system are interrelated, and how the whole functions.

Hicks (1972) defined a system as a:

> set of interrelated, interdependent, interactive elements. It is an organized or complex whole; a combination of this forming a unitary whole (p. 46).

This definition stressed the complexity of the whole system, despite the mutual relationships, mutual dependence of its elements. Those emphasizing the characteristics of the social system (mutual relationships, mutual dependence and mutual interaction) assumed that the presence or the value of one variable in the system imposed a degree of constraint on the range of possible variations in other parts of the system.

Griffiths (1964), Bertrand (1967), Havelock (1971) and Parsons (1951, 1964, 1969, 1977) indicated their commitment to key points, making up a social system: "Interdependence, interrelationships, wholeness, linkage." Griffiths (1964) considered a system to be " . . . a complex set of elements in interaction" (p. 116).

The complexity of interaction between elements of a system often renders evaluations difficult. Bertrand (1967) stated that:

> Certain collectives are systems whose parts are interdependent and which, as units, are in turn interlinked with one another through mutual dependencies (p. 25).

Bertrand's definition raised some issues: (1) What should the degree of dependency between system parts be in order to keep the whole system in equilibrium? (2) Can components of a system be interlinked without being dependent?

Havelock (1971) added the holistic dimension, the sense of wholeness and equilibrium to Bertrand's definition of the system. According to Havelock (1971):

> A system may be thought of merely as a set of components which act with and upon one another to bring about a state of balance, interdependence, or wholeness (p. 2-2).

So, a system cannot be understood as long as it is not perceived in all its aspects. According to those definitions, the Cameroonian agricultural system cannot be understood as long as it is not seen in the social, cultural, economic, physical and religious environment of the country.

Parsons (1964) indicated that a holistic system ought to be observed and evaluated in its own environment. Parson's assertion got support from Axinn and Thorat (1972) and Axinn (1978).

Parsons (1964) thus said:

> System is the concept that refers both to a complex of interdependencies between parts, components, and processes that involve discernable regularities of relationships, and to a similar type of interdependency between such a complex and its surrounding environment (p. 177).

Parsons (1977) strongly believed that:

> System is the concept around which all sophisticated theory in the conceptually generalizing disciplines is and must be organized (p. 177).

Scholars of social systems supported Parson's assertion because they thought that any regularity of relationships could be more adequately understood if the whole complex of multiple

interdependencies of which it formed part were taken into account. Bennis, et al. (1966) stated that:

> It is helpful to visualize a system by drawing a large circle. We place elements, parts, variables inside the circle as the components, and draw lines among the components. Outside the circle is the environment, where we place all other factors which impinge upon the system (p. 203).

For purposes of description and study, systems are classified in three main categories: incomplete or partially complete systems, dynamic systems and open/close systems.

Incomplete or Partially Complete Systems

Earlier, it was mentioned that interdependency or state of balance was a key element in social systems. In fact, that degree within systems is relative. Havelock (1971) remarked that:

> There is tremendous variance among systems in the amount of interdependence, and there is variance among components within a system on the amount of interdependence (p. 2-3).

Thus, one may talk about "loosely structured" systems and "tightly structured" systems. Certain system components can be described as only partially or loosely interdependent so that the resultant state of balance is weak or at least potentially unstable. The system may also include unpredictable components which appear and disappear either at random or as they may be required by the other components. When these unpredictable components are not present, the system is incomplete and may not be able to function as a system. The

degr

refe

Dynam

"dyna

more

syste

Figure

The

fixed pa

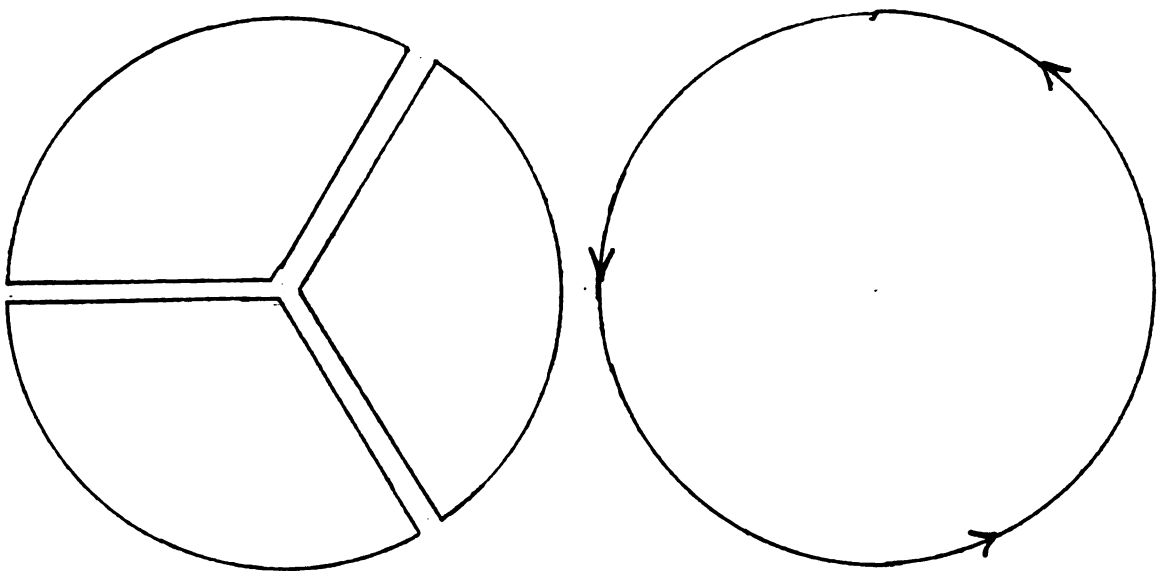
push and

each othe

degree of interdependency existing among components of a system is referred to as the "integrity" of the system.

Dynamic and Static Systems

It seems important to make a distinction between "static" and "dynamic" systems. In static systems, components simply exist in a more or less fixed relationship to one another. In contrast, dynamic system components act upon one another.



Dynamic System Static System

Figure 1: Dynamic and Static Systems.

The components of a static system are related to one another in fixed patterns. The components of a dynamic system, on the other hand, push and shove at one another, displace each other, or force changes in each other in a pattern of action and reaction that maintains a dynamic

equilibrium or balance of forces. In fact, most systems in the real world have both static and dynamic properties.

Open Systems

All of the systems that can be identified and examined in the real world are open systems, which contain both dynamic and static components which are themselves open subsystems.

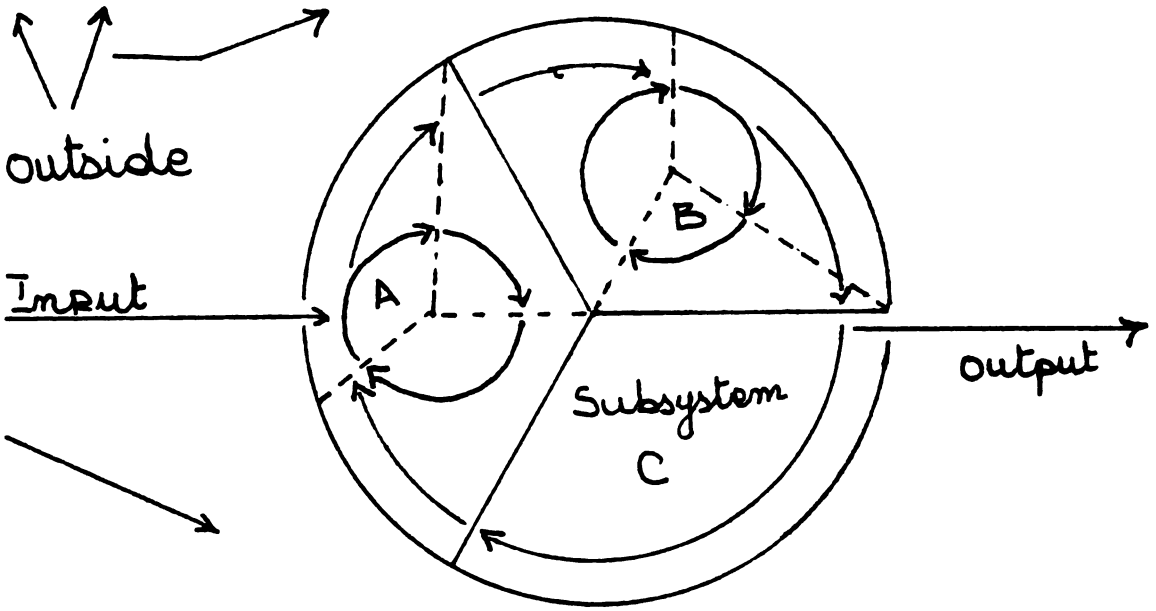


Figure 2: An Open System with Subsystem Components.

Parsons (1977) said that:

> A social system is inherently an open system engaged in processes of interchange (or "input-output relations") with its environment, as well as consisting of interchange among its internal units. Regarding it as an open system is, from some viewpoints, regarding it as part of, i.e., a subsystem of--one or more super ordinate systems. In this sense, it is interdependent with the other parts of the more comprehensive system or systems and, hence, partly dependent on them for essential inputs (p. 180).

Figure 2 shows that Subsystem A receives input from outside which is translated and retranslated until it gets to Subsystem B. In B some output occurs in addition to further translation into Subystem C. Finally , Subsystem A gets feedback from C.

Loomis and Loomis (1965) argued that:

> All social systems . . ., display evidence of openness and gaps in connections, degrees of relative autonomy of actions or groups or larger systems (p. xxiii).

So, in the real world, systems are open and bear the characteristics of dynamic and static systems.

Loomis and Beegle (1950), Loomis (1960) stressed that systems are made of elements: the latter constitute with processes, the working components, the parts and articulating functions of the social system.

> Whatever system one is viewing, . . ., or any of its component subsystems, the elements that constitute it as a social system and the processes that articulate it remain the same (Loomis, 1960, p. 5).

Parsons (1951, 1964, 1969, 1977), Loomis (1960), Loomis and Beegle (1950), Loomis and Loomis (1965) have been extremely valuable in identifying the characteristics, elements, and processes of social systems.

Characteristics of Social Systems

There are four distinguishing attributes of the social systems. Goal Attainment. It is the process whereby systems seek to achieve important objectives that are essential to their maintenance and/or growth. Parsons' (1969) said that:

> As a formal analytical point of reference, primacy of orientation to the attainment of a specific goal is as the defining characteristic of an organization (p. 75).

Goal attainment has serious implications for the openness, the external relations, and the internal structure of the social system. In the attainment of their goals, systems produce things (outputs) which can be utilized in some way by another system. Any output of one system is a potential input for another. Sometimes outputs are intended to be inputs to others. Sometimes they are not.

In this study it is assumed that agricultural research station's output (i.e., new varieties of maize and/or Arabica coffee) are inputs to the extension service. The latter's output become inputs to the farmers. Feedback from farmers are inputs to extension agents and researchers.

Adaptation. It involves the adjustment to changes in the environment of the system that is conducive to goal attainment.

Integration. This involves the coordination of actions that takes place within the system so as to optimize goal attainment. Axinn and Thorat (1972) stressed the importance of an integration of the agricultural system if it is to feed the family, the community, the nation and the world. They said:

> Many inputs usually are listed as necessary for high productivity in the agricultural sector. . . but these inputs alone cannot bring to a nation an agriculture in which it can take pride and where those engaged in agriculture find dignity in their work . . .; the additional input, the crucial input . . . is the integration of research, and education/extension with policy making body, with supply, with production and with marketing (p. 5-6).

that

subs

inte

of

prod

inte

inpu

from

othe

(FON

abov

agri

Tens

intr

func

by w

to

actic

Th
se
fo
th

I

Socia

Integration does not mean fusion. It mainly refers to problems that the country and individuals face in putting all agricultural subsystems together so a recommended agricultural policy will work as intended.

In Cameroon today, there is a general consensus that integration of agricultural subsystems have been neglected. Cameroonian farmers produce not only for family needs but also for national and international markets. They are more than ever dependent on off-farm inputs over which they have little or no control. They get pesticides from crop protection brigades, fertilizers from the cooperatives or other sources, and credit from National Funds for Rural Development (FONADER) if qualified. There is little or no coordination among the above mentioned subsystems along with the agricultural research, the agricultural extension and education and the marketing subsystems.

Tension Management. This relates to the concern for solving intrasystem problems that may impede or prohibit goal attainment. This function is closely related to the communication of sentiment (process by which members of a social system may, through symbols, be motivated to achieve goals, to conform to norms, and to carry out systematic action) within the social system. Loomis (1960) indicated that:

> The importance of tension management and the communication of sentiments for integration, for cooperation and solidarity, and for commitment to group ends and willingness to sacrifice for them can scarcely be overestimated (p. 15).

Loomis (1960) created a taxonomy of key concepts that are basic to social system analysis. His outstanding contribution to the field

involves the identification of key elements and processes of social systems.

Basic Elements of Social Systems

An element is the constituent part of some larger whole. It is the unit of analysis employed in explaining interaction within the social systems.

> Elements that stand in a given relation to each other at a given moment do not remain in that relation for any length of time. The processes mesh, stabilize, and alter the relations between the elements through time; they are the tools through which the social system may be understood as a dynamic functioning continuity (Loomis & Loomis, 1965, p. 3).

Following are nine elements identified by Loomis (1960).

Ends and Objectives. They are goals toward which the system is working. They are also changes which members of the system expect to accomplish through the operation of the system.

Norms. Gould and Kolb (1964) defined norm as:

> A standard shared by the members of a social group to which the members are expected to conform, and conformity to which is enforced by positive and negative sanctions (p. 472).

A norm is said to be the essence of a group. It is what gives a group its identity. It is a broad and general concept which can be used to describe any attitude, belief, value, or mode of behavior which is held in common by the members of the group.

Norms are not always facilitators, but also may function, to a large extent, as barriers which restrict behavior and allow only a very

limited range of inputs to pass into the system. In fact, Havelock (1971) noted that:

> Most norms typically act as barriers restraining or inhibiting inputs from intruding on a social system (p. 2-25).

Attitudes, values, thought patterns, and even language are examples of social norms which bind together some people and set them apart from others. They make it easier for communication and linkages to take place within a system, and by the same token, they make it less easy for communication and linkages to take place between (sub) systems.

Since a norm is the essence of a group, it is the element that gives it identity. The extension service in Cameroon might be an example. During training and sworn-in ceremonies, extension agents are provided with the following beliefs/norms: (1) They should all be in the office at the same time (8:00 a.m.). "Nonetheless, some report in earlier or later, depending on the daily schedule" (2) They should provide service to farmers (e.g. demonstrate or provide them with agricultural innovations). (3) This service should carter farmer's needs. (4) They should work collectively, coordinating their separate behaviors according to established routines. (5) They should collaborate with modern and traditional officials.

Roles. Behavior patterns that individuals may exhibit to help achieve some purpose, or may be expected to follow in a given situation because of the positions they hold, such as a researcher, an agricultural change agent, or a farmer. The rationalization and separation of

functions that takes place in innovation development, and dissemination system and adoption systems is generally accompanied by a designation and separation of roles. That is, functions, as they become clearly defined, are assigned to separate individuals. Parsons and Shils (1951) defined social systems largely in terms of roles. According to them:

> A social system is a system of the actions of individuals, the principle units of which are roles and constellations of roles. It is a system of differentiated actions, organized into a system of differentiated roles (p. 190-191).

Roles are, in fact, complex norms representing as they do the normalization and standardization of functions. They are maintained by shared expectations about background, training and characteristics of the role holder, and the manner in which the role is to be acted.

In studying innovation development, dissemination and adoption, only certain kinds of roles are going to be of central concern. Specifically, those linking roles related to the production, processing and consumption of the innovation. For example, Lionberger and Gwin (1982) have identified the following linking roles or duties of extension workers:

> Information carrier, friendly listener, motivator, process facilitator, agency linker, ability builder, skills teacher, work helper, program administrator, group worker, fence keeper, promotor, local leader, counselor, protector and institution builder (p. 92-99).

An extensive review of literature by Alemu Beeftu (1985) revealed 27 major roles of change agents:

> Administrator, activist, advocate, advisor/guide, analyzer/ interpreter, applied researcher, broker, consultant, coordinator, dealing with resistance, determining change objectives, developer, educator, evaluator, facilitator, informer, innovator/starter/initiator, legitimizer, maintainer of change, model, motivator, organizer, planner, problem identifier or diagnostician, relationship builder, stimulator and therapist (p. 74-75).

Alemu's list deals not only with extension worker's role but with change agents in general. Nevertheless, there are similarities. The above mentioned roles, as all roles in a social system, are refilled periodically as role holders leave the system, die or change roles.

The type of role which is of very special concern in this study, is namely the role of "linker," whether it is for researcher, extension worker or farmer. As applied research and development, practice, and consumer roles and subsystems become more and more firmly established in institutional molds, there appears to be a greater need for specialized roles which link these (sub) systems to one another.

Power. As the term is used here, refers to the capacity to control others, even if they seek to resist such control. It has many components which are often classified as authoritative and non-authoritative control.

Authority is the right, as determined by the members of the social system, to control the actions of others. Authority, always implies some degree of institutionalization. In formal organizations such as the research system or the extension system, authority is usually specified in the bylaws in terms of roles (duties) and responsibilities of the various officers. In general, authority in the social systems is hierarchical. Non-authoritative power is variously

categorized by social scientists. Although difficult to differentiate, there are two important types: unlegitimized coercion and voluntary influence. Unlegitimized coercion implies either physical or mental control or both. It is involved when one actor originates and another actor responds or obeys unwillingly.

Voluntary influence may be regarded as control over others which is not built into the authority component of the status but results from the willingness of the subordinate to become involved by the superordinate. The capacity to influence may reside in the individual actor and his/her facilities, but it does not reside in the status. Influence may be based upon such factors as skill in human relations, superior knowledge of the social system, wealth or reputation, and outstanding qualities. Influence is manifested in many ways and is essentially non-authoritarian.

Sanction. It refers to the rewards and penalties meted out by members of a social system as a device for inducing conformity to its norms and objectives. Sanction can be either positive (rewards) or negative (penalties) and may be manifested in the potential satisfaction giving or depriving mechanism at the disposal of the members. Rewards are given to members of the group for a job well done or for compliance with the norms. Punishments are given to members of the social system for infraction of the norms. Penalties may be the deprivation of rewards or actual acts of punishment.

Rank. Official or unofficial standing of the individual within the social system, in relation to the other individuals. It is based on one of several criteria. It always has reference to a specific

individual, system, or subsystem. It is affected by membership in social systems. Rank at one time or another is the product of evaluation process.

Belief. An organized set of strongly held feelings usually shared by selected others, that serve as measures for evaluating conditions and things encountered or experience. "Belief is that aspect of human action considered central to knowing" (Loomis, 1960, p. 11). Belief may be scientifically proven or not. The significance of beliefs for the social scientist is not always determined by the objective truth or falsity of the beliefs.

Perception is an aspect of the belief system. In fact, what actually is and what people perceive it to be are by no means the same. Both place constraints on what people do. The importance of studying what the situation really is on Cameroon's agricultural system is obvious. But the influence of what people think the situation is bears some explanation. Lionberger and Gwin (1982) contended that "what a person perceives a situation to be is real in its consequences" (p. 14). It has been observed by sociologists that people act mostly on their own definition of a situation. In Cameroon, like in many other countries, few farmers still perceive chemical fertilizers to be soil poisons.

Sentiments.

> They are closely related to beliefs and combined with it in the empirical world and yet analytically separate in the social system (Loomis, 1960, p. 13).

Beliefs represent what people know about the world and around them, no matter how they know it; sentiments, on the other hand, are primarily expressive and represent what people feel about--no matter why they feel it. Loomis (1960) considered sentiment to be "the chief element articulated in the internal pattern of a social system" (p. 13). Sentiments and beliefs are highly instrumental in determining the choice of means and ends.

Facilities. They are means or resources used to attain the ends of the social system. They have great importance in the analysis of economic and social development. In the study of the social systems, emphasis is upon the relation of the facilities to their utilization, not upon the items as facilities per se.

Scientists often focus upon the members' utilization of facilities and the changes in the system as the facilities and technology change. Regardless of the intrinsic nature of the facility, it is its use, not its intrinsic qualities which determines its significance to the social system.

As indicated above, elements along with processes constitute the working components, the parts and articulating functions of the social system.

Basic Processes of Social Systems

Hall (1977) indicated that processes of social systems "are related to major ways in which an organization moves from one state to the next" (p. 201). There are six processes described in this section: Socialization. The process through which the social and cultural

heritage is transmitted. Through the process, each new member learns the skills, beliefs, ends, and norms of the social system in which he is accepted. He/she internalizes the interaction and expectancy patterns which make status-roles and the elements of power and rank operative in the system. According to Merton quoted by Loomis (1960):

> Socialization involves the acquisition of attitudes and values, of skills and behavior patterns making up social roles established in the social structure (pp. 34-35).

Social Control. Process by which deviance is either eliminated or somehow made compatible with the functioning of the social groups. Of the elements and processes which have been discussed those most closely related to social control are norms, power, and sanctions.

Institutionalization. Process through which organizations are given structure and social action and interaction are made predictable. It is said to be the:

> global master process which patterns beliefs, rank, sanction, sentiment through the elements and their articulating processes as well as the master processes" (Loomis, 1960, p. 36).

It may involve all the other elements and processes. Of particular importance in institutionalization are the elements norms, and sentiments.

Boundary Maintenance. Process whereby the identity of the social system is preserved and the characteristic interaction pattern maintained.

Members of a social system tend to respond to internal or external threats by an increased evaluation of the process of boundary

maintenance and the activities devoted to it. According to Loomis (1960):

> Increased boundary maintenance may be achieved by assigning a higher primacy or evolution to the activities characteristic of the external pattern, such as the pursuit of a broadened goal, in which case the elements ends, power and rank may be expected to increase in primacy (p. 31).

The various categories into which boundary maintenance devices fall suggest their wide array. They may be physical, social, expressed in group contraction/expansion.

Communication. This is the process by which information, decisions, and directives are transmitted among actors and the ways in which knowledge, opinions, and attitudes are formed or modified by interaction.

Ennis (1961) argued that any communication activity should be viewed as a social system. He also maintained that information flow could be analyzed as a system. Orr, et al. (1964) noted ways in which information flow as a system can be useful in this study:

- to identify critical operations and activities where limited capacity may disrupt the functioning of whole component or to the entire social system;
- to determine where agricultural innovations may be advantageous and to credit their dysfunctional consequences on potential users;
- to assess mechanisms for coordinating component operations and activities; and
- to provide holistic perspective for examining the problems of communication (p. 1136).

Loomis (1960) indicated that:

> Unquestionably the incredible network of social system . . . is dependent upon the persistence of communication. Without it the life-line of interaction would be lost and the systems would quickly collapse (p. 31).

There is no doubt that understanding the dynamics of any given social system calls for a knowledge of the communication media, channels, and barriers within the system. Communication is said to be the primary process basic to the articulations of each of the elements of a social system and to the unity of the whole.

Linkage. According to Loomis and Loomis (1965):

> Linkage is the process whereby the elements of at least two social systems come to be articulated so that in some ways and on some occasions they may be viewed as a single system (p. 16).

So, systematic linkage relates members of at least two (sub) systems.

Betrand (1967) defined linkage as "the process whereby one social system establishes a bond or tie with another system" (p. 33). The process of one system establishing a bond or tie with another system may result in the formation of larger systems through such linkages.

Linkage is in many respects a corollary of boundary maintenance. Whereas the process of boundary maintenance refers to the limits set upon intersystem contact, the process of systemic linkage refers to the organizational arrangements for (sub) system interdependencies. Loomis (1960) said that:

> Without boundary maintenance, social groups would be indistinguishable among a mass of individuals and interaction

> would be haphazard; without systemic linkage an unthinkable parochialism would deny to groups any form of contact outside their own boundaries (p. 33).

In this respect, other social scientists (i.e.: Axinn & Thorat, 1972) defined linkage as:

> Clusters of channels that connect one major component with other major components in a social system/outside world (p. 12).

In fact, an understanding of linkage systems, both within and between systems, is important to the understanding of the system itself. According to Loomis (1960):

> To understand a social system it is always necessary to know how it is linked to other systems and to the larger system of which it is part. To understand social change, it is necessary to understand how agents of such change link themselves to target systems which are changed (p. 34).

Thus, to understand the Cameroonian agricultural system, it is absolutely necessary to know how different subsystems (research, extension/education, marketing, production, governance, and supply) are linked to each other and to the system as a whole. As said earlier, social systems are rarely closed, for they overlap and interlock with many other systems in their environment. Hicks (1972) and Hall (1977) mentioned that an organization does not exist in a vacuum. The environmental factors affect an organization. They help it attain its goals or get it in the way. They set limits and provide opportunities.

The interaction between organizations and their environment is not a one-way action. Not only does environment affect the social system,

but systems also can and do bring about change in the environment. Often it is the very reason for their existence, as in the case of the research and extension systems. In attempting to accomplish its mission of bringing about change in the environment, it is important to consider the process of linkage. Hicks (1972) stressed that the long life of a system depends upon how it can make an orderly structure of its complex relationships. These relationships include those both external and internal to the organization. As seen above, characteristics, elements and processes constitute the working components and articulating functions of the social system. They are helpful in illuminating the social nature, the interdependent nature of system activities.

Social system analysis in general:

> suggests how individuals/subsystems can work together and coordinate their separate activities as part of a larger functioning organism/system which has sensing and self-steering features analogous to those of the individual person/system (Havelock, 1973, p. 2-30).

Social scientists have realized that certain distortions are inherent to social system theory. Following are the identified distortions:

Real Social Systems are Open Systems

The social system approach may give the impression that social systems are self-contained, but just as individuals are dependent on a larger environment for resources, so too are social systems. Hence,

they are always open systems, thoroughly dependent upon and interrelated with a multiple-system environment.

Social Systems May Not See Themselves as Systems

The human being, like any living organism, is a true system by nature. The brain, the complex neutral connections, the internal organs, muscles, skeleton, and skin, from one integrated unit, evolved and refined over millions of years. The same cannot be said in any respect of organizations. They seem to be analogous to individual human systems in the same respects but the "organic unity of social organizations" is debatable. Havelock (1973) said:

> Any social scientist may posit the existence of systems, but to a great extent social systems exist only in the minds of their members (p. 2-30).

Systems Serve People As Well As Systems

Social organizations come into existence and survive for many reasons and to achieve many purposes, but chief among them should be the fulfillment of individual human needs. Agricultural research and agricultural extension obviously have a common ultimate objective: increase in the productivity of agricultural producers, with the evident corollary of the improvement of their standards of living.

This study, however, showed that with time, there have been differences between individuals, members of the above subsystems, on the attainment of formally stated objectives.

Social Systems are Multi-Purpose

Related to the above point is another fact that most social systems are multi-purpose. Different members of a system derive different types of benefits and any individual member is likely to derive a variety of benefits. It is impossible to say that it exists solely for the benefit of one particular group or that it serves one particular function. This multi-purpose aspect of all social systems is especially confusing for those who attempt to talk about only one function, as it is in the case of innovation development and dissemination, principal concern of this study.

A Social System-Level Analysis Does Not Adequately Depict Inter-System Phenomena

The formal organizations (i.e. The Institute of Agronomic Research and the Extension Service) are only parts of the greater picture as far as innovation development and dissemination is concerned. Havelock (1973) said: "It is impossible to understand organizations apart from inter-organizational relationships" (p. 2-32). This is said to be one of the weaknesses of social systems theory.

Within the system, different roles are played at different positions. Some of the roles, as already identified, include applied research-developer and basic researcher, linker and user. It is assumed that each of the above roles is likely to be represented in the society at large by separate organizational and institutional forms. The implication is that innovation development and dissemination is an inter-organizational and inter-systemic problem.

For those who are concerned with change, Chin (1962) has discussed the importance of this level of analysis. He said:

> The intersystem model leads us to examine the interdependent dynamics of interaction both within and between the units. We object to the premature and unnecessary assumption that the units always form a single system. We may be misled into a utopian analysis of conflict, change-agent relations to clients--if we neglect system differences. But an intersystem model provides a tool for diagnosis that retains the virtues of system analysis, adds the advantage of clarity, and furthers our diagnosis of the influence of various connectives, conjunctive and disjunctive on the two systems (Chin, in Bennis et al., 1962, p. 208).

Social system analysis bears distortions which ought to be kept in mind when used, as in this study, to understand, explain, predict and control facts like other sciences.

In the coming section, there will be an attempt to apply the social system theory to the agricultural system and more specifically to the Cameroonian Agricultural System.

The Agricultural System

Axinn and Thorat (1972) and Axinn (1978) indicated that:

> Any social system can be said to have six major functional components: production, supply, marketing, governance, research and extension/education. Each component has sub-system(s) within it, with its own set of sub-component(s) and linkages. Each component also has linkages with outside systems. These outside linkages are with other units that are related in some way to that component's function (p. 9, 17).

Each of the functional components is related to the others through an infrastructure of linkages. Further, these functions and linkage-infrastructure which connects them and relates them to the outside

world, and are always in a social/political/economic/cultural/religious/physical context, which sets the pace and the style of all the actions of the separate components and the interactions between them. Figure 3 (p. 58) illustrates the agricultural social system in its environment according to Axinn and Thorat (1972) and Axinn's (1978) definitions cited previously.

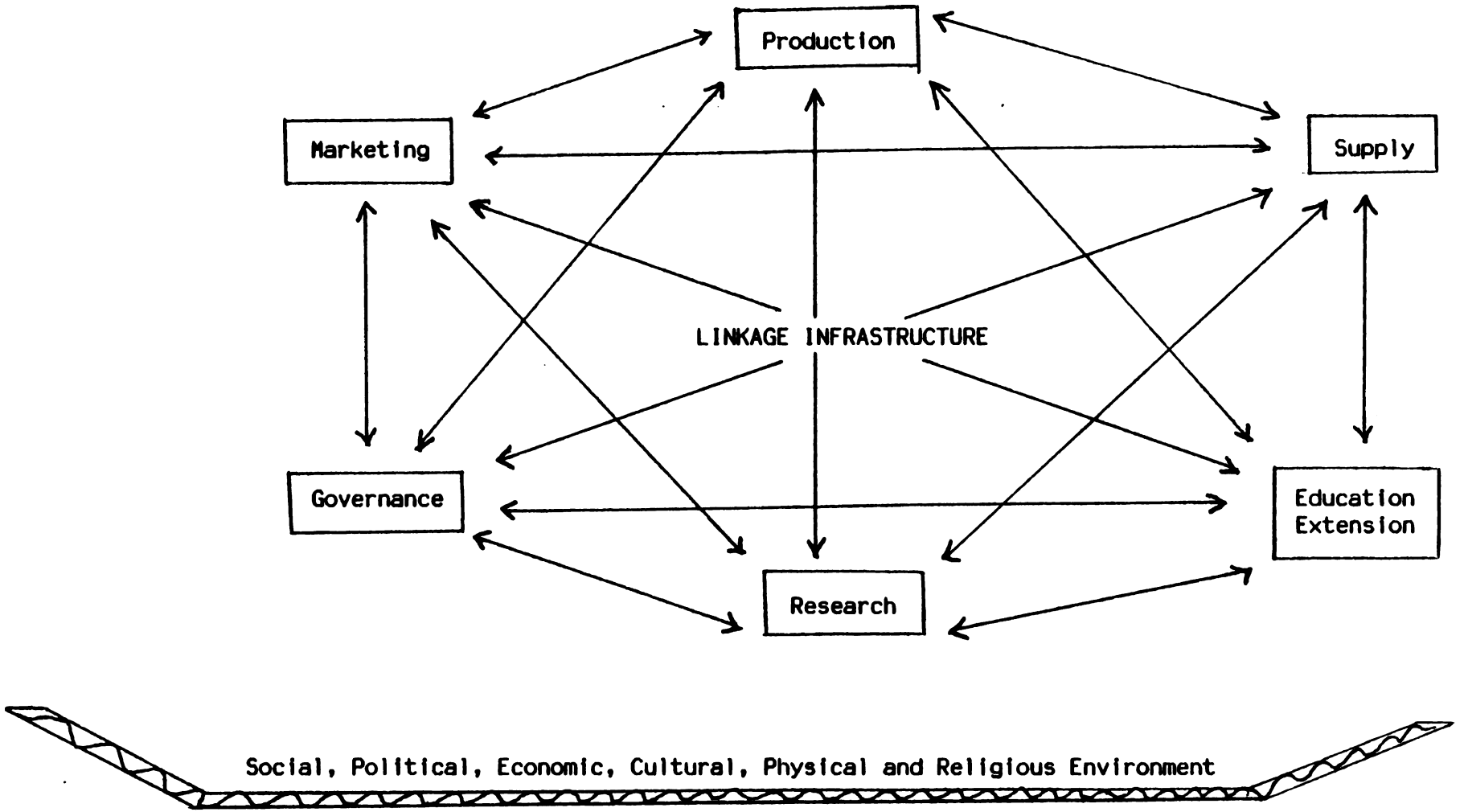


Figure 3. Agricultural System in its Environment
(Adapted from Axinn and Thorat, 1972, p. 9 and Axinn, 1978, p. 17)

Like in any social system, a change in any one component, or in any linkage affects all of the other components and linkages. Axinn's functional components of the social system find parallel in Havelock and Benne's "administrative structure" and Katz and Kahn's delineation of six types of structure which act as functional and subsystems within the complex organization. Havelock and Benne (1967) claimed that innovation development and dissemination was supported and controlled by many groups and individuals in the greater society. Such groups and individuals, and the systems of which they are a part, have been designated collectively as the "administrative" structure of innovation development and dissemination. They are said to have isolated five aspects:

> although there are probably more--of this administrative backup of innovation development and dissemination. These are (1) education, (2) financial support, (3) legal or administrative control, (4) protection, and (5) growth or change maintenance (p. 51).

Katz and Kahn (1966) delineated six types of social structure which act as interrelated functional subsystems within the complex organization:

> As organizations develop the various functions of carrying on the work of the system, insuring maintenance of the structure, obtaining environmental support, adapting to environmental change, and of coordinating and controlling activities, they become differentiated into appropriate subsystems. Thus the (1) technical or productive subsystem grows around the major type of work that gets done. The (2) maintenance subsystem ensures the survival of organizational forms through the socialization of new members and the use of penalties and rewards in rule enforcement. The supportive function of (3) procurement and disposal are directed at transactions with agencies in the external enviornment. The most critical supportive task or relating to the larger society and of

> legitimizing the part played by the organization is played by (4) institutional subsystem. The anticipation of changing forces which may affect the organization is carried out by an (5) adaptive subsystem with its research and planning activities. Finally, cutting across all subsystems is the (6) managerial structure which adjudicates the activities of the subsystem both in relation to one another and to external world (p. 456).

There is a direct correspondence between several of the proposed structures of the social system in these three models. From the perspective of this study, the central and crucial task of organizations is to ensure the flow of information from the research stations to potential users (farmers).

Axinn's "production" subsystem is analogous to Katz and Kahn's "technical or productive" subsystem. In each case the other subsystems operate to support, control and maintain the major function of the organizational system, and it is not surprising to find parallel functions for these subsystems as described in the three models. For example, Katz and Kahn's "maintenance" is similar in meaning to "education structure" (Havelock & Benne) and to "extension/education" as used by Axinn and Thorat. Also, "managerial structure" (Katz & Kahn) is equivalent to "legal and administrative control" (Havelock & Benne) and "governance" (Axinn and Thorat). Figure 4 below shows the parallels between the three models.

No.	Axinn & Thorat (1972)	Havelock & Benne (1967)	Katz & Kahn (1966)
1	Extension/Education	Education Structure	Maintenance
2	Governance	Legal and Administrative Control	Managerial Structure
3	Supply/Marketing	Financial Support	Procurement and Disposal
4	Research	Change Maintenance	Adaptive Subsystem
5	Production	Growth	Technical or Productive Sub-System
6	-----	Protection	Institutional Subsystem

Figure 4. Parallel between models of social systems.

In Axinn and Thorat's model, "protection" is insured by the "governance" subsystem. Their model depicts here six major functional components, related to each other through a linkage infrastructure. Following are the components:

Production. As related to agriculture involves land, labor, capital, management and technology. The component includes communities of farmers.

Supply. For agricultural production, it includes individuals, organizations and agencies that provide the production components its inputs (seeds, fertilizers, credit, and other) that make it possible for supplies to flow.

Marketing. It includes the individuals, organizations (i.e.: UCCAO) and agencies that receive the product from the production subsystem and either store, transport, process, export or otherwise consume it.

Governance. It is the function that provides for law and order, quality control, administration, and regulation of activity within and transactions among the other components.

Research. It is the component that studies the operations of others, along with possible alternative operations, and generates innovations that will be useful to the system.

Extension/Education. It is the subsystem that trains personnel for all other components and usually also ensures the flow of information among the other components.

Benor et al. (1984), endorsing the models of social systems developed by Katz and Kahn (1966), Havelock and Benne (1967), and Axinn and Thorat (1972) said that:

> Extension/education and research services, input supply and credit arrangement, marketing structures and price systems, as well as communication and transport networks, are basic features of infrastructure required for agricultural development. Although the private sector often has an important role in the development of such facilities, policy guidelines on infrastructural development and operation are the responsibility of the governance (p. 5).

As agricultural development proceeds as in Cameroon today, the number of specialized subsystems increase and the institutions that provide services tend to become more highly specialized. Each component, identified in the models, has a subsystem with its own set of sub-components and linkages. Each component also has linkages with

outside systems. These outside linkages are with other units that are related in some way to that component function. An example will be the extension which has infinite linkages with formal education. The latter contributes to the staff development (recruitment, pre-service training, in-service training, etc.) for extension services.

Linkers are said to be either individuals or organizations. In this study the linker is considered to be the extension service (organization), but in organization studies, individuals making up the organization are often the target populations. Hord (1986) said:

> Basic to the study of organizations and their activities is the study of the individuals who make up the group. Individuals are: joined together in groups, small and large, and they interact in these groups both as individuals, and as groups . . .An individual cannot exist in isolation, but only in relation to other individuals and groups (p. 22).

This justifies the study of researchers, extension workers and farmers to assess the current linkages and interrelationships among organizations involved in the development and diffusion of agricultural innovations in Cameroon.

Axinn and Thorat (1972) indicated that:

> Linkages are made up of such individual channels as . . . radio transmitters and receivers, television transmitters and receivers, press, publications, and all kinds of networks of interpersonal relationships (p. 8).

It is through linkage that transactions between one subsystem and another take place. Each linkage has a certain capacity (quantity of transactions over time), a certain fidelity (quality) and a certain memory or recycling capability.

In Chapter I, it was indicated that, in Cameroon like other less developed nations, no effective link existed between agricultural extension and agricultural research. This situation obviously is detrimental to the effectiveness of both. In fact, Benor et al. (1984) noted that:

> Without a close link with extension and feedback from the field, research becomes excessively academic and does not relate to farmers' real problems. This leads researchers to focus on technically optimal situations rather than on the economics encountered under practical field conditions. Consequently, the recommendations of the service are often inappropriate to the farmers' needs and their technical and financial capabilities. Indeed without a continuous flow of new practical recommendations suited to those needs, the extension service rapidly runs out of anything to extend (p. 20).

Agricultural Innovation Development and Dissemination

This section deals with issues related to innovation development and dissemination.

Today, in agriculture where a continuing supply of updated innovations is needed, folk knowledge alone is not sufficient. Developing and disseminating agricultural innovations (i.e., maize and Arabica coffee) in a country like Cameroon is a major enterprise. The trend in investment in research continues to rise. Of this, agricultural innovations (i.e. maize and Arabica coffee) are only parts. To provide a continuously updated supply of agricultural innovations, special systems capable of developing, transforming, and disseminating science-based innovations are required. These systems have great potential for change, which in turn may lead to general development of the country.

Figure 5 below (p. 66) shows the elements that need to be studied, if innovation development and dissemination is to be clearly understood:

(1) the functions that must be performed in the total operations;

(2) the theory to practice continuum of development that must take place from the time the basic science knowledge is developed until a portion of it is turned into a usable invention and put into use;

(3) the social subsystems that must be developed and that must become properly linked to sustain the flow of information to potential users; and

(4) the basic concepts that prescribe how the system should run and for whom. (Lionberger & Gwin, 1982, pp. 31-32).

This system assumes that agricultural innovations needed by farmers is one way or another science based. Thus, transformation of basic science into usable practice is required. This is not to deny that Cameroonian farmers still develop innovations that are worthy of trial and use by others, or to suggest that the wisdom of the ages built into traditional farming practices should be ignored.

The basic foundation of scientific research in agricultural innovation development and dissemination is the identification and establishment of need priorities. Houle (1972) defined needs as:

> A condition or situation in which something necessary or desirable is required or wanted. Often used to express the deficiencies of an individual or some category of people either generally or in some set of circumstances. A need may be perceived by the person or persons possessing it or by some observer (p. 233).

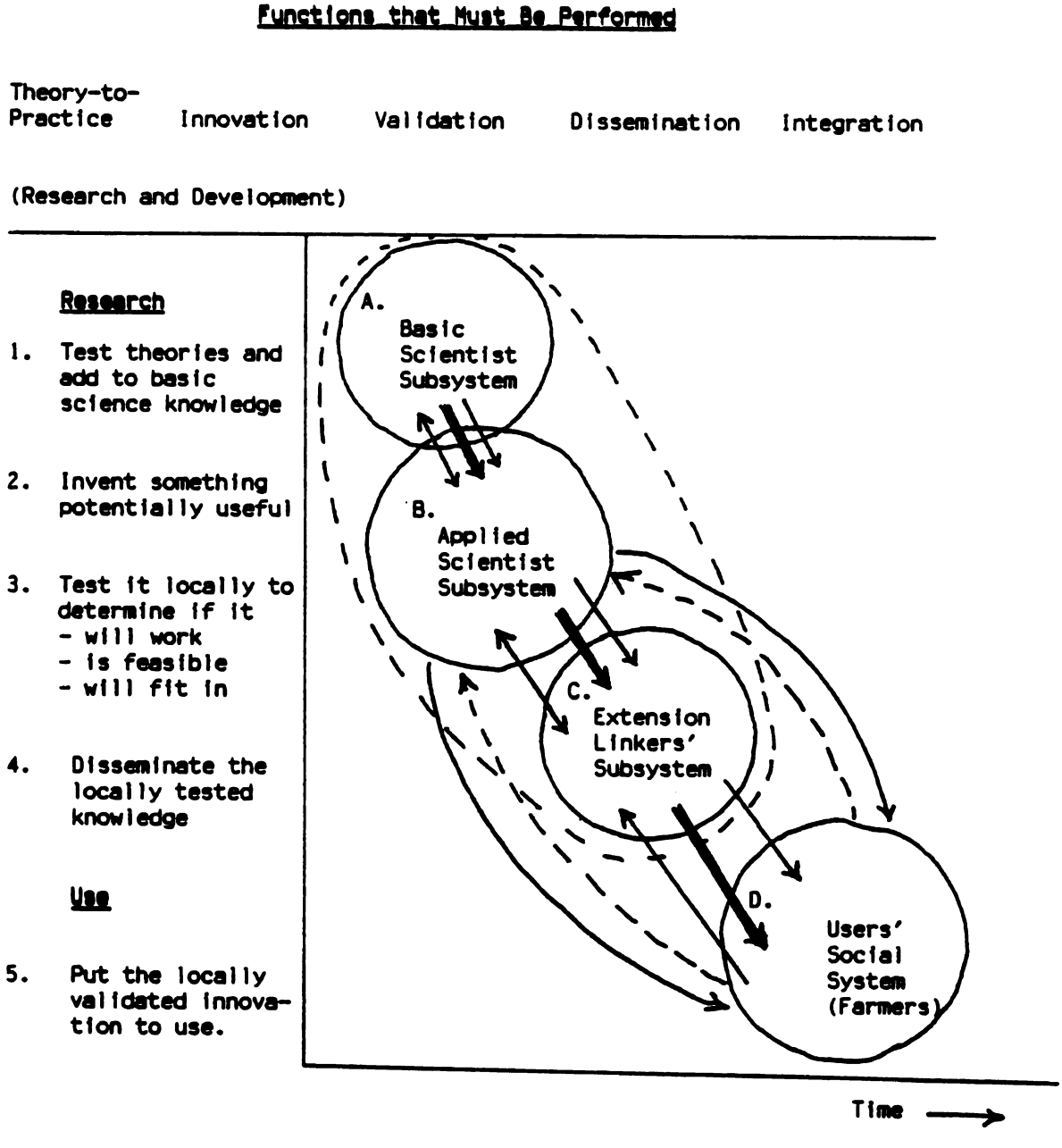


Figure 5. A Model to Generate and Disseminate Agricultural Innovations. (Adapted from Lionberger & Gwin, 1982, p. 31).

Many classifications of needs can be found in psychology, sociology and education literature. Boyle (1981) citing Monette identified four major categories of needs: (a) basic human needs, (b) felt and expressed needs, (c) normative needs, and (d) comparative needs. Maslow (1970) conceived five types of needs arranged in a hierarchy and based on the assumption that once individuals or groups satisfy a basic need, they will begin to seek to satisfy a need at the next higher level. Meanwhile, the individual feeling the need does not have to satisfy needs at the bottom before moving up. Sometimes after satisfying the higher level, he/she may still want to satisfy a need from a lower level.

Figure 6 below illustrates Maslow's hierarchy of needs.

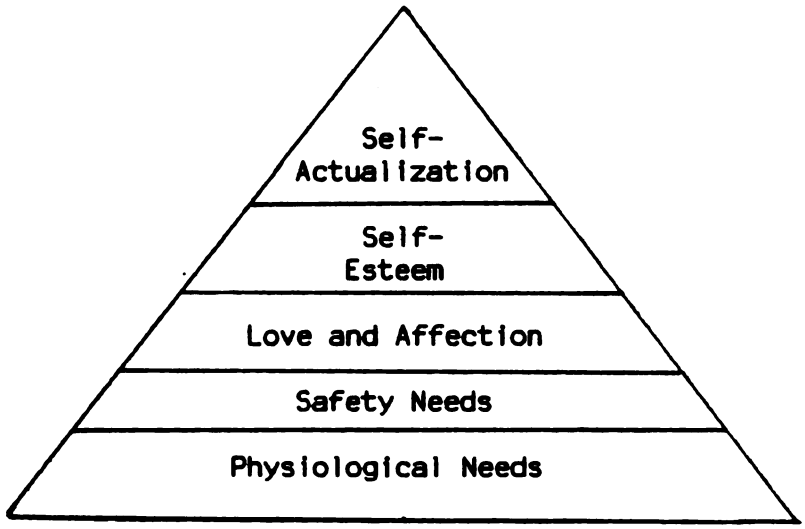


Figure 6. Maslow's Hierarchy of Needs.
(Maslow, A. H. Motivation and Personality, New York: Harper, 1970, pp. 35-47.)

A thorough knowledge of the farmers' needs is fundamental if extension educators and researchers are to meet their objectives: support to agricultural and rural development.

Rogers (1983) indicated that:

> A recognition of a need/problem stimulates research activities designed to create an innovation to solve the problem/need (p. 135).

In the agricultural social system, needs assessment is carried out mainly by extension workers or may be perceived by researchers.

Basic and Applied Research

Researchers (basic and applied) ensure the next step of the innvoation development and dissemination process. Basic researchers are said to be almost exclusively concerned with extending the frontiers of basic science. Implications for practical application are ordinarily of little concern to them.

Applied scientists, on the other hand, are interested in seeing what can be done with basic science knowledge. They usually are expected to produce something that is useful.

This does not imply that applied researchers do not also endeavor to make contribution to basic science. They often do. Also, basic researchers may be more productive in extending the frontiers of basic science when they are required to interact with applied scientists. Applied researchers are often expected to assume major responsibility for testing innovations for local adaptability. This responsibility is carried out jointly with extension workers under "Test and Liaison

Unit" (TLU) in Cameroon. Based in research stations (i.e. Bambui), TLU is responsible for establishing linkages between agricultural research and agricultural extension and farmers.

Development of Agricultural Innovations

Although farmers still develop agricultural innovations that are worthy of trial and use by others, it is often assumed that most of these innovations are developed in experiment stations. At this stage it is difficult to predict the kind of fruits they will yield. Rogers (1983) said:

> If the adopter of an innovation is faced with a degree of uncertainty, the inventor-developer of a new idea must cope with even greater uncertainty . . . she/he must understand and adjust his/her own problems (as an innovation-adopter must do), but also the problems of various other individuals and organizations who will be the ultimate adopters of the innovation that she/he is creating (p. 140).

A critical point in innovation development and dissemination is the decision by the innovation-developer of which innovation is ready to be diffused to potential adopters. He ought to make rational decisions. Hall (1977) indicated that:

> Decision issues always involve two major dimensions: (a) beliefs about cause/effect relationships, and (b) preferences regarding possible outcomes (p. 134).

Often the innovation developer has to decide among various alternatives, and to each alternative is attached a set of consequences. March and Simon (1970) even remarked that: "most human

decision-making . . . is concerned with the discovery and selection of satisfactory alternatives" (p. 95).

In an organization such as the agricultural research the desire is to move toward greater rationality rather than away from it. What should be taken into consideration here is the amount and quality of information available to the decision-making process. Since information is central to decision-making and since communication allows information to flow, a few words about this process in the social system should be stated.

In social systems, communications are linked to decision-making, which is in turn linked to goal achievement. It has been indicated that:

> Power, leadership and decision-making rely upon the communication process either explicitly or implicitly, since these processes would be meaningless in the absence of information (Hall, 1977, p. 270).

Further, Katz and Kahn (1966) reported that:

> the closer one gets to the organizational center of control and decision making, the more pronounced is the emphasis on information exchange (p. 233).

In a social system, communication is affected by social and organizational factors. In fact, it is what the receiver does with the communicated message that is the most important part of the whole process. Therefore, the perceptual process becomes a key element in understanding communication in social systems. As for the structural

(organizational factors), vertical and horizontal considerations greatly affect the communication process.

Vertical communications are usually seen as vital in organizational operations. They involve both downward and upward communication flows. Hall (1977) said that:

> Just as communication downward becomes more detailed and specific, those going up the hierarchy are the filtering and editing of information (p. 28).

Social systems also deal with clients. These groups do not necessarily form a vertical relationship, but the nature of communication to them is affected by their relationships with the organization in terms of the power they hold vis-a-vis the social system. All over the world, studies have shown that agricultural extension serve the rich farmers better than the poor. The obvious reason is related to the influence the rich farmers have on the institution, and its agents.

Effective communication within social systems such as agricultural research and extension service are necessary for the development of appropriate and useful innovations to be disseminated to potential users (farmers).

Commercialization of Agricultural Innovations

Once an innovation (i.e. Arabica coffee/maize) has been developed (in this case by the research station), and it is ready to be disseminated to potential users, it ought to be multiplied. The multiplication or commercialization to use Rogers' (1983) term is:

> the production, manufacturing, packaging, marketing and distribution of a product that embodies an innovation (p. 143).

In the study areas, the commercialization of agricultural innovations was carried out by research experiment stations. But also by seed multiplication farms of the Rural Development Project of the West Province (PDRPO).

Sometimes, there is not enough seed for potential adopters. Not everybody meets the requirements for adoption of the innovation. Those who are committed to adopt will steal as did Bamileke farmers who used to stealing young coffee plants at Dschang Experiment Station in the 1930s (Tchouamo, 1980, p. 13). The trend is continuing since the 1982 IRA report indicated that:

> The quantities of seeds (maize) were grossly inadequate. Thus, attempts will be made to produce more seeds in 1983 so as to satisfy more growers (p. 20).

It becomes important to ensure the availability of innovations once it is decided that it is going to be disseminated to potential users.

Dissemination, Integration, Adoption and Consequences of Agricultural Innovations

The disseminating function is often ensured by the extension service. Lionberger and Gwin (1982) argued that:

> Indications are that information from scientists just doesn't get out to users unless someone works at getting it out, no matter how capable the potential adopters are or how interested the applied researchers are in getting their innovations used. Even if farmers went directly to researchers (a few, but not

> many do), they would face a communication gap. The researchers' technical information needs to be translated into farmers' language before the farmers can understand it. For this translating, special expertise is required. This is one thing that the extension workers must do. The other is to get the translated information out to users (p. 39).

So, the extension subsystem plays the key role of linking agricultural researchers and farmers.

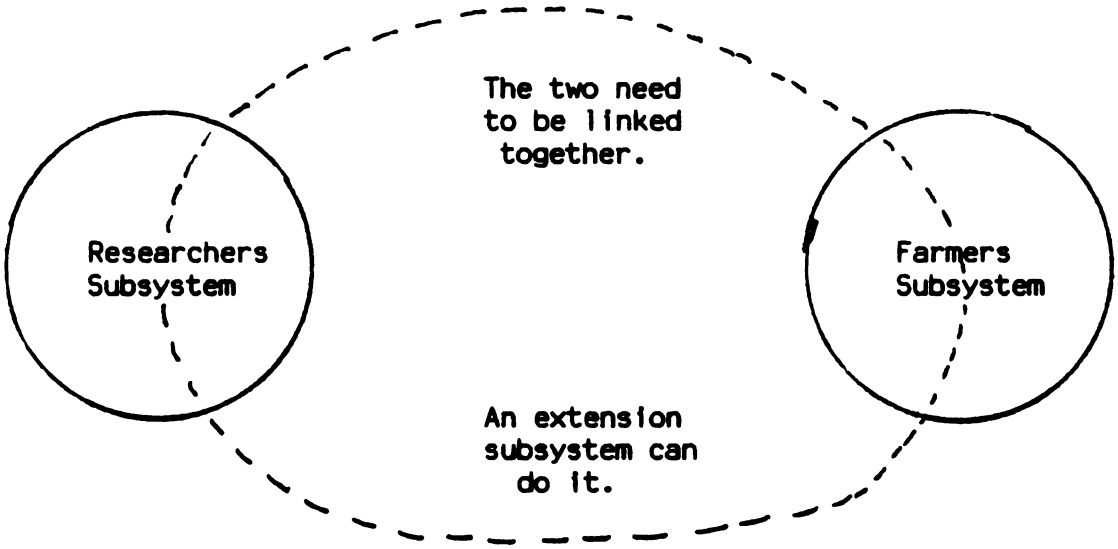


Figure 7. Linking Role of the Extension Subsystem.

Nevertheless, that linking role of the extension workers can never be limited to providing information from researcher sources to users and to communicating back needs/problems to researchers, but they also perform other important linking roles like getting contact with services and agencies that supply inputs to farmers. The user then integrates the innovation in his own system. His decision to accept or reject the innovation is often influenced by social and cultural factors. Rogers (1983) has identified five attributes that might influence the adoption of the innovation. They are: relative

advantage, compatibility, complexity, triability and observability (pp. 210-238).

Both researcher and user of agricultural innovations are affected by risk and uncertainty. The researcher minimizes risk and uncertainty by taking more time in testing and validating the innovation, while the potential adopter sometimes resists its trial, and does it only after he has observed the results in the neighbor's farm. Researchers would like to avoid unplanned consequences by being as rational as possible. Unfortunately, dysfunctional consequences of innovations are sometimes inevitable. It is often believed that sound linkages among research, extension and farmer subsystems will lead to making decisions with minimized dysfunctional consequences. These unforeseen consequences may jeopardize the credibility of the researcher and his/her agency as a whole as well as the extension worker's and his/her agency.

The Cameroonian Agricultural System

To understand the Cameroonian agricultural system, it is necessary to be briefed on the social, cultural and physical environment in which it operates.

The Study's Sectorial Characteristics and Context

1. Cameroon covers an area of 475,000 Km^2. Only one-third of the area is arable land. The area under cultivation is estimated at 2,000,000 ha*, that is 13% of the useful agricultural area. The

*1 ha = 2.4711 acres.

small family farm prevails and ensures 93% of national agricultural production. The remaining 7% comes from the large industrial plantations.

2. Economically, the Gross National Product (GNP) has increased by an average of 7% to 8% per year during the Fourth Five-Year Plan (1976-1981). The growth went through considerable variations due to the fluctuation of world market's prices of export crops and the effects of the exploitation of petrole. The contribution of petrole to the general exportations has increased from 1% (1978) to 63% (1982). During the same period the agricultural products' shares to the export decreased from 78% (with 53 percent from cocoa and coffee) to 28%.

   Coffee (Arabica and robusta) is the country's major export crop (106,134 tons in 1984/85 counting for 111,201 millions of FCFA**) (Cameroon in Figures, 1985, p. 13, 18). Arabica's share was 21,785 tons (Cameroon in Figures, 1985, p. 13) among which 14,071 tons (Cameroon Agriculture, No. 2, 1986, p. 14) were produced in the West Province. Cocoa is the second major export crop. In 1984/85, the total amount exported was 121,071 tons for a value of 105,858 millions of FCFA (Cameroon in Figures, 1985, p. 13, 19). Six percent of the country's food is imported. The imports are related to crops that cannot be grown (i.e. wheat) for ecological reasons.

** 1 $ USA = 300 FCFA.

From the Atlantic Ocean to the frontiers with Chad, the country presents a variety of geo-morphological, pedological and climatical conditions. Five major agro-ecological zones have been identified:

- The Humid Forest Zone in the South.
- The Costal Plains.
- The High Plateaux of the West.
- The Central Savana Zones.
- The Sub-Sahelian Zone in the North.

4. Coffee and cocoa are grown in the first three zones. Arabica coffee, being exclusively a variety of highlands, is grown in the High Plateaux of the West, the main zone of this study.

5. Agricultural and rural development are carried out by a set of complex instituions placed under different ministerial departments (agriculture, animal husbandry, higher education and scientific research, plan and regional development, trade and industry, etc.).

   Some institutions are national while others are regional. Among the national institutions are:

   - The National Funds for Rural Development (FONADER), supplier of farm credits.
   - The National Marketing Board (ONCPB), ensuring the commercialization of export crops. At the same time it attempts to stabilize producer prices.
   - The National Centre for the Development of Cooperative Enterprises (CENADEC).

- The Food Development Authority (MIDEVIV).
- The National Centre of Agricultural Mechanization (CENEEMA).

Regional institutions include:

- Cotton Development Authority (SODECOTON) in the North and Extreme North Provinces.
- The Cocoa Development Authority (SODECAO) in the South and Central Provinces.
- The Central Union of Agricultural Cooperatives (UCCAO) in the West Province.
- The North West Development Authority (MIDENO) in the North West Province.

The marketing of agriculture produce is ensured by:

- The farmer cooperatives or their unions such as: the Northwest Cooperative Association LTD (NWCA) in the North West Province, the Central Union of Agricultural Cooperatives of the West (UCCAO) in the West Province.
- Integrated Rural Development authorities such as the Cotton Development Authority (SODECOTON), and/or
- The private sector (individuals, and or companies).

It is in this social, physical, cultural, economical environment that this study was conducted. It is assumed as in Figure 3 (see p. 58) that the Cameroonian agricultural system is made up of six major subsystems (production, marketing, supply, research, governance, extension/education). For the purpose of this study, emphasis will be on the research, production and extension/education subsystems.

The Cameroonian Agricultural Research System

Scientific and technical research in its modern terms started in Cameroon in 1935 with the creation of "Société d' Etudes Camerounaises (SECAM)" (Tchala, 1985, p. 6). Since the country gained political independence in 1960, it has placed emphasis on technical and scientific research as a vital and fundamental instrument of its economic, social and cultural development.

The evolution of SECAM led to the creation in 1979 of the General Delegation for Scientific and Technical Research (DGRST). By Decree No. 79/435 of December 4, 1979, the DGRST was entrusted with the task of formulating, orienting and implementing Government policy in the field of science and technology. In this report, the DGRST was made responsible among other things for:

- stimulating, coordinating and supervising scientific activity throughout the country;
- encouraging and facilitating scientific and technical research intended to promote the economic, social and cultural development of the nation within its own institutes or in associate bodies;
- ensuring the training and promoting of the research workers and technicians it needs to achieve its aims;
- assembling collections, compiling scientific and technical documentation and publishing or ensuring the publication of results;
- facilitating the registration of inventions by submitting applications for patents and licences to the competent bodies, and developing and using them for economic purposes;
- ensuring the transfer of adapted and efficient technology;
- maintaining special relations with the universities and institutions and technical bodies attached to certain

services, so as to confer a united approach to scientific and technical research in Cameroon;

- ensuring liaison, on behalf of the Government, with foreign, national and international scientific and technical organizations (U.R.C./DGRST, 1982, p. 8-91, R.C., Decret No. 84/154 du 18 Avril 1984, p. 14).

Agricultural Research Finances

Research, in general, and agricultural research, in particular, is financed by the Cameroonian Government, parastatal organizations, foreign agencies such as the United States Agency for International Development (USAID), the Food and Agricultural Organization (FAO), the World Bank, etc. The table below shows the increase in the allocation of research budget from 1974 to 1981.

Table 1. Trend of research financing from 1974 to 1981.

Fiscal Year	Recurrent Budget	Capital Budget	Total
1974-75	775,000,000	255,432,875	1.,030,432,675
1975-76	1,210,000,000	546,786,000	1,756,786,000
1976-77	2,027,778,086	400,000,000	2,427,778,086
1977-78	2,126,486,687	132,882,655	2,259,365,342
1978-79	2,446,907,023	140,000,000	2,586,907,023
1979-80	2,343,233,631	946,000,000	3,289,233,631
1980-81	2,589,827,000	2,113,000,000	4,701,827,000

Source: Fifth Five-Year Plan, 1981, p. 300.

The above table indicates that from 1974 to 1980, the total research budget has increased by about 356%. From 1977 to 1979, the Government has provided to the research subsystem 2.3 billions CFA francs and 2.5 billions CFA francs, respectively. The largest share was allocated to the Institute of Agronomic Research, one of the main focus of this study as indicated in the table below.

Table 2. Agricultural research budget for the fiscal years 1977-1979.

Fiscal Year	Research (Total)	IRA	ISH	IRZ	Other Institutes
1977-78	2.3 billions	36%	11%	7%	46%
1978-79	2.5 billions	35%	12%	7%	46%

Source: Van Gils, 1979, p. 4.

The above table indicates that Government has provided a significant amount of money to research related to agriculture, the backbone of the economy. Researchers develop research programs and budget in line with priorities set by the Supreme Council of Higher Education and Scientific Research.

The process for developing research priorities appears to provide little or no role for farmers and extension agents.

Structural Organization of Research in Cameroon

Created in 1974, the Council for Higher Education and Scientific and Technical Research defines the major orientations of the Scientific and Technical Research Policy of the Government. This council is

presided over by the Head of State. Created in 1983, the Ministry of Higher Education and Scientific Research (MESRES) assumes the task of elaborating the scientific and technical policy in conformity to the mission assigned to the DGRST in 1979.

The definition and the orientation of research programs are carried out by the Committee of Programmes composed of representatives of the technical services of the Ministries, the University institutions, the Ministry of Finances and the users of research results.

The Institutes of Research Subsystem are:

- The Institute of Agronomic Research (IRA);
- The Institute for Medical Research and the Study of Medical Plants (IMPM);
- The Institute for Geological and Mineral Research (IRGM);
- The Institute for Animal Research (IRZ);
- The Institute of Human Sciences (ISH);
- The National Committee for Man and Biosphere (MAB);
- The National Committee for the Development of Technologies (CNDT).

The Institute of Agronomic Research (IRA) which is investigated in this study has the task of drawing up programmes and carrying out research in the area of agronomy. It develops experimental activities in order to improve agricultural and forestry production. These activities of IRA attempt to improve the quantity and quality of agricultural production in order to provide sufficient food for the Cameroonian population and the export of the surplus.

In order to meet the challenges, the Institute has initiated programs in the five identified ecological zones indicated at the beginning of this section in the areas of both export and food crops.

IRA manages the following programs:

- Cereals (rice, maize, millet, sorghums, etc.)
- Roots and tubers (manioc, cocoyam, taro, yam, sweet potatoe)
- Legumes (soybean, peanuts, beans, niebe)
- Perennial crops
- Plantains and banana
- Fruits (pineapple, pears, mangoes)
- Food technology
- Cocoa
- Coffee (Arabica, Robusta, Arabusta)
- Oils (palm oil, coconut)
- Rubber
- Cotton
- Dense Forest
- Savana Forest
- Botany
- Soils
- Etc.

This study paid attention to two of the many programs:

- cereals with special emphasis on maize.
- coffee with special emphasis on Arabica coffee.

The justification for the choice of the two crops were indicated in Chapter I.

The major research objectives for maize in Cameroon were:

- to increase maize production by developing high yielding varieties;
- to stabilize the high yield potential of newly released varieties by incorporating disease and pest resistance;
- to improve quality by the introduction of the Opaque-2 gene into some of the improved maize varieties;
- to develop crop management and cultivation packages acceptable to the farmer for maximum returns;

- to determine the gap between research-based recommended practices and traditional practices on crop production, identify major constraints to increased crop production with a view to determining future research goals and needs;

- to institute and maintain a liaison between the research station and the extension service, particularly for the release and transfer of improved materials and technology;

- to assist in the training of field staff and extension agents on new methods of crop management through regular refresher courses and field days (Ayuk, Takem, 1985, p. 2-3).

The last two objectives involve linkages between the research and extension services. These activities are carried out under the Training and Liaison Unit (TLU) programme.

The study also paid attention to the coffee programme and more specifically to Arabica coffee sub-programme. The main research objectives in that area were:

- to increase Arabica coffee production by developing high yielding, disease and pest resistant varieties;

- to determine the yield responses to inputs, i.e.: chemical fertilizers;

- to assess different varieties' reactions to treatment against fungi and damaging insects;

- to improve the processing of coffee in order to test the quality of varieties being disseminated;

- to institute and maintain a liaison between the research station and the extension service, mainly for the field trials of varieties that might be disseminated to potential users;

- to create interspecific hybrids and to select a new variety of Arabusta.

Thus, linkages with extension were once more among the priorities of the Arabica coffee sub-programme. A structural organization of IRA services is shown in Figure 8 (see page 85).

A researcher/administrator is responsible for each level. He/she ensures that activities delegated to his/her position are carried out without failure. Various positions were used to assess if there were opinion differences within the researcher group regarding the importance and the frequency of linkages within that survey population (e.g. Chapter IV).

The structural organization of the research services flows from the research antenna (basic research unit) to the Ministry of Higher Education and Scientific Research. The research antenna, headed by a chief carries out local trials and tests the adaptability of new varieties. The chief of research antenna reports to the research site coordinator based in the nearest research station. The research site coordinator reports to the chief of the research station who in turn reports to the chief of the research center. The latter reports to the director of the Institute of Agronomic Research who directly reports to the Minister. At all levels of the structure, activities are both administrtive and technical.

STRUCTURE AND LINE FUNCTION OF IRA SERVICES

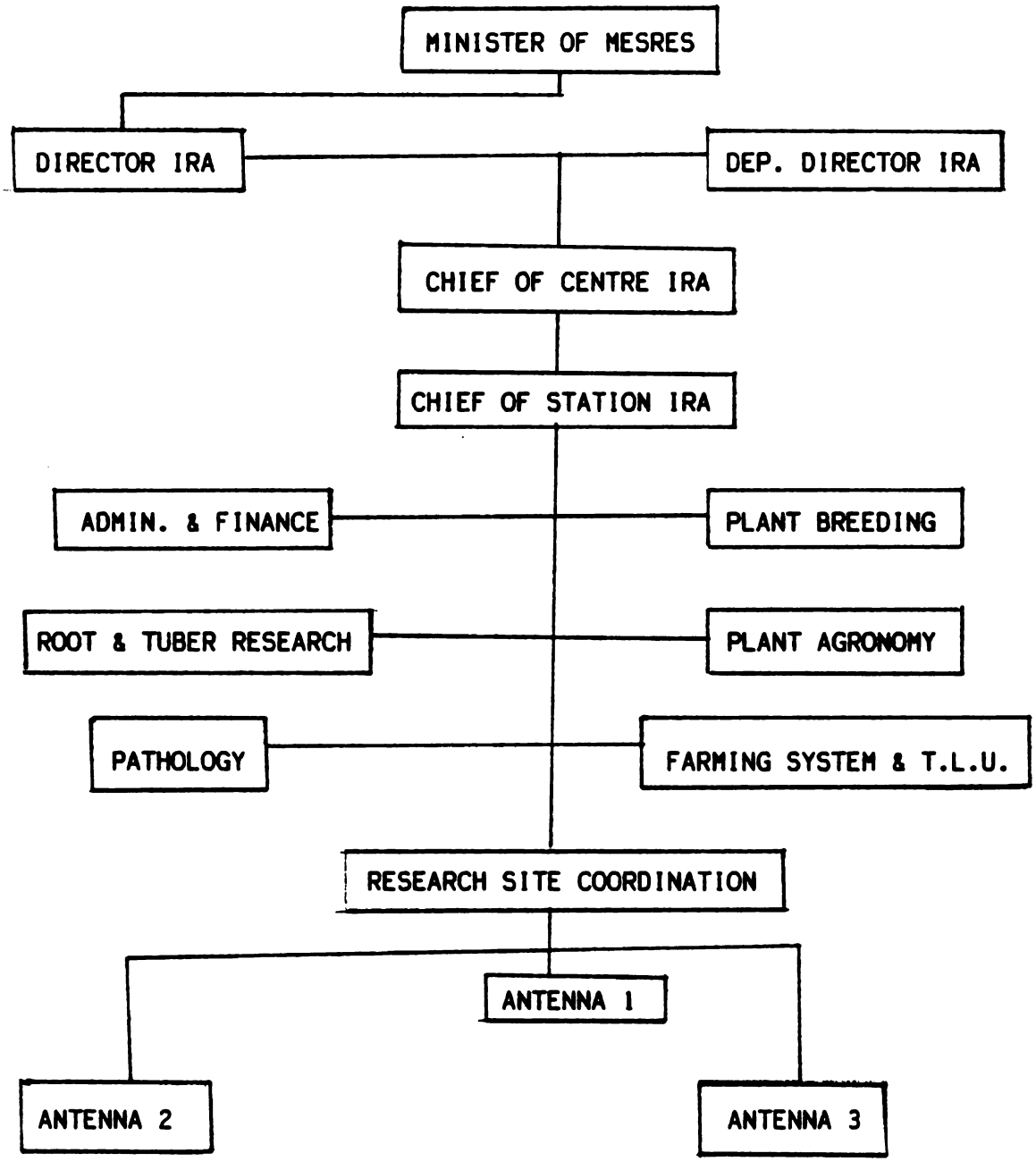


Figure 8. Structure and Line Function of IRA Services

The Cameroonian Extension Subsystem

It is admitted that every society has some kind of a system of agricultural extension. Axinn and Thorat (1972) stated that:

> Ever since men learned how to communicate with each other, information on how to produce food and fiber has been passed on from one generation to the next and has traveled from one village to another (p. 6).

Extension, defined narrowly as "the process of extending useful and practical information through a broad range of methods to persons in out-of-school situations" (Prawl, 1984, p. 25), appeared in Cameroon a few years after the Germans declared the Country to be their Colony (1884). British, French and later the independent government of Cameroon went on with this type of extension.

The evolution and growth of the system from the colonial periods to the present led to major changes in two areas: methodology and organizational structure.

Methodology. In its early days, extension was mainly in the spoken form (general and special meetings, farm and home visits, method demonstration meetings). This approach prevailed over written (bulletins, news articles, personal letters, circulars) and visual (posters, slides, motion pictures, etc.) methods, commonly used these days.

Also, improvements have been noticed in other methods. Individual and group contacts, although still extensively used are little by

little supplemented by mass contacts (bulletins, circular letters, radio, television, posters, exhibits at agro pastoral shows).

The approach which formerly was autocratic is more and more democratic with farmer involvement in the development and implementation of extension programs.

Structural Organizations. The structural organization of the extension subsystem was not homogeneous for all the country during the colonial era. Besides the British system adopted in the West Cameroon, and the French in the East, there were many structures dealing with extension. Even today, some of the extension activities are carried out by: agricultural parastatal organizations and integrated rural development projects (from the Ministries of Agriculture and Animal Husbandry), religious organizations and foreign technical assistant interpretation institutions (e.g. SATA "Swiss Agency for Technical Assistance"). In this study, attention was paid to the extension service of the Ministry of Agriculture.

In 1893, French legislation created the "Societes Indigenes de Prevoyance" (SIP) in colonies. Private societies, but of public interest, SIP's main objective was to promote the cultivation of export crops. In the late forties, SIP was superseded in Cameroon by the "Societies Africaines de Prevoyance" (SAP) (Flores, 1969, p. 225; Kom, 1977, p. 161; Tchouamo, 1980, p. 23). SAP added to SIP's acitivities the education of farmers. Mobile teams were organized and sent out to farms in order to demonstrate new (modern) agricultural practices,

advise on crop diseases, selection of species, seeds, harvesting, processing and conservation. There is no evidence that initiators of SAP's educational activities were influenced by Seaman A. Knapp who advocated demonstrations on farmer's land as the major extension method.

The decree of September 26, 1950 replaced SAP by the "Secteurs de Modernisation" (SEM) which were commodity based. There was in each region of the country one SEM, whose major activity was to promote the major export crops of the area. SEM served as support to the extension service. The post independence period is characterized by many constitutional changes that affected all services including the extension service.

According to Tchala (1985), extension is nowadays carried out by two major ministries: the Ministry of Agriculture and the Ministry of Animal Husbandry, Fisheries and Animal Industries. This study dealt with the extension service of the Ministry of Agriculture. Decree No. 83/084 of February 14, 1983 defined the functions of the head of the Extension Service, from the Department of Agriculture as follows:

- promotion of agricultural techniques;
- preparation and follow-up of agricultural programs;
- development of agricultural expertise in cooperation with other officers;
- multiplication of selected plant or seed materials;
- liaison with internal or foreign agronomic research organizations;
- promotion of agricultural mechanization in liaison with the National Center of Agricultural Mechanization.

One of the many functions of the head of the national extension service is thus to link this subsystem with local and foreign research organizations. The same emphasis was expressed in the objectives of the agronomic research in Cameroon.

According to Decree No. 83/084 of February 14, 1983, the structural organization of the Cameroonian extension service includes the following positions:

at the national level

- a Service of Agricultural Extension headed by a Chief of Service.

at the provincial levels

- a Provincial Delegation of Agriculture headed by a Provincial Delegate;
- a Provincial Chief of Agricultural Service headed by a Chief of Service;
- Divisional Delegations of Agriculture headed by Divisional Delegates;
- Subdivisional Delegations of Agriculture headed by Subdivisional Delegates;
- Agricultural Posts headed by Chiefs of Agricultural Posts;
- local unit of extension service headed by agricultural monitors.

From the national to local levels, positions held by various leaders are administrative, supervisory and operational. So, the closer a position is to the local level, the more operational it is.

Positions were used in Chapter IV to examine if there were opinion differences within the extension worker group regarding terms and

conditions about the importance and the frequency of linkages within the extension worker survey population.

In the next chapters, perception by extension workers along with researchers on the application of these decrees will be assessed.

The Cameroonian Production Subsystem

Earlier this subsystem was considered to include farmers, land, capital and technology. This section will be restrained to the study of those who own and/or operate unit(s) of operation: farmers.

Table 12 of the 1984 Agricultural Census (Ministry of Agriculture) indicated 1,155,500 farmers in Cameroon. Of these, 159,300 (Table 2, 1984 Agriculture Census, Ministry of Agriculture) are in the West-Province, geographical area of the study. The smallest of the country's ten provinces, it is densely populated. More than 300 inhabitants per Km^2 in certain chiefdoms is common, while the national density average is estimated at 21 (Fifth Five-Year Plan, 1981, p. 33). den Ouden (1981) said that the region:

> is economically the object of much appraisal, surprise and fear, ... It has an economic importance surpassing national frontiers for the production of coffee (Arabica) and food crops (p. 1-3).

The economic importance is said to be related to the "dynamism" of the inhabitants, most of whom are farmers: the average farm size is in the range of one to four hectares. This leads farmers to rationally use land. It also explains the predominance of the mixed cropping systems.

The dominant tribes in the region are the Bamileke and the Bamun. The Bamileke are traditionally organized in chiefdoms. It is fundamentally an inegalitarian society where ascribed status plays a very minor role. Individual achievement is promoted by the organization of the chiefdom. They have a system of incompatible inheritance. One heir inherits all properties of the head of the family. The heir is not necessarily the first born (primogeniture) or the last (ultimogeniture) descent. Every non-heir is the potential founder of a new lineage. den Ouden (1981) indicated that:

> the political, economic and social worlds of men and women were and are relatively strongly separated in this . . . society (p. 15).

The division of labor indicates that women are more involved in food crop production (i.e. maize), while men usually care about coffee (export crop).

The Bamum are organized under one Sultanate. Bamun farmers (men) deal with food crops as well as export crops. Women are less involved in farming than Bamileke women. The difference lies in the religious beliefs. Most Bamileke are Christians while most Bamun are Moslems.

Chapter IV on the findings will provide details, information about characteristics of survey farmer population. Also, the social, economic and cultural characteristics may influence the way farmers perceive their relations with researchers and extension agents.

Linkages Between Researchers, Extension Workers and Farmers

Some of the missions of the scientific and technical research in Cameroon are to:

(1) ensure liaison, on behalf of the government, with foreign, national and international scientific and technical organizations;

(2) ensure the transfer of adapted and efficient technology;

(3) maintain special relations with institutions and technical bodies attached to certain services, so as to confer a united approach to scientific and technical research (DGRST, 1982, p. 9).

On the other side, the head of the extension service in the Department of Agriculture (Ministry of Agriculture) is responsible for maintaining "liaison with internal or foreign agronomic research organizations" (Decree #83/084, Feb. 14, 1983).

There is a clear indication that there has been an awareness, both on the research side and on the extension side, of the importance of linkages between the two subsystems. But reality has shown that such interaction is not easily brought about in practice. Tchala (1985) argued that relations between agricultural research and agricultural extension went through different steps since the independence. Both were within the Department of Agriculture. Later, they were separated by the creation of a separate administrative unit dealing exclusively with research, in general, and agricultural research, in particular. Agricultural extension, however, remained a service of the Department of Agriculture in the Ministry of Agriculture. Nowadays, one assists to a new form of cooperation between agricultural research and

agricultural extension, thanks to the creation of the Training and Liaison Unit at the Institute of Agronomic Research.

Some people believed that the creation of the National Office of Scientific and Technical Research in 1974 which in 1979 became the General Delegation for Scientific and Technical Research rather cut off the linkages between the research, the extension service, and farmer subsystems. Because the extension and research subsystems were in separate independent administrative units, the number of communication relays between them has been increased. It became more difficult to establish linkages between the subsystems than ever. This situation is well illustrated by Kelso and Gervais' findings (see page 3).

Today, a new unit (Test and Liaison Unit) has been developed within the Institute of Agronomic Research (IRA). The objectives of the unit are:

> to foster communication linkages between research (IRA) and extension (Ministry of Agriculture and various parastal organizations) services, and to enhance the two-way flow of information between researchers and farmers

The current linkages initiated by TLU teams are in the following areas: "training of extension workers, agro-socioeconomic surveys of farms, on-farm trials and collaboration with other agencies."

Training

Since 1983, TLU has participated in in-service training of extension workers in principles of food crop production. Research results (extension bulletins, leaflets, etc.) were shared with

participants. In 1983, TLU reported they had trained 110 extension workers.

Agro-Socioeconomic Surveys

The objectives of such surveys are to: (1) describe farmers' circumstances (agronomic, economic and social) with particular references to certain food crops such as maize; (2) identify constraints to increased production (including those perceived by farmers themselves). Research programs are later designed to solve the problems identified during the surveys.

On-Farm Trials

Carried out by researchers on farmers' fields, on-farm trials are designed to:

1. determine the optimum level of application of chemical fertilizers on chosen crops;
2. compare the performance of a number of improved varieties with locally grown species, under fertilized and unfertilized conditions, across locations and on farmers' fields, under joint researchers' and farmers' management;
3. determine the "on-farm" economic viability of growing currently recommended IRA varieties using moderate rate of chemical fertilizers.

The TLU approach to linking research, extension and farmers is very positive. In fact, the 1983 IRA Bambui Station Annual Report stated:

> One hundred and fifty maize minikit trials were distributed to Ministry of Agriculture field demonstrators to be set out on farmers' fields throughout the North West and South West

> Provinces. Each minikit contained: seed of improved maize variety, fertilizer, a measuring cord, a measuring stick, an instruction sheet and an observation form. The maize trial was to be managed jointly by the extension agent and the farmer. The farmer was free to plant any crop in association with the maize as he/she desired. At harvest time, the demonstrator was to estimate the maize yields (using the "measuring stick method" developed by TLU); complete the observation form and mail it to the TLU (p. 144).

There is a willingness to share the research results with extension agents, allow them to try in their various conditions, while giving farmers the possibility of experiencing the innovations under their usual cultural practices. As far as farmers will be allowed to adopt the maize innovation without extra constraints, TLU is more likely to gain success.

Problems often arise when farmers have to give up their traditional methods to adopt the new patterns. TLU is also responsible for establishing collaborative links with the Ministry of Agriculture, Parastatal agricultural organizations and agricultural development projects (i.e. the Rural Development Project of the West Province, North West Development Project). Collaborations of these subsystems with the research subsystem are in the areas of field staff training, on-farm trials, provision of seeds and farm surveys.

TLU serves as direct link between research stations and potential users of research results (farmers, parastal agricultural organizations). It reinforces the activities of the extension agents and adds more credibility to their actions.

Theoretical linkages between agricultural research, agricultural extension and farmers may be summarized by Figure 9 below.

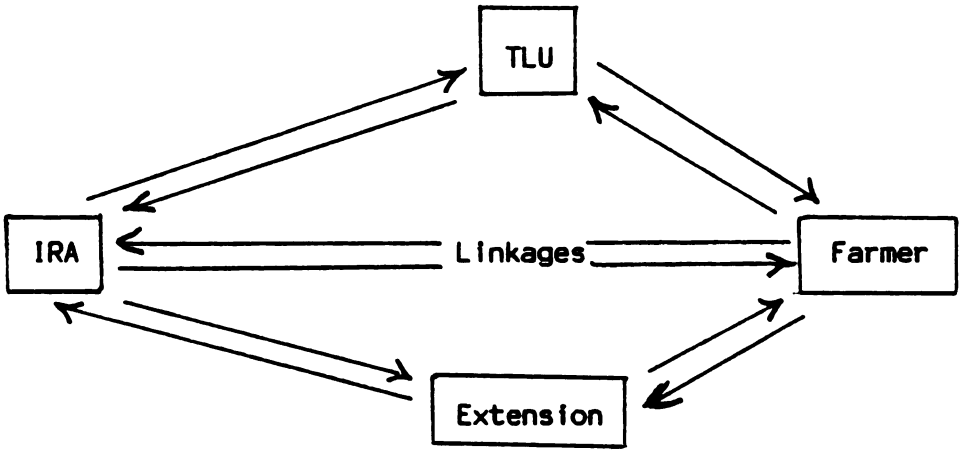


Figure 9. Current Linkages Between Agronomic Research, Extension, Farmer, and TLU.

TLU personnel, most of whom are called extension agronomists, are comparable to the extension specialists in the U.S.A. Cooperative Extension Service. But instead of being located in a university campus, as are most extension specialists, they are based in research stations. There is a hope that they will make differences in the Cameroonian approach to rural development, by bringing closer the main actors of that development: farmers, extension workers and researchers.

Summary

The review of literature began with the purpose of the study and the choice of the social systems theory as the foundation of the study. The purpose of the review was to introduce the reader to the general field of the social systems before narrowing the literature review down

to the agricultural system in general, then to the Cameroonian context, and finally to the three subsystems with their linkages, the main focus of the study.

Social systems, or set of interrelated units that are engaged in joint problem solving to accomplish a common goal might be incomplete/complete, dynamic/static or open. In the real world, all social systems are open systems, containing both dynamic and static components which are themselves open systems.

Loomis and Beegle (1950), Loomis (1960) indicated that systems were made of the following elements: ends and objectives, norms, roles, power, sanction, rank, belief, sentiments, and facilities. Elements constitute with processes the working components, and articulating functions of the social systems.

According to Richard Hall (1977), processes of social systems are related to major ways in which an organization moves from one state of balance to the next. Processes of social systems include: socialization, social control, institutionalization, boundary maintenance, communication, and linkage.

In addition to identified basic elements and processes, Parsons (1951, 1964, 1969, 1977), Loomis and Beegle (1950), Loomis (1960), Loomis and Loomis (1965) have identified the characteristics of social systems: goal attainment, adaptation, integration, and tension management. Social system approach often give the impression that social systems are self-combined, while as human beings are dependent on a larger environment for resources, so too are social systems.

Thus, they are always open systems, thoroughly dependent upon and interrelated with a multiple-system environment.

The agricultural system was selected as an example of a social system. Katz and Kahn (1966), Havelock and Benne (1967) Axinn and Thorat (1972), Axinn (1978) indicated that the agricultural system was made up of major components or social structure or subsystems or administrative structure. The major agricultural susbystems are: production, supply, marketing, governance, research and extension/ education along with other components such as mass media and transportation networks, the private sector. The aforementioned subsystems are basic features of infrastructures required for effective agricultural development.

For innovations to be developed and disseminated properly, there should be effective linkages between and among the agricultural subsystems. The extension education subsystem often is viewed as the bridge between the agricultural research and the production user (farmer) subsystems.

An analysis of the Cameroonian agricultural system indicated possible linkages between research, extension and production subsystems. Agricultural researchers, extension workers and farmers often relied on informal linkages for exchange of agricultural information. It mainly depended on many factors: individual initiatives and physical proximity of extension staff to research facilities. Limited efforts in limited geographical areas are carried out to strengthen the current linkages between agricultural subsystems through Test and Liaison Unit (TLU).

This chapter indicated that agricultural production ought to be viewed in the context of the whole system. But emphasis should be on the needs and priorities of the farm family (71.4% of the Cameroonian population). The section on the agricultural innovation development and dissemination showed that agricultural problems must be identified jointly by farmers, extension workers and researchers. The latter's mandate to generate innovation should not end at the research station but requires follow-through with farmers, who in turn are knowledge and innovation generators.

CHAPTER III

THE RESEARCH METHODS AND PROCEDURES

Introduction

This chapter contains a description of the methods and procedures used to assess how farmers, extension workers and researchers perceived the linkages and interrelationships among organizations involved in the development and dissemination of maize and Arabica coffee innovations in Cameroon. The design chosen, according to a typology used by researchers in the fields of education (Borg & Ball, 1983) and social sciences (Babbie, 1983; Bateson, 1984; Isaac & Michael, 1984) can be categorized as a descriptive survey in the form of self-delivered questionnaire.

Babbie (1983) indicated that "survey research is . . . the most frequently used mode of observation in the social sciences (p. 209). Scientists such as Bateson (1984) defined survey research as "a means of knowledge production (p. 10). This definition stresses the active, creative role of the researcher. If she/he is not active and creative, the knower (researcher) will hardly convey to others valid data. In fact, as other studies:

> One of the goals of this "one" was to provide data, draw conclusions and generate knowledge that could contribute toward the development of theories to explain and direct future research activities" (Steele, 1986, p. 87).

Survey studies offer many advantages. According to Isaac and Michael (1984), they are designed to:

- Collect detailed factual information that describes existing phenomena;
- Identify problems or justify current conditions and practices;
- Make comparisons and evaluations;
- Determine what others are doing with similar problems or situations and benefit from their experience in making future plans and decisions (p. 46).

The objectives of this study specified in Chapter I fall within the purposes of survey research drawn by Isaac and Michael.

Other advantages of survey research indicated by Babbie (1983) stressed that:

> Survey research is probably the best method available to the social scientist interested in collecting original data for describing a population too large to observe directly (p. 209).

This approach was suitable to the study since the author had to randomly draw study samples from:

- 32 researchers (Fifth Five-Year Plan, 1981, p. 306);
- 9,670 extension workers (Ministry of Agriculture, Department of Studies and Projects, 1986, p. 25);
- 159,300 farmers (Ministry of Agriculture, Department of Studies and Projects, 1986, p. 25).

Since all the 32 researchers, 9,670 extension workers and 159,300 farmers could not be observed, a survey of random samples of these populations would give their characteristics.

Moreover, Babbie (1983) pointed out that "surveys are also excellent vehicles for measuring attitudes and orientations in a large population" (p. 209).

The method chosen for the study provided sound knowledge about:

- Linkages and interrelationships among the Institute of Agronomic Research (IRA), the Extension Service and the Production Subsystem.
- The three populations (researchers, extension workers, and farmers) and in measuring how they perceive the linkages and interrelationships among and between the aforesaid organizations.

Benson and Benson (1975), Babbie (1983) and Bateson (1984) indicated that questionnaires are essentially and almost directly associated with survey research. More on questionnaires will be discussed in the section dealing with the instrumentation.

In this chapter, five major sections are developed. The first presents the approach to measurement. The next describes: the population and sampling procedure along with the instrumentation (Questionnaire design and development). Another describes the procedures for questionnaire distribution and collection and finally, data analysis is discussed.

Approach to Measurement

Babbie (1983) defined measurement as "careful, deliberate observations of the real world for the purpose of describing objects and events in terms of the attributes comprising a variable" (p. 101).

Measurement seems to present a special problem for social science. Nevertheless, Babbie (1983) affirmed that "we can measure anything that

exists. There are no exceptions. If it exists, we can measure it" (p. 101). Babbie's measurement assumption quoted above leads us to be confident that we can measure the opinions of researchers, extension workers and farmers regarding the current linkages between the Institute of Agronomic Research, the Extension Service and the production subsystem.

Key questions that directed the research procedures and the measurements were:

1. What are the selected personal and situational characteristics of the survey population, members of the three groups under study?

2. What is the current state of linkages among and between respondents, members of the three groups being studied?

3. Are there significant differences between response means for members of subgroups within each three survey population group, identifiable by personal characteristics on selected terms and/or conditions about linkages among and between agricultural subsystems involved in the development and dissemination of agricultural innovations?

4. Are there significant differences between response means by survey population groups on selected individual perception statements and selected terms and/or conditions about linkages among and between agricultural subsystems involved in the develoment and dissemination of agricultural innovations?

Measurements of perception were the main concern in providing information that would help in generating answers to the research questions. In this study, perception was defined as "personal inclination to disregard some things that one is aware of, emphasize others, and put meanings together in one's own way" (Lionberger & Gwin, 1982, p. 223). Perception is part of one important element of the social system: belief. What actually is and what a person perceives

it to be are by no means the same. Nevertheless, both place constraints on what a person does. Although it is important to study what the linkages between the Institute of Agronomic Research, the Extension Service and the farmer subsystem are, it is also necessary to assess what those concerned (researchers, farmers and extension workers) think the situation is. Lionberger and Gwin (1982) contended that "what a person perceives a situation to be is real in its consequences. People act mostly on their own definition of a situation" (p. 14).

How did we measure respondents' perception of the linkages between the Institute of Agronomic Research, the extension service and the farmer subsystem? We called on the Likert method:

> based on the assumption that an overall score based on responses to the many items reflecting a particular variable under consideration provides a reasonably good measure of the variable" (Babbie, 1983, p. 380).

Rensis Likert has developed a measurement method, called Likert scaling, said to "represent a systematic and refined means for constructing indexes from questionnaire data" (Babbie, 1983, p. 380).

Likert-type scale is associated with a question format. The particular value of this format is, according to scientists, "the unambiguous ordinality of response categories."

Part I of the survey questionnaire for this study contained items related to personal and situational characteristics of the respondents.

Part II included statements that reflect respondents' perception of linkages among and between the Institute of Agronomic Research,

the Extension Service and the production subystem. This part combined items that were answered on a five-point scale (definitely should not, should not, may or may not, should and definitely should) with the frequency of dealing with such activities on a three-point scale (often, sometimes, never). The respondent was provided with a possibility to circle a "no opinion" response category. Borg and Gall (1983) said that "one method of dealing with subjects who are not familiar with a particular topic is to include a 'no opinion' category as one of the response alternatives for each item" (p. 423). Other scientists argue that the disadvantage of this method is that subjects with little or no information about a particular topic will often still express an opinion in order to conceal their ignorance or because they feel social or professional pressure to express an opinion. In order to prevent this from happening to the study, respondents' familiarity with each opinion object covered in the survey was investigated. So, a pretest was conducted with small samples of the three groups under study (2 researchers, 10 extension agents and 15 farmers in Dschang area). It was intended to determine whether they were capable of expressing an informed opinion about items of the survey instrument.

Part III of the questionnaire dealt with items that were direct measures of respondent's perception concerning conditions and situations relative to:

- collaboration between researchers, extension workers and farmers;
- assignment of research, teaching and extension responsibilities to one individual;

- integration of agronomic research, agricultural extension and education in one administrative unit.

Items were answered on a five-point Likert-type scale: (strongly disagree, disagree, undecided, agree, and strongly agree). As in Part II, a respondent was given the opportunity to circle an "undecided" response category.

Finally, respondents were stimulated to provide written comments. In this section, they provided: thorough opinions about the country's agricultural system. They expressed concerns about the questionnaire built with an unfamiliar American style. Most reaction was on respondent's perception of weaknesses of the Cameroonian Agricultural system as a whole. Suggestions for improving the system were provided. Information gained from the summary of these qualitative written comments were combined with the quantitative response summaries during the data analysis (next chapter). Some of the important comments are in their original language (French and/or English) left in Appendix D.

Population

As other researchers, the author could not investigate the entire population of researchers, extension workers and farmers in whom he was interested. So, investigation had to be limited to a small sample of researchers, extension workers and farmers. One of the problems faced was the selection of a sample of subjects who were representatives of the population to which the research findings might be generalized.

> The procedures we use in selecting our sample are very important because they determine the extent to which we can apply our findings to the population from which our sample was drawn" (Babbie, 1983, pp. 141-160,; Borg & Gall, 1983, p. 235).

It is generally admitted that the purpose of social research is to learn something about a large group of people by studying a much smaller group of people. According to Borg and Gall (1983), "the larger group we wish to learn about is called a population, whereas the smaller group we actually study is called a sample" (p. 238). Researchers distinguish two aspects of population. The first aspect they have identified is called target population or universe, meaning "all the members of a real or theoretical and hypothetical set of people . . . to which we wish to generalize the results of our own research" (Borg & Gall, 1983, p. 241; Babbie, 1983, p. 146).

The second aspect of research population is the survey population, said to be "that aggregation of elements from which the survey sample is actually selected" (Babbie, 1983, p. 147).

The target population for this study included all stakeholders that could be involved in some aspects of agricultural innovation development and dissemination in Cameroon, with respect to Arabica coffee and maize. Among the stakeholders, the following were considered:

1. Researchers from the Institute of Agronomic Research.
2. Maize and/or Arabica farmers of the country.
3. All extension workers from the Ministry of Agriculture and other institutions involved in some aspects of extension activities.

4. Teachers and students from the University Centre of Dschang, the Regional Colleges of Agriculture and the Technical Schools of Agriculture.

5. Policy makers from the Governance who vote on:

   - the allocation of resources to research institutions and Ministries,

   - laws establishing formal linkages between subsystems involved in the development and dissemination of agricultural innovations in Cameroon.

6. Administrators and agents of organizations (i.e. UCCAO), private citizens (i.e. licensed buyers) involved in the marketing of agricultural productions.

7. All individuals from parastatals (i.e. FONADER) and private organizations (i.e. AGRICHIM) involved in the supply of inputs (i.e. fertilizers, pesticides) without what adoption and dissemination of innovations may be limited.

Experience has shown that researchers could not investigate the entire population in whom they were interested. Among the major limiting factors, Babbie (1983) and Borg and Gall (1983) indicated time and financial resources. The limiting factors, the central purpose of the study led the author to limit itself to the following survey population:

1. Researchers: Scientists from the Institute of Agronomic Research, whose research responsibilities were in the area of maize and/or Arabica coffee. (32)

2. Extension Workers: Civil servants of the Ministry of Agriculture and the Rural Development Projects involved in the dissemination of agricultural innovations in the Country as a whole, and more specifically in the West Province (703, Prawl, 1986, p. 25).

3. Farmers: Persons in the West Province who owned and/or managed a unit of maize and/or Arabica coffee production (159.300, Prawl, 1986, Table #2).

Researchers

For years farmers thought that they were the developers of agricultural innovations and that whatever they learned from ancestors would be communicated to others. Today, this type of knowledge is no longer sufficient. Developing and disseminating agricultural innovations in a country like Cameroon is a major enterprise. Some scientists (basic and applied) commonly called researchers are specialized in:

- the invention or adaptation of potentially useful agricultural innovations,
- the local test to determine if it will work, is feasible in the farmer conditions,
- the dissemination of useful innovations to potential users.

Researchers from the Institute of Agronomic Research, involved in some way in cereal and coffee programmes were relevant to the study. Within the cereal programme attention was paid to those dealing exclusively with maize and within the coffee programme, the focus was on those concerned with Arabica coffee.

This group was chosen because of its commitment to try to extend the frontiers of scientific knowledge. Also, it was trying to apply scientific knowledge to farmers' problems, although farmers had little say on the research programmes. Researchers' main functions in the system were to develop and validate maize and Arabica coffee innovations.

Extension Workers

It has been shown that information from scientists does not get out to users unless someone works at getting it out, no matter how capable the potential adopters are or how interested the researchers are in getting their innovations used. Even if farmers went directly to researchers (in Cameroon, very few do as discovered during data collection), they would face a communication gap. The researchers' technical information needs to be translated into farmers' language before the farmers can understand it. For this translating, special expertise is required. This is one thing that the extension workers must do. The other is to get the translated information to users. Extension workers, thus, were chosen for their linking abilities.

A November 1985 study by Warren Prawl indicated that there were 9,670 extension workers (from the level of Agricultural Engineer to Monitor) in Cameroon distributed in the following organizations:

- Central Departments of the Ministry of Agriculture (227)
- Provincial Delegations of Agriculture (3,657)
- Regional Colleges and Technical Schools of Agriculture and other Minagri Services (374)
- Parastals, Development Societies, Public Industrial and Commercial enterprises, In Training Abroad and other Ministries (5,312) (Prawl, 1986, p. 25).

Only extension workers from the areas where maize and Arabica coffee were the major crops were considered in this study. Within the areas, the focus was narrowed down to those in service in the West Province (703) [Prawl, 1986, p. 25]. In this administrative unit, the

main employers of the extension workers are the Provincial Delegation of Agriculture for the West and the Rural Development Project of the West Province (PDRPO).

Farmers

It is at the farm level that the innovations developed and validated by researchers, then disseminated by extension workers are supposed to be used. Farmers form what Lionberger and Gwin (1982) called the "User Subsystem." It is at the farmstead that the integration or the act of putting diverse elements; "i.e. information, supplies and services" together occurs.

The 1984 Agricultural Census indicated that there were 1,155,500 farmers in Cameroon (Minagri, 1984 Agricultural Census, Table 2).

In the study, attention was paid to those growing maize and/or Arabica coffee. They were found to be in the West Province (159,300) (Prawl, 1986, Table 2). It is believed that they are in the best position to express opinions about linkages and relationships between organizations involved in the development and dissemination of maize and Arabica coffee innovations.

Sampling

"Sampling means selecting a given number of subjects from a defined population as representative of that population" (Babbie, 1983, p. 142; Borg & Gall, 1983, p. 240). The advantage of drawing a small sample from a large target population is that it saves the researcher the time and expense of studying the entire population. How to make

sure that the sample selected really is representative of the population to which the researcher wishes to generalize research findings is the concern of the following section.

Scholars have stressed that for a sample to be representative, the ideal solution is to select a random sample from the target population. A random sample being "one in which each individual in the defined population has an equal chance of being selected" (Borg & Gall, 1983, p. 244). Scientists admitted that the main purpose for using random sampling techniques in research was that they yield research data that can be generalized to a larger population within margins of errors that can be determined statistically. Also, random sampling permits the researcher to make certain inferences about population values (e.g., mean, standard deviation) on the basis of obtained sample values. Borg and Gall (1983) indicated that:

> If a random sample has not been drawn from a defined population, however, the logic of inferential statistics is violated and the results of inferential statistics must be interpreted with much more caution" (p. 244).

Random sampling bears some limitations. It is admitted that even if a simple random sample is initially selected, some subjects probably will refuse to cooperate and others will be lost through attrition, leaving the researcher with a sample that is not truly random. Examples are shown below.

During the data collection:

1. A researcher from Bambili "IRA" Station, initially selected was in Tunisia and did not return within the period the research was being conducted.

2a. One extension worker in the Nde Division refused to cooperate. The reason he gave was that the information provided will help the researcher to achieve a degree, and then improve his situation. While the potential respondent did not foresee any benefit to be gained by filling the questionnaire.

2b. A selected extension worker could not be reached. The extension staff list obtained indicated that he was in Bamougoum (Mifi Division). But during the questionnaire distribution, the researcher learned that the potential respondent has been transferred to Bangoulap (Nde Division).

2c. The Mifi Divisional Chief for the Rural Development project of the West was selected. He got the questionnaire, but two weeks later was dismissed from the position (it was learned that the dismissal came after his service vehicle was stolen) and could no longer fill the questionnaire. He no longer had access to documents that could help him to provide accurate information to the researcher.

3. A farmer, selected in Kouoptamo (Nun Division) could not be reached. Although he still was a farmer leader registered in that village, he could not be interviewed. And the researcher learned that the farmer leader was rather a "coxeur" and resided in Foumban. He only came back to the village during the harvesting season to illegally purchase other farmers' output. He sold his farm four years ago and nowadays runs a store and two trucks in Foumban.

The aforesaid examples indicated how hard it was to truly come out with a researchable random sample. Borg and Gall (1983) advised:

> If the sample was not formed randomly, the researcher must gather data about the sample and the population on characteristics critical to the study (p. 242).

Before describing the selection technique used to draw the samples studied, it is necessary to say a few words about the sample size. One of the problems faced by the author was the determination of the size of samples necessary to attain the objectives of the study. Borg and Gall (1983) suggested:

> The general rule is to use the largest sample possible. The rule is a good one because, although we generally study only samples, we are really interested in learning about the population from which they are drawn. The larger the sample, the more likely is its mean and standard deviation to be representative of the population mean and standard deviation (p. 257).

For survey research Seymour Sudman (1976) advised that:

> There be at least 100 subjects in each major subgroup and 20 to 50 in each minor subgroups whose responses are to be analyzed (p. 2).

Because of time constraint, the author collected only 412 questionnaires (Researchers, 25; Extension Workers, 163; Farmers, 224).

The size was also determined on the basis of advice provided by the guidance committee members, and Borg and Gall (1983) stressed that larger samples were necessary among other things under the following conditions:

- When many uncontrolled variables are present as in the study. Under such conditions, the large sample is the best solution since it ensures to some extent that the uncontrolled variables will themselves be operating randomly for the different groups being studied and therefore will not have a systematic effect upon the results.
- When attrition as already reported is expected.
- When the population is highly heterogeneous on the variables being studied (p. 257-260).

The same approach was used to select samples from the populations. The technique used was the simple random sampling; it is:

> a process of selection from a population that provides every sample of a given size an equal probability of being selected (Borg & Gall, 1983, p. 245).

Various techniques can be used to derive a simple random sample. In this study, the most common, which involves the use of a Table of Random Numbers to draw a sample from the list was applied. Following are the procedures for the selection of the three samples:

Researchers. A list of 32 researchers from the Institute of Agronomic Research (IRA) dealing exclusively with maize and/or Arabica coffee was obtained from the Administration office of the following research stations: Bambui, Ekona, Foumbot, Santa and Yaounde'. The author intended to interview all of them and have them fill the questionnaires. When he reported to the stations he realized that in:

- Bambui, one researcher could not be reached. He was attending a seminar in Tunisia (North Africa).
- Ekona, one of the potential respondents left two weeks earlier and was on maternity leave in her home town.
- Yaounde', the last one who could not be reached was attending a refresher course at Ibadan (Nigeria).

So, 29 of them could be interviewed and were given the questionnaire.

Extension Workers. Lists of Extension Workers were obtained from the six divisional delegations of agriculture and the six agricultural sectors (Rural Development Project of the West Province). The number totaled 703; each was assigned a number from 1 to 703. The Table of Random Numbers (Babbie, 1983, pp. 496-497) was used to draw a sample of 200 subjects from the list. Eyes closed, a row (column) was selected as starting point. Then, all the numbers that followed in the row

(column) was selected. When more numbers were needed, he proceeded to the next row (column) until enough numbers were selected to make up the desired sample size (200). Envelopes with names and addresses of the selected subjects were prepared and filled with questionnaire and cover letter.

Farmers. Lists of farmer-leaders were obtained from the Agricultural Sector offices of the Rural Development Project of the West in Bafoussam, Foumban and Mbouda. These being the main producing areas of the maize and Arabica coffee.

As we did for the other cases, a number from 1 to 970 was assigned to each farmer-leader. Using the Table of Random Numbers, a sample of 265 subjects was drawn from the list. During the data collection 15 non-selected farmers were added to the sample. This was intended to verify if farmer-leaders were really representative of the farmer population.

Instrumentation

Self-administered questionnaires were used in this study to collect the data. This approach was combined with participant observation and interview (unstructured and structured). Many reasons led the researcher in reaching the decision to use different but complementary approaches for data collection:

1. Most farmers could not record answers on questionnaire items. Interviewers were recruited and trained. Their duty was to interview selected farmers and record the answers on the questionnaire. The selection, training and supervision of interviewers is subject of an entire section.

2. Participant observation helped the research or to familiarize himself with the current linkage issues raised by researchers, extension agents and farmers.

3. The survey population is more familiar with interviews and participant observation than any other research techniques.

4. Resources were available and the researcher could travel to meet with respondents to be interviewed.

Each research technique was beneficial to the researcher. Information gathered went beyond the scope of this study despite the efforts made by the researcher to limit conversations to the research topic.

Questionnaire Development

For each sample, a three-part questionnaire was developed for completion by selected respondents. Part I requested data on personal and situational characteristics of the elements selected for the study. Part II was designed so that the respondents reflected their perception toward a set of statements related to activities that will indicate the current linkages between the Institute of Agronomic Research, the Extension Service and the production subsystem. Those who responded expressed their opinions on a five-point scale (1 = definitely should not; 2 = should not; 3 = may or may not; 4 = should; 5 = definitely should) combined with a three-point frequency scale (1 = often; 2 = sometimes; 3 = never). Part III was developed in such a way that respondents' perception toward the following terms and/or conditions could be measured on a five-point Likert-type scale (1 = strongly disagree; 2 = disagree; 3 = undecided; 4 = agree, 5 = strongly agree):

- Linkages through collaboration between members of the agricultural subsystems.
- The linkage effectiveness by assigning teaching, research and extension responsibilities to one member of the agricultural subsystems.
- Linkages through integration of certain agricultural subsystems in the same administrative unit.

Directions were given at the beginning of each part of the questionnaire. Some respondents were rather irritated by the directions. The questionnaire was designed in an American style while most respondents had French educational background. They were not used to such an approach to research, but visits the researcher paid to respondents helped to ease the situation. Purposes of directions were explained. Sometimes, it was followed by a lengthy discussion. Often, the respondent was convinced by the usefulness of directions in a research instrument.

Instructions also were provided throughout the survey instrument. They were intended to encourage respondents to make written comments and most of them did. The last page of the questionnaire contained blank space to provide respondents an opportunity to make final comments. Each of the respondent group had two versions of the questionnaire: English and French versions. Researchers and extension workers chose the version which best matched their language interest. Farmers provided information recorded in the interviewer's major language.

When developing a survey instrument, social scientists pay special attention to two technical considerations: reliability and validity.

They often ask themselves the following questions:

1. Is it reliable? Is it an accurate, consistent and stable measuring instrument?

2. Is it valid? Is it really measuring what it claims to measure? And is it relevant?

Validity

Validity is defined as "the extent to which a measuring device fulfills the purpose for which it is used." There are several standards for validity: face, content, construct, concurrent and predictive. Three types of validity were considered during the development of the survey instrument: content, construct and face validity. According to Borg and Gall (1983):

> Content validity is the degree to which the items in the instrument represent the content that it is designated to measure (p. 276).
>
> Construct validity in the other hand is the extent to which a particular instrument can be shown to measure a hypothetical construct (p. 280).

Isaac and Michael (1984) stressed that:

> face validity is used to indicate whether the instrument, on the face of it, appears to measure what it claims to measure (p. 113).

Before reviewing how the validity of the instrument was insured let us remind the reader that:

> these aspects of validity are only conceptually independent, and only rarely is just one of them important in a particular situation; a complete study of an instrument would normally

> involve information about all types of validity (Isaac & Michael, 1984, p. 122).

When the Guidance Committee met to review the research proposal, a thorough examination of the questionnaire took place. Each member provided useful comments on the instrument (removal of items which seemed not relevant to the study and editing).

In Cameroon, the instrument adopted by the Guidance Committee and the University Committee on Research Involving Human Subjects (UCRIHS) went through the following procedures: pre-testing, translation into French, pre-testing and administration at a large scale.

The English version of the questionnaire was circulated to two researchers, ten extension workers and fifteen farmers in Dschang area. Researchers, extension workers and farmers chosen were similar to the three groups of the survey population. For the farmers, an English speaking agent was recruited as pre-test interviewer.

All questionnaires came back with written comments. After the refinement, the instrument was translated into the French language. Two researchers, ten extension agents and fifteen farmers, different from the previous ones were selected for the pre-test of the new instrument. A French speaking agent was recuited at this phase to translate and record the answer for farmers. As in the first case, all the questionnaires were returned with suggestions. The researcher realized that certain terms were preferred to others (i.e. extension personnel preferred the term "agent de developpement" to "agent de vulgarisation," while farmers preferred "planteur" to "paysan").

Comments and suggestions made by respondents on the pre-tests were considered and incorporated into the final version of the questionnaire.

The English version of the cover letter approved by the University Committee on Research Involving Human Subjects (UCRIHS) was jointly signed by the Guidance Committee Chairman, the Director General of the University Centre of Dschang and the Researcher. Because of delays in equipment acquisition, the Guidance Committee chairman left Cameroon while the French version of the cover letter was not ready. Nevertheless, it was jointly signed by the Deputy Director General of the University Centre of Dschang and the researcher. The questionnaires and cover letter were ready to be sent to selected respondents.

Reliability

It is defined as:

> the accuracy with which a measuring device measures something; the degree to which an instrument measures consistently whatever it does in fact measure (Babbie, 1983; Borg & Gall, 1983; Isaac & Michael, 1984).

There are several ways of creating reliable measures. Babbie (1983), Seymour Sudman and Norman Bradburn (1986) advised to:

- ask only for information relevant to the research;
- in asking people for information, ask only about things the respondents are likely to know the answer. Ask about things relevant to them, and be clear in what you are asking;
- be clear in the question;

- ask for the same information more than once using the same or a similar question;
- ask several questions about the same concept. If one of the questions elicits a very different response, that is a clue that the item is unreliable.

Babbie, Sudman and Bradburn's advice was closely followed during the pre-test. Some respondents were upset with repetition. Final comments of one respondent are significant. "Vous faites trop de jeux de mots et les memes phrases sont parfois renversees."

Distribution and Collection of the Questionnaire

Questionnaires were printed on 8 1/2" x 11" white sheets. The front page contained the research topic, the respondent's group category and the addresses of the Michigan State University AEE Department and the Rural Education Department of the University Centre of Dschang.

It is later that the researcher realized the importance of the addresses. Most questionnaires were unexpectedly returned by mail, while they were hand delivered.

Different approaches were used in delivering and collecting questionnaires to the three groups of survey population.

Researchers

The visit to each research station was announced at least two weeks in advance by a radio message. The latter specified the date, time, purpose of the visit and the researchers the author wanted to meet with.

During the first visit to the station, lists of researchers dealing with crops under study were obtained. The author met with the chief of the station and available researchers.

During the second visit, questionnaires, accompanied with cover letters were delivered to selected respondents. A third visit was paid to Foumbot Research Station where four out of seven researchers did not return the questionnaire within the deadline.

In Bambui, the author was lucky, since the day of his second visit coincided with researchers' monthly meeting. As the visit was announced in advance, potential respondents established a schedule.

After the meeting, the author was introduced to researchers by the chief of the station and was given the schedule. It was interesting to see that the four-day programme was completed in two. Meetings were planned even after the working hours. All selected respondents except one who was in Tunisia by the time of the data collection, returned their questionnaire with interesting, useful comments and suggestions for improvement.

Extension Workers

During the first visit to Divisional and Subdivisional Delegations of Agriculture, the researcher inquired about each extension worker's working language. Lists of extension staff were also obtained during the occasions. Envelopes bearing names and addresses of selected respondents were prepared. Questionnaires and cover letter were in the working language of the respondent. Selected respondents were then grouped by subdivision.

During the second visit to the localities, questionnaires were given to the Subdivisional Delegate of Agriculture. He was in charge of distributing to the extension workers of his area. It was possible since they usually meet every fortnight for evaluation. It would have been very costly for the author to travel in all areas where extension workers were located. The Subdivisional Delegates of Agriculture also accepted the responsibility for collecting the questionnaires from their colleagues.

A third and sometimes a fourth visit were paid to the Subdivisional Delegations of Agriculture to collect the remaining questionnaires.

Most of the Divisional Delegates, Provincial Chief of Services, mailed the completed questionnaires to the Department of Agricultural Education at the University Centre of Dschang. Their unexpected initiatives saved a lot of research resources.

Farmers

They were selected in the three main producing divisions of both maize and Arabica coffee. The divisions were: Bamboutos, Mifi and Nun. Subdivisions in which farmers to be interviewed were randomly selected during the researcher's first visit to the Divisional Delegations of Agriculture. The following subdivisions were therefore selected:

- Galim in the Bamboutos Division
- Baham, Bamendjou and Bandjoun in the Mifi Division
- Foumbot, Koutaba and Foumban in the Nun Division

It was not possible to have a complete list of all farmers of the aforementioned areas. Nevertheless, leaders in the Rural Development Project of the West Province "PDRPO" provided lists of farmer-leaders of the entire Province by Division, Subdivision and Villages.

Farmer-leaders are elected representatives of their peers at the level of the Cooperative Centre of the Central Union of the Agricultural Cooperatives of the West "UCCAO."

The cooperatives of the Central Union of the Agricultural Cooperatives of the West (UCCAO) are farmer associations owned by Arabica coffee farmers of the West Province who use their facilities and services. The structural organization of the cooperatives are superseded on the political divisions of the West Province. Each cooperative is divided into cooperative sections. A section consists of several cooperative centres, established within an entire chiefdom or a quarter of the chiefdom. A cooperative centre consists of cooperative member-farmers.

Membership to the cooperative is opened to anybody growing at least 500 plants of Arabica coffee. This number may cover a land area of .5 ha (approximately one acre).

Member-farmers elect representatives to the cooperative centres, who in turn, elect board of directors of the cooperative section and so on. Members of the board of directors of the cooperative centres are called farmer-leaders. The characteristics of the farmer-leaders in this study are summarized in Table 7.

Farmer-leaders to be interviewed were randomly selected from the lists provided by PDRPO. The technique used to select farmer-leaders was similar to the one used to select extension agents.

Because of their level of education, farmers were not asked to read questionnaires and enter their own answers. The researcher recruited and trained interviewers who asked questions orally and recorded respondents' answers on the questionnaire.

It is often admitted that there are advantages in having questionnaires administered by an interviewer rather than the respondent, who in this situation cannot record the answers by himself. Among the advantages, Babbie (1983) indicated:

> Higher response rates than mail surveys, decreases in the number of "no response," guard against confusing questionnaire items (p. 229).

Interviewers were hired and they were promised to get a premium for each questionnaire well filled. Interviewers were selected among the professional interviewers of the Ministry of Agriculture. This research happened to be conducted when they were on break. With the help of the Divisional Delegates of Agriculture of the selected areas, interviewers were selected on the basis of their availability, the ability of communicating in the language of the villages where farmers ought to be interviewed, and their educational level (at least 6 years of high school).

On the basis of the above criteria, the geographical area to cover, and the resources available, nine interviewers were chosen:

[two (Kouoptamo), one (Foumbot), one (Foumban), one (Baham), one (Bandjoun), one (Bamendjou), and two (Galim)].

Three training sessions took place respectively in Bafoussam, Galim and Kouoptamo. Interviewers were briefed concerning the purpose of the study and the importance of their contribution to its success. Instrument items were reviewed. Any misinterpretation was examined. At the end of the session, role play technique was used to verify if everything was understood. Some participants were interviewers while others played the role of farmers. They were thus given the questionnaires and cover letters. According to the following figures:

Kouoptamo	40	Galim	15
Koutaba	30	Baham	15
Foumbot	50	Bamendjou	30
Foumban	30	Bandjoun	30

The number of farmers selected by community depended on its farming population size and the importance of maize and Arabica coffee to that community.

Interviewers were advised to contact the Subdivisional Delegates of Agriculture in case they faced any problem. A meeting with them was scheduled after two weeks. During the session no major problem was reported.

The Subdivisional Delegates of Agriculture supervised the interviewers during their normal tours in the villages.

When it was realized that some farmer-leaders were no longer representatives of their colleagues, interviewers were advised to randomly choose in the community farmers who were not listed and

interview them. Forty-five such farmers were interviewed. The analysis of data indicated no significant difference between the 45 and other farmers normally selected. By January 3, 1987, 412 questionnaires (25 researchers out of 29, 163 extension workers out of 200, and 224 farmers out of 265) were collected. The total return rate was 83.56%. There was little concern about the 16.44% nonrespondents. In fact, Borg and Gall (1983) said that:

> If only a small percentage of your subjects failed to respond, this question is not critical. If more than 20 percent are missing, however, it is very likely that most of the findings of the study could have been altered considerably in the non-responding group had returned the questionnaire and had answered in a markedly different manner than the responding group (p. 434).

So, it is desirable to check the nonresponding group if more than 20% of the questionnaires are not returned.

The cover letter and questionnaire both gave instructions to respondents concerning the possibility of receiving a summary of the study. If interested, the individual was requested to write his/her name and address on a separate sheet and return along with the questionnaire. Of the instruments returned, 351 made a request for a copy of the research summary (85.20% of the total respondents).

Structured and Unstructured Interviews

Structured interviews were extensively used by the hired interviewers to gather information from farmers. The researcher used unstructured interview to get information from extension workers and agricultural researchers. No structured instrument was used. However,

in most discussions, certain questions and interpretations were the main focus of the discussion:

- Extension agents often raised concerns about their inability to return to the University Centre of Dschang for further training, lack of in-service training opportunities, etc.
- Researchers often inquired about training opportunities in the U.S. universities.
- Both groups expressed serious concerns about the current Cameroonian agricultural system and its ability to sustain food self-sufficiency. Weaknesses and issues were discussed. Also, it often came out that neither extension workers, nor farmers and research technicians were involved in decision making process within the system. It often was reported that farmers declined the adoption of coffee innovations because of low prices they received for their output. Suggestions for improvement were often made.

So, the unstructured interviews were of special value to the researcher in: (1) filling gaps in his knowledge of the existing system; (2) determining the rationale used by extension workers, research technicians, and researchers in general; and (3) determining their conclusions and general comments.

Data Analysis

Data obtained from the 412 questionnaires were prepared for analysis on a microcomputer using the statistical analysis package "Statpack" (Walonick, 1985). This program was chosen for its ability to be handled by neophytes of computer manipulation such as the author. Lack of financial resources also contributed to the choice of the program.

A codebook was constructed to guide in the transformation of questionnaire responses into numerical data for computer entry. All quantifiable data were recorded on disk through direct keyboard entry. The data were submitted to frequency counts in order to detect data entry or coding errors, with corrections being made where necessary.

The first part of the analysis consisted of determining the basic distributional characteristics of the data. Response frequencies and measures of central tendency (mean, medium, mode) and dispersion (variance, standard deviation) were generated for respondents on each appropriate questionnaire item in Part I and Part II. A breakdown procedure was used to generate descriptive statistics for each of the three main groups and for other selected subgroupings (male, female, etc.). Items from the questionnaire (Part II) that provided for responses on a 5-point Likert-type scale were interpreted and analyzed if they were measured at the interval level. One-way Analysis of Variance (ANOVA) tests were utilized to compute F ratios in order to determine if significant differences existed between main groups and between subgroups on individual response mean scores. A statistical t-test was reported between any two group or subgroup mean scores when a significant t statistic was indicated. The .05 level of significance with an accompanying 95% confidence level was used in assessing results of this study.

Summary

This chapter gave a detailed description of the methods and procedures that were used in conducting the study. The first section

contained the fundamental reasons for the selection of the descriptive survey method and the measurement process. In the second section, the criteria of selecting target and survey population were exposed.

The third section explained the questionnaire development, validation, distribution and collection. This section outlined the interviewer recruitment, training processes.

The fourth and final section contained an introduction to the data analysis procedures, used to produce the findings that will be presented in Chapter IV. (Copies of the survey documents and supplemental materials utilized in the survey are contained in Appendix C.)

Th

- as
  Ca
  an

- ex
  fa
  Re

In

Followi

- Th

- Th

- De

- Pe

- Pe

- Cu
  th

- Co
  of

- Pe
  ag

- Su

CHAPTER IV

STUDY FINDINGS

Introduction

The purpose of the study was to:

- assess the current formal and informal linkages among and between Cameroonian agricultural subsystems involved in the development and dissemination of maize and Arabica coffee innovations;
- examine the perception by researchers, extension workers and farmers of linkages among and between the Institute of Agronomic Research, the Extension Service and the Production subsystem.

In this chapter, the findings are presented and discussed. Following are the main sections of the chapter:

- The Non-Respondents.
- The Respondents.
- Description of each respondent group.
- Perception of linkages within each respondent group.
- Perception of linkages between respondent groups.
- Current perceived formal and informal linkages between members of the subsystems under study.
- Comparison of perception response means for members of subgroups of the survey population.
- Perception by response groups of linkages between members of agricultural subsystems through collaboration and integration.
- Summary of written comments by respondent groups.

retur

The d

follow

- f

- t

- f

R

office

(e.g.

semina

T

instru

- A
p
c
t

- T

- D
(

F

interv

were e

The Non-Respondents

Eighty-two out of 494 members of the survey population did not return the questionnaires within the deadline set by the researcher. The distribution of nonrespondents between the survey groups was as follows:

- four researchers out of 29;
- thirty-seven extension agents out of 200;
- forty-one farmers out of 265.

Researchers who did not return the questionnaires were not in offices by the time data were collected. They mostly were on leave (e.g. maternity, training, and participation in international seminars).

Thirty-seven extension workers failed to return the survey instrument for the following reasons:

- Apparent unwillingness to cooperate. In fact, there was no penalty for those selected members of the survey population who could not return the questionnaires. This was clearly stated in the cover letter.
- Transfer of extension agents from one location to another.
- Dismissal of extension agent from positions for various reasons (Also, see Chapter III, the Sampling).

Forty-one farmers out of 265 could not be reached by the interviewers. Most of them were no longer in communities where they were expected to be.

allow

would

respor

result

T

the 41

were e

F

catego

The limited resources (i.e. time) available to the author did not allow him to get access to the nonrespondents. Moreover, while it would have been good to have a higher percentage of returns, a non-respondent rate of 16.46% did not appear to seriously affect the results.

The Respondents

There were 412 cases in this study: 25 respondents (6.0%) out of the 412 cases were researchers; 163 (40.0%) out of the 412 respondents were extension agents; while 224 (54.0%) were farmers.

Figure 10 displays the distribution of the respondents by group category.

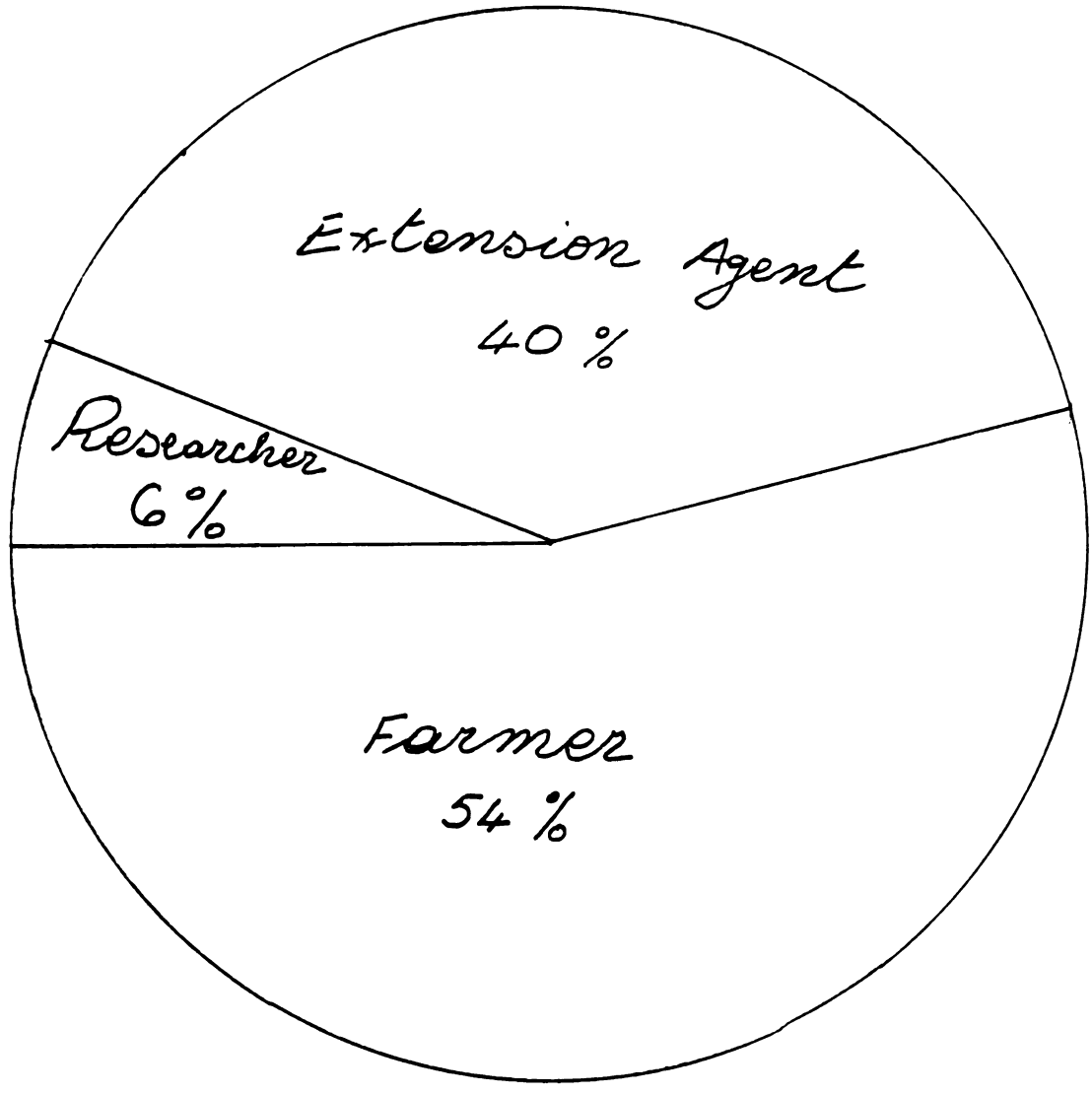


Figure 10. Respondent Group Category (n = 412).

the

their

perce

small

numbe

femal

Thirty-six (8.9%) of the 412 cases were females; 363 (88.0%) of the 412 respondents were males. Respondents that did not indicate their gender amounted to 13 (3.1%) of the 412 respondents. The percentage of respondents who failed to indicate their gender was smaller (3.1%) than the percentage of non-respondents (16.46%). The number of male respondents (363) was about ten times the number of female respondents (36).

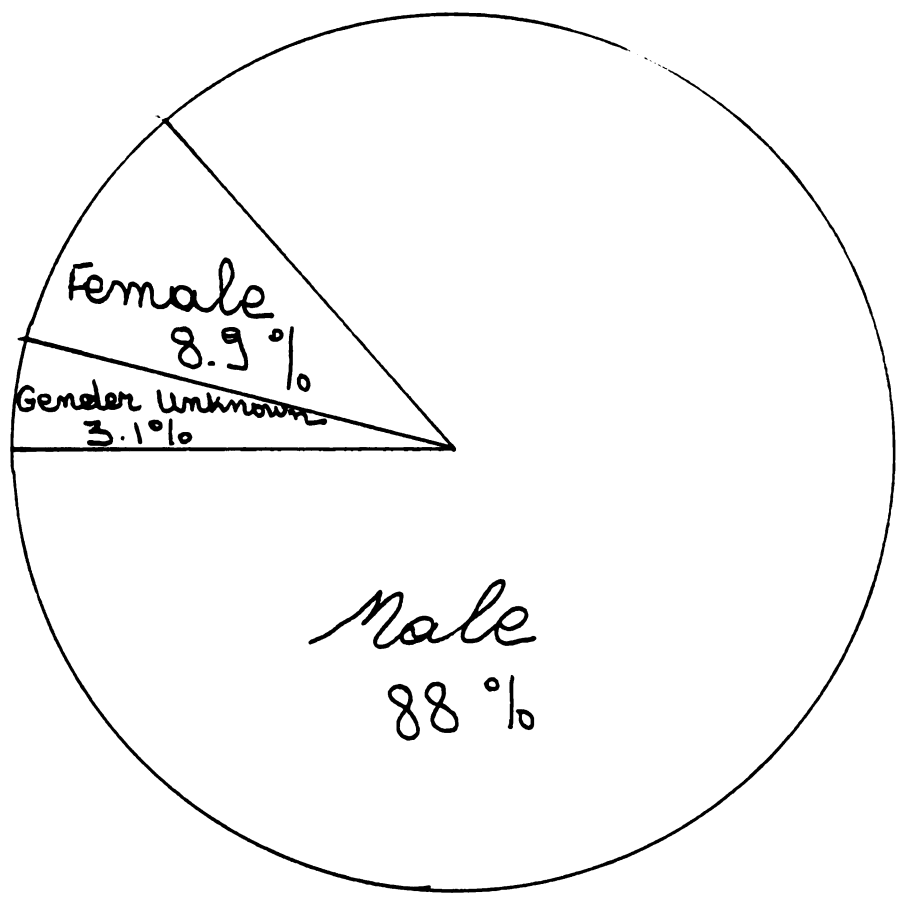


Figure 11. Gender of Respondents.

The

while

resea

respo

respo

exten

displa

Table

Age Ra

25 yea

26-29

30-34

35-39

40-44

45-49

50-54

55 an

No Re

Total

Sourc

The majority of respondents were between the ages of 30-34 years. The farmer group had 24.1% of its respondents aged 55 years and over, while no extension agent was in that age category. Only 4.8% of the researchers fell in the older age. On the other hand, only nine respondents (2.2%) were 25 years old or less. All researcher respondents were more than 25 years old.

Table 3 displays the number and percentage of respondent farmers, extension agents and researchers by age range. The same data are displayed in Figure 12.

Table 3. Number and percentage of respondent farmers, extension agents and researchers by age range

Age Range	Respondents (n = 412)					
	Farmer		Extension Agent		Researcher	
	No.	%	No.	%	No.	%
25 years or under	2	0.9	7	4.3	0	0.0
26-29	6	2.6	52	31.9	2	8.0
30-34	30	13.4	62	38.0	4	16.0
35-39	43	14.7	23	14.1	8	32.0
40-44	29	13.0	9	5.5	7	28.0
45-49	24	10.7	6	3.7	2	8.0
50-54	36	11.1	2	1.2	1	4.0
55 and over	51	22.8	0	0.0	1	4.0
No Response	3	1.3	2	1.2	0	0.0
Total	224	100.0	163	100.0	25	100.0

Source: Data collected during the field survey.

100
80
60
40
20
0
Percentage of Respondents

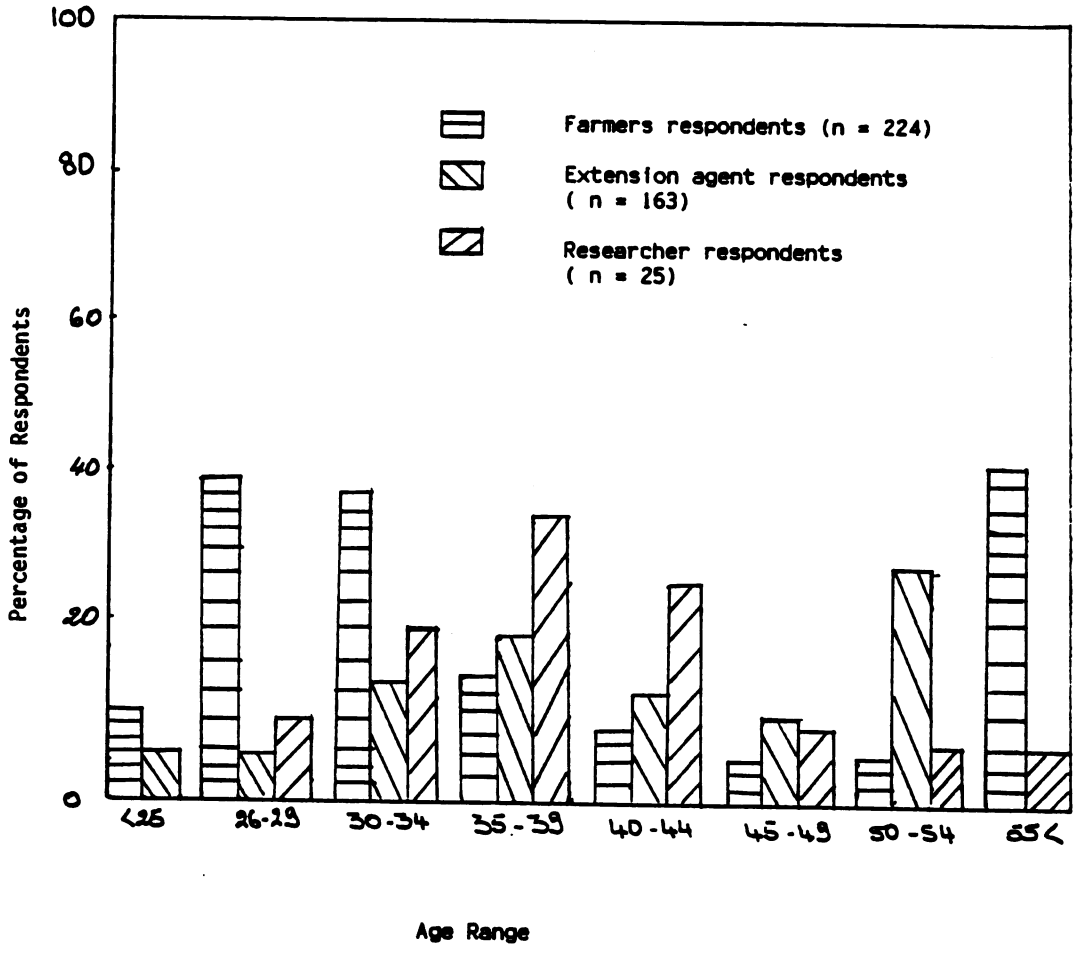


Figure 12. Age of Respondents.

years
(137
Bache
respo
than
educa
or ed
educat
resear
played
accord
resear
T
three

The majority of respondents (34.4%) had had a maximum of four years of formal education. Most of these respondents were farmers (137 of the 141 cases). The least educated researchers held a Bachelor's degree or its equivalent. The most educated extension agent respondents held the degree of Agricultural Engineer, which is higher than Bachelor's degree but less than a Master's degree. The most educated farmer respondents did not reach the Bachelor's degree level or equivalent. These findings seemed to suggest that the different educational levels may affect the working linkages between members of research and production subsystems. This linking role is likely to be played by the extension subsystem whose educational level was, according to this study, intermediary between farmers' and researchers'.

Table 4 contains the data regarding the levels of education of the three survey groups.

Table

Level

4 yea

5-6 y
equiva

7-9 y
equiva

10-12
equiva

13-15
equiva

More
but l
Bache
equiv

Bache
equiv

Agric
Engin
equiv

Maste
equiv

Ph.D.

Other

No Re

Total

Table 4. Number and percentage of respondent farmers, extension agents and researchers by level of education

Level of Education	Respondents (n = 412)					
	Farmer		Extension Agent		Researcher	
	No.	%	No.	%	No.	%
4 years or less	137	61.2	1	0.6	0	0.0
5-6 years/ equivalent	45	20.1	67	41.1	0	0.0
7-9 years/ equivalent	17	7.6	4	2.5	0	0.0
10-12 years/ equivalent	8	3.6	25	14.1	0	0.0
13-15 years/ equivalent	2	0.9	36	22.1	0	0.0
More than 15 years but less than a Bachelor Degree/ equivalent	15	6.7	5	3.1	0	0.0
Bachelor Degree/ equivalent	0	0.0	15	9.2	3	12.0
Agricultural Engineer/ equivalent	0	0.0	5	3.1	4	16.0
Master's Degree/ equivalent	0	0.0	0	0.0	6	24.0
Ph.D./Equivalent	0	0.0	0	0.0	11	44.0
Other	0	0.0	6	3.7	1	4.0
No Response	0	0.0	1	0.6	0	0.0
Total	224	100.0	163	100.0	25	100.0

farme

Percentage of Respondents

01 = 4
2 = 5-6
3 = 7-9

Figure 13 displays the various levels of education of respondent farmers, extension agents and researchers.

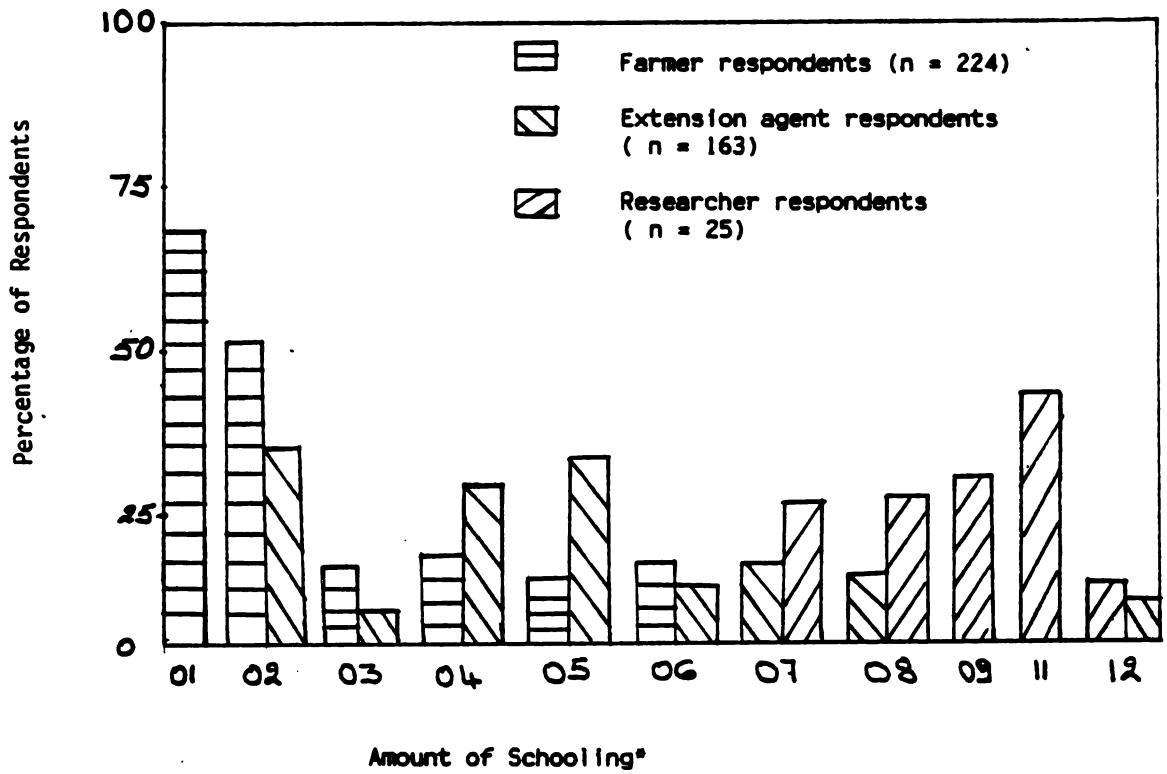


Figure 13. Level of Education of Respondents.

*01 = 4 years or less
02 = 5-6 years/equivalent
03 = 7-9 years/equivalent
04 = 10-12 years/equiv.
05 = 13-15 years/equiv.
06 = more than 15 but less Bach./equiv.
07 = Bach. D./equiv.
08 = Ag. Engineer
09 = Master's
10 = Ph.D.
11 = Other

1.

2.

3.

groups

Agricu

about

age,

the pr

of re

(10)

area(s

the

variet

farmer

E

influe

of the

Description of Each Respondent Group

The three groups in the survey population were:

1. Agricultural researchers from the Institute of Agronomic Research "IRA," whose main research responsibilities were in maize and/or Arabica coffee programs;
2. Extension workers from the Ministry of Agriculture "MINAGRI" and the Rural Development Project of the West "PDRPO;"
3. Maize and/or Arabica coffee farmers from the main producing areas of both crops.

A description of important characteristics for each of the three groups is presented in the following subsection.

Agricultural Researchers

The agricultural researchers who responded, provided information about the following characteristics: (1) position, (2) gender, (3) age, (4) citizenship, (5) level of education, (6) number of years in the profession, (7) current research responsibilities, (8) language(s) of research reports, (9) language(s) of communication with farmers, (10) Language(s) of communication with extension workers, (11) major area(s) of the highest degree earned, (12) length of dissemination of the latest maize variety, (13) length of dissemination of the latest variety of Arabica coffee, (14) channel(s) of communication with farmers, (15) channel(s) of communication with extension workers.

Each of these characteristics was considered to have a potential influence on linkage patterns with other groups and with other members of the same researcher groups.

Table

Posit

Gende

Age

Citiz

Educa

Numbe

A summary of researcher characteristics is presented in Table 5.

Table 5. Characteristics of agricultural researcher respondents

Characteristics	No.	%
Position		
Chief of research centre	1	4.0
Chief of research station	3	12.0
Chief of research antenna	1	4.0
Technician of research	2	8.0
Assistant of research	5	20.0
"Charge" of research	4	16.0
Other (e.g. Chief of Party)	8	32.0
No response	1	4.0
Gender		
Female	3	12.0
Male	22	88.0
Age		
25 or less	0	0.0
26-29	2	8.0
30-34	4	16.0
35-39	8	32.0
40-44	7	28.0
45-49	2	8.0
50-54	1	4.0
55 and over	1	4.0
Citizenship		
Cameroonian	15	60.0
Other	10	40.0
Education		
Bachelor Degree and equivalent	3	12.0
Agricultural Engineer	4	16.0
Master's Degree	6	24.0
Ph.D.	11	44.0
Other	1	4.0
Number of Years in Profession		
0-4 years	8	32.0
5-9 years	7	28.0
10-14 years	2	8.0
15-19 years	3	12.0
20 years and more	5	20.0

Tabl

Curre

Langua

Langua

Langua

Channe

Channe

Table 5. (cont'd)

Characteristics	No.	%
Current Research Responsibility		
Arabica coffee	3	12.0
Maize	13	52.0
Both	1	4.0
Other	6	24.0
No Response	2	8.0
Language(s) of Research Report		
English	15	60.0
French	5	20.0
Both	5	20.0
Language(s) of Communication with Farmers		
English	9	36.0
French	7	28.0
Both	6	24.0
Other	2	8.0
No Response	1	4.0
Language(s) of Communication with Extension Workers		
English	10	40.0
French	9	36.0
Both	5	20.0
Other	1	4.0
Channel (1) of Communication with Farmers		
Group	1	4.0
Group and Individual	1	4.0
Mass	3	12.0
Mass and Individual	4	16.0
Mass and Group	15	60.0
No Response	1	4.0
Channel(s) of Communication with Extension Workers		
Individual	1	4.0
Individual and Group	1	4.0
Mass	3	12.0
Mass and Group	18	72.0
No Response	2	8.0

Table 5. (cont'd)

Characteristics	No.	%
Major Area of the Highest Degree Earned by the Researcher		
Social Sciences	1	4.0
Biometrics	1	4.0
Agricultural Economics	2	8.0
Crop Breeding	6	24.0
General Agronomy	7	28.0
Other (e.g. Soil Science, Farming Systems, etc.)	8	32.0
Length of Time Since Dissemination of the Latest Variety of Maize		
Less than one year	1	4.0
1-2 years	3	12.0
3-4 years	0	0.0
5-6 years	2	8.0
7-8 years	1	4.0
9-10 years	2	8.0
11 years and more	1	4.0
No Response	15	60.0
Length of Time Since Dissemination of the Latest Variety of Arabica Coffee		
Less than one year	0	0.0
1-2 years	0	0.0
3-4 years	0	0.0
5-6 years	1	4.0
7-8 years	0	0.0
9-10 years	2	8.0
11 years and more	1	4.0
No Response	22	84.0

Eight of the 25 researcher respondents (32.0%), all foreigners, have different titles from what is commonly known in Cameroon. Their position might be "Contract Expatriate Researcher" or "Chief of Project/Unit," etc. Of the researcher respondents, three out of 25 (12.0%) were female. One of them, a USA citizen held a Ph.D. in

anth

high

The t

Degre

emplo

Resea

and 3

indic

that

does

worker

held

socia

(60%)

commu

commu

respo

coffe

coffe

coffe

anthropology, and was the "chief of the unit" of the dissemination of high yielding maize variety in the South West Province of Cameroon. The two others, Cameroonians, both U.S.A. graduates, held Master's Degree in Crop Breeding and Crop Protection respectively, and were employed in Training and Liaison Unit (TLU) and Farming System Research.

Of this group category, eight out of 25 (32.0%) were between 35 and 39 years of age. Only two (8.0%) were above 50 years of age. This indicates a relatively young research team and is supported by the fact that 32% of them have served for less than four years.

Eight out of 25 (32.0%) researchers are expatriates. Their status does not favor the development of informal linkages with extension workers or with farmers.

Eleven out of 25 researchers (44%) held Ph.D.s, while six (24%) held Master's Degrees in different areas related to agricultural and social sciences.

English was their basic working language. Fifteen out of 25 (60%) reported the research results in English. Nine out of 25 (36%) communicated with farmers in English; and ten out of 25 (40%) communicated with extension workers in English.

Thirteen (52%) of the researcher respondents had their research responsibility in maize, while only three (12%) dealt with Arabica coffee. Six (24%), others, although, they dealt with research on coffee, preferred to be classified as administrators, rather than coffee researchers.

Mass media and group approaches were the two main channels of communication with farmers (60%) and extension workers (72%).

Fifteen out of 25 researchers (60%) were not aware of any formal dissemination of a new variety of maize for the past two years. The maize variety Z290 widely disseminated in the West and North-West Provinces was officially released to potential adopters in 1976.

None of those dealing with Arabica coffee recalled of any dissemination of a new variety for the past two years. The "Java" variety, currently contested by farmers and extension workers because of its sensitivity to diseases and short-life expectancy has been disseminated since 1977.

Agricultural Extension Agents

Extension agents provided information about the following personal characteristics: (1) position in the service, (2) gender, (3) age, (4) educational level, (5) number of years in the profession, (6) number of farmers currently served, (7) language(s) of communication with farmers, (8) language(s) of communication with researchers, (9) channel(s) of communication with farmers, and (10) channel(s) of communication with researchers.

A summary of these characteristics is presented in Table 6 below.

Tab

Posi

Gende

Age

Educa

Table 6. Characteristics of agricultural extension worker respondents

Characteristics	No.	%
Position/Title		
National Chief of Extension Service	1	.6
Provincial Chief of Agricultural Service	1	.6
Divisional Delegate of Agriculture	3	1.8
Sub-Divisional Delegate of Agriculture	17	10.4
Chief of Agricultural Post	23	14.1
Agricultural Monitor	72	44.2
Other (e.g. Chief Sector PDRPO)	40	24.5
No Response	6	3.7
Gender		
Female	5	3.1
Male	154	94.5
No Response	4	2.5
Age		
25 years or under	7	4.3
26-29 years	52	31.9
30-34 years	62	38.0
35-39 years	23	14.1
40-44 years	9	5.5
45-49 years	6	3.7
50-54 years	2	1.2
55 years and over	0	0.0
No Response	2	1.2
Educational Level		
4 years in school or less	1	0.6
First school leaving certificate	67	41.1
Agricultural Conductor	4	2.5
Technical Agricultural Agent	25	14.1
Agricultural Technician	36	22.1
Senior Agricultural Technician	5	3.1
Engineer of Agricultural Works	15	9.2
Agricultural Engineer	5	3.1
Master's Degree	0	0.0
Ph.D.	0	0.0
Other	6	3.7
No Response	1	0.6

Tab

Numb

Numbe

Main

Mair

Mai

Table 6. (cont'd)

Characteristics	No.	%
Number of Years in the Extension Profession		
Less than one year	17	10.4
1-4 years	82	50.3
5-9 years	28	17.2
10-14 years	17	10.4
15-19 years	9	5.5
20 years and more	9	5.5
No Response	1	0.6
Number of Farmers Served		
299 or less	11	6.7
300-399	5	3.1
400-499	11	6.7
500-599	13	8.0
600-699	5	3.1
700-799	15	9.2
800-899	7	4.3
900-999	4	2.5
1,000 or more	76	46.6
No Response	16	9.8
Main Language(s) of Communication with Farmers		
English	3	1.8
French	51	31.3
Both	11	6.7
Local dialect/Pidgin	96	58.9
No Response	2	1.2
Main Language(s) of Communication with Researchers		
English	3	1.8
French	134	82.2
Both	19	11.7
Local dialect/Pidgin	2	1.2
No Response	5	3.1
Main Channel(s) of Communication with Farmers		
Individual	2	1.2
Group	9	5.5
Mass	21	12.9
Individual and Group	5	3.1
Individual and Mass	4	2.5
Group and Mass	109	66.9
No Response	13	8.0

Tab

Mair

(44.

were

They

with

resp

line

divi

dele

the

(38%

Exte

Cert

serv

Table 6 (cont'd)

Characteristics	No.	%
Main Channel(s) of Communication with Researchers		
Individual	3	1.8
Group	6	3.7
Mass	8	4.9
Individual and Group	6	3.7
Individual and Mass	14	8.6
Group and Mass	106	65.0
No Response	20	12.3

Most extension agent respondents were agricultural monitors (44.2%). Forty out of the 163 (24.5%) extension worker respondents were from the Rural Development Project of the West Province (PDRPO). They were classified as "other," since they held different titles within that organization. Only five of 163 extension worker respondents (3.1%) were female. None of those five was in the front line (in direct contact with farmers). All completed the staff at the divisional and sub-divisional (Administrative and Supervisoral levels) delegations of Agriculture. The extension agents were mainly between the ages of 26 and 39 (84.0%), with the 30-34 group being the largest (38%). Only two extension agents were in the 50-54 age group (1.2%). Extension worker respondents who held the First School Leaving Certificate were 41.1%.

Half of the extension worker respondents (50.3%) had been in the service for more than one year, but less than four years.

ll e

shou

exte

Nati

diale

resea

resea

langu

metho

(65.0

same

farme

secti

addit

from

progr

Parti

farme

week,

Almost half of them (46.6%) served more than 1,000 farmers. Only 11 extension workers (6.7%) served less than 300 farmers. The reader should be reminded that the number of farmers served did not apply to extension workers of the administrative and supervisory levels (e.g. National Chief of Extension Service).

Most extension agents (58.9%) communicated with farmers in local dialects or in Pidgin English, while 82.2% of them communicated with researchers in the French language. Table 5 indicates that most researchers (40%) communicated with extension workers in English language.

Most extension worker respondents used group and mass media methods to communicate with farmers (66.9%) and with researchers (65.0%). Table 5 also shows that researcher respondents combined the same methods to communicate with extension workers (72%) and with farmers (60.0%).

Local agricultural news is reported weekly on the Provincial News section of "Cameroonian Tribune," the national daily newspaper. In addition, the Provincial station of Radio Bafoussam airs each Wednesday from 8:30 p.m. to 9:00 p.m. in the French language, an agricultural program intended to inform the public about the agricultural news. Participants of the program are extension workers, researchers and farmers. The same program is aired in local dialects several times a week, and more specifically from 5:30 a.m. to 6:00 a.m.

Farm

foll

(3)

(6)

comm

with

worke

resea

size

past

years

Table

Posit

Gender

Farmers

The farmer respondents (224) provided information about the following characteristics: (1) position in the community, (2) gender, (3) age, (4) level of education, (5) number of years in farming maize, (6) number of years in farming Arabica coffee, (7) language(s) of communication with extension agents, (8) language(s) of communication with researchers, (9) channel(s) of communication with extension workers, (10), channel(s) of communication with agricultural researchers, (11) size of the farm, (12) last year's farm income, (13) size of family, (14) adoption of a new variety of Arabica coffee the past two years, (15) adoption of a new variety of maize the past two years. Table 7 summarizes the characteristics of farmer respondents.

Table 7. Characteristics of farmer respondents.

Characteristics	No.	%
Position/Title in the Community		
Paramount Chief	3	1.3
Chief of the Quarter	28	12.5
Dignitary in the Community	29	12.9
Farmer	155	69.2
Other	8	3.6
No Response	1	0.4
Gender		
Female	27	12.1
Male	191	85.3
No Response	6	2.7

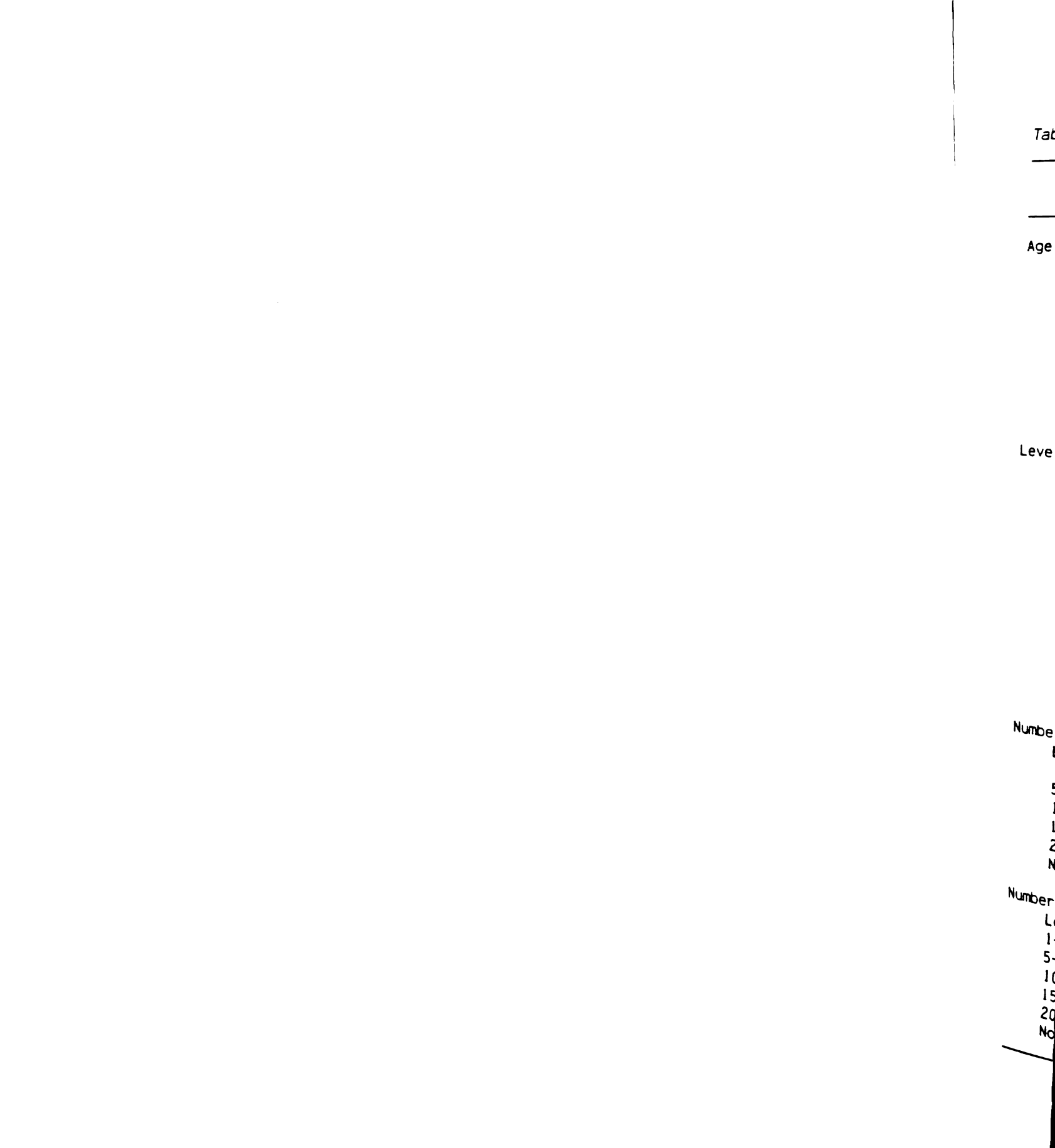

Tab
Age
Leve
Numbe
Number
Lo
1-
5-
1(
15
20
No

Table 7. (cont'd)

Characteristics	No.	%
Age		
25 years or under	1	0.4
26-29 years	6	2.7
30-34 years	30	13.4
35-39 years	43	19.2
40-44 years	29	12.9
45-49 years	24	10.7
50-54 years	36	16.1
55 years or more	54	24.1
No Response	1	0.4
Level of Education		
0-4 years	137	61.2
5-6 years	45	20.1
7-9 years	17	7.6
10-12 years	8	3.6
13-15 years	2	0.9
More than 15 years and less than a Bachelor Degree	15	6.7
Bachelor Degree and Equivalent	0	0.0
Agricultural Engineer	0	0.0
Master's Degree	0	0.0
Ph.D.	0	0.0
Other	0	0.0
No Response	0	0.0
Number of Years in Farming Maize		
Less than a year	4	1.8
1-4 years	23	10.3
5-9 years	33	14.7
10-14 years	33	14.7
15-19 years	30	13.4
20 years or more	93	41.5
No Response	8	3.6
Number of Years in Farming Arabica Coffee		
Less than a year	1	0.4
1-4 years	14	6.3
5-9 years	40	17.9
10-14 years	33	14.7
15-19 years	36	16.1
20 years or more	90	40.2
No Response	10	4.5

Tab

Main
Exte

Main
Rese

Chann

Chann

Size

Table 7. (cont'd)

Characteristics	No.	%
Main Language(s) of Communication with Extension Workers		
English	17	7.6
French	53	23.7
Both	1	0.4
Local dialect or Pidgin	153	68.3
No Response	0	0.0
Main Language(s) of Communication with Researchers		
English	29	12.9
French	73	32.6
Both	2	0.9
Local dialect or Pidgin	83	37.1
No Response	37	16.5
Channel(s) of Communication with Extension Workers		
Individual	20	9.9
Group	15	6.7
Mass (e.g. radio, newspaper)	10	4.9
Individual and Group	6	2.7
Individual and Mass	4	1.8
Group and Mass	164	73.1
No Response	5	2.2
Channel(s) of Communication with Researchers		
Individual	5	2.2
Group	10	4.9
Mass	12	5.4
Individual and Group	8	3.6
Individual and Mass	7	3.1
Group and Mass	23	10.2
No Response	159	71.1
Size of the Farm		
Less than one ha	12	5.4
1-4 ha	121	54.0
5-9 ha	58	25.9
10-14 ha	15	6.7
15-19 ha	8	3.6
20 ha or more	7	3.1
No Response	3	1.3

Table 7 (cont'd)

Characteristics	No.	%
Size of the Family		
4 members or less	15	6.7
5-9 members	70	31.3
10-14 members	40	17.9
15-19 members	26	11.6
20-24 members	26	11.6
25-29 members	7	3.1
30-34 members	6	2.7
35-39 members	8	3.6
40 members or more	7	3.1
No Response	7	3.1
Last Year's Farm Income (FCFA)*		
Less than 99,999	61	27.1
100,000 - 199,999	43	19.2
200,000 - 299,999	30	13.4
300,000 - 399,999	27	12.1
400,000 - 499,999	23	10.3
500,000 or more	34	15.2
No Response	6	2.7
Adoption of a New Variety of Arabica Coffee for the Past Two Years		
Yes	71	31.7
No	54	24.1
No Response	99	44.2
Adoption of a New Variety of Maize for the Past Two Years		
Yes	141	62.9
No	81	36.2
No Response	2	0.9

*1 = 300 FCFA.

Of the farmer respondents, 27 out of 224 (12.1%) were female. This figure is slightly lower than the national average of female farm operators which is 14.5% (Table 12, 1984 Agricultural Census).

yea

onl

forr

that

So,

same

or m

resp

the

educ

educ

aver

Arab

with

37.1

Whil

expr

rese

exte

and

Of the farmer respondents, 90 out of 224 (40.2%) were over 50 years. Only seven (3.1%) of respondents were below 30 years, while only one (0.4%) was said to be less than 25 years.

Of the farmer respondents, 61.2% had fewer than four years of formal education. Table 12 of the 1984 Agricultural Census indicated that 72.5% of farmers in Cameroon had (0-3) years of formal education. So, 61.2% found in the study is lower than the national average. The same table also showed that only 1.8% of farmers had completed 15 years or more of formal education. This study indicated that 6.7% of farmer respondents fell within that range. Compared to the national average, the study was conducted in a community where there is a high number of educated farmers. Of the farmer respondents, 20.1% were within the education group of 5-6 years. The figure is close to the national average (18.6%) (Table 12, 1984 Agricultural Census).

Most farmer respondents have been farming maize (41.5%) and Arabica coffee (40.2%) for more than 20 years.

Of the farmer respondents, 153 out of 224 (68.3%) communicated with extension agents in their local dialect or Pidgin English; and 37.1% of them used the same language to communicate with researchers. While all of them communicated with extension workers, 16.5% did not express any opinion about their language of communication with researchers.

They used all of the available means cited to communicate with extension workers. But the dominant channel was a combination of group and mass methods of communication (73.1%).

com

com

cha

of p

a fa

they

land

memb

Arab

the r

the

secti

perce

addit

linka

deter

B

decis

nonim

No opinion was expressed by 71.1% concerning channels used to communicate with researchers. This suggests that they may not communicate much with researchers.

Summaries of final comments are presented at the end of this chapter. More than half of farmer respondents (54.0%) operated units of production within the farm size group of 1-4 ha. Only 3.1% operated a farm of more than twenty ha. Some farmer respondents indicated that they were limited in the adoption of new varieties by a shortage of land.

Almost half (49.2%) of farmer respondents had a family of 5-14 members.

Of the farmers interviewed, 68.3% did not adopt a new variety of Arabica coffee for the past two years, but 62.9% of them had adopted the maize hybrid Z290.

Perception of Linkages Within Each Respondent Group

Part II of the questionnaire provided information used to assess the perception of linkages within each respondent group. In that section of the questionnaire, respondents were asked to determine their perceptions about the importance of linkages within their group. In addition, they were asked to identify how often such interaction/ linkage took place. The group mean and standard deviation were determined.

Based on the group mean of the expressed importance of linkages, a decision was made whether the group perceived linkages to be important/ nonimportant. Also, based on the group mean of the frequency of

interaction within the group, a decision was made whether linkage "often," "sometimes" or "never" took place between the respondents.

Farmer Group. Table 8 deals with variables related to linkages within the farmer group. It displays the means and standard deviations of each linkage activity within the farmer subgroup for linkage perception and the frequency of linkage execution.

Table 8. Means and standard deviations for linkage perception and frequency of linkage execution with farmer subgroup.

Items	Linkage Perception (n = 224)		Frequency of Linkage Execution (n = 224)	
	Mean	SD	Mean	SD
Request help from colleague farmers to improve production and productivity	3.313	1.264	1.737	0.760
Use neighbor farmers' advice to improve production and productivity	3.184	1.280	1.906	0.747
Assist colleague farmers in improving their production and productivity	3.491	1.176	1.647	0.672
Composite Means	3.329	1.240	1.762	0.726

Farmers responded to the perception of linkage activity on a 5-point Likert type scale with 1 = Definitely should not; 2 = Should not; 3 = May or may not, 4 = Should; and 5 = Definitely should.

Farmers answered the questions dealing with the frequency of linkage execution on a 3-point Likert type scale with 1 = Often; 2 = Sometimes; and 3 = Never.

Farmers perceived that they "may or may not" request advice from and assist their peers in improving agricultural production and productivity. They also reported they were more likely than not to use the advice requested from colleagues.

They "sometimes" requested and used colleagues' advice and they "sometimes" assisted their peers. Past studies have indicated that most people were influenced to change ways of doing things by a friend or neighbor. So, it is with other farmers that they are likely to become persuaded to try innovations. Also, dissemination and adoption of innovations take place faster where good personal channels of communication exist.

Results summarized in Table 8 suggest that there were positive linkages among farmers. There was a willingness to collaborate with peers and reports of actual collaboration were recorded.

Extension Agent Group. Table 9 below summarizes the perception of linkages and the frequency of the execution of linkage activity within the extension agent respondent group.

Table 9. Means and standard devisions for linkage perception and frequency of linkage execution within extension agent subgroup.

Items	Linkage Perception (n = 163)		Frequency of Linkage Execution (n = 163)	
	Mean	SD	Mean	SD
Request help from colleagues to solve a professional problem	4.043	0.999	1.423	0.626
Organize supervisors and administrators' visits	3.712	1.373	1.509	0.754
Regularly attend staff meetings	4.245	0.941	1.276	0.546
Use supervisors' advice to improve the extension programs	4.196	1.032	1.252	0.558
Assist colleagues in improving the quality of their extension programs	3.564	1.224	1.656	0.902
Work on national initiatives to improve extension programs and the profession	3.540	1.420	1.736	0.871
Composite Means	3.834	1.165	1.475	0.710

Extension agents responded to the linkage perception items on a 5-point Likert type scale with: 1 = Definitely should not; 2 = Should not; 3 = May or may not; 4 = Should; and 5 = Definitely should.

Extension agents responded to the frequency of the execution of linkage activity on a 3-point Likert type scale with: 1 = Often; 2 = Sometimes; and 3 = Never.

Extension agents felt they "should" seek and request help from colleagues if they wanted to be successful in their profession. They also believed they "should" organize supervisors' tours in their units and regularly attend staff meetings where important issues were discussed, and use their supervisors' advice to improve their extension programs.

So, they "often" sought the needed assistance from peers, "often" attended staff meetings, "often" organized supervisors' visits and "often" used the latter's advice to improve the extension programs.

Extension workers also perceived they "may or may not" assist colleagues who face problems in carrying out their duties, and in addition they felt that they "may or may not" work on national initiatives to improve the extension profession and services. Nevertheless, they "sometimes" assisted their peers and "sometimes" participated in national efforts to improve the extension profession.

There was clear indication that the perceived working relationships among extension agents were excellent. This was a positive factor for effective linkages within the extension agent survey population.

Researcher Group. Table 10 summarizes the linkage perception and the frequency of the execution of linkage activity by researcher respondent subgroup.

Table 10. Means and standard deviations for linkage perception and frequency of linkage execution within agricultural researcher subgroup.

Items	Linkage Perception (n = 25)		Frequency of Linkage Execution (n = 25)	
	Mean	SD	Mean	SD
Request help from colleagues to solve a professional problem	4.650	0.625	1.280	0.449
Regularly attend staff meeting	4.640	0.480	1.320	0.466
Use supervisors' advice to improve the research programs	4.080	1.055	1.640	0.742
Assist colleagues who need help	4.280	0.826	1.360	0.480
Work on national initiatives to improve the research profession and services	4.000	1.356	1.560	0.852
Composite Means	4.330	0.868	1.432	0.598

Agricultural researchers responded to the linkage perception items on a 5-point Likert type scale with: 1 = Definitely should not; 2 = Should not; 3 = May or may not; 4 = Should; and 5 = Definitely should.

Agricultural researchers answered the frequency of the activity of linkage execution on a 3-point Likert type scale with: 1 = Often; 2 = Sometimes; and 3 = Never.

Researchers believed they "definitely should" request assistance from peers, and regularly attend staff meetings. They also felt they

"should" use supervisors' advice to improve research programs, assist colleagues who needed help in carrying out their activities, and work on national initiatives to improve the research profession and services.

Researchers "often" sought assistance from colleagues, regularly attended staff meetings and assisted those of their colleagues who experienced professional problems.

Meanwhile, they "sometimes" used supervisors' advice to improve the research programs, and "sometimes" participated in national efforts to improve research profession, programs and services.

Perception of Linkages Between Respondent Group

The next section of this chapter describes members' mutual perception of linkages between respondent groups.

Farmers with Extension Agents. Table 11 summarizes the farmer perception of linkages with extension agents.

Table 11. Means and standard deviations for farmer perceptions of linkages and frequency of linkage execution with extension agents.

Items	Linkage Perception (n = 224)		Frequency of Linkage Execution (n = 224)	
	Mean	SD	Mean	SD
Communicate to extension agents problems faced in the farm	4.063	0.777	1.344	0.528
Participate in meetings organized by extension agents	3.942	0.950	1.366	0.551
Call for extension agents anytime a problem arises in the farm	4.049	0.932	1.424	0.615
Wait for extension workers to provide information on recent innovations	3.647	1.084	1.549	0.673
Regularly pay a visit to the Agricultural Post for latest agricultural news	3.589	1.184	1.629	0.676
Seek suggestions from extension agents to improve production and productivity of the farm	3.839	1.005	1.531	0.674
Use extension agents' advice to improve the production and productivity of the farm	4.054	0.939	1.268	0.508

Table 11 (cont'd.)

	Linkage Perception (n = 224)		Frequency of Linkage Execution (n = 224)	
	Mean	SD	Mean	SD
Seek assistance from extension agents during sales of output	2.826	1.443	1.973	0.886
Composite Means	3.751	1.040	1.514	0.652

Farmers responded to the perception of linkage with extension agents on a 5-point Likert type scale with: 1 = Definitely should not; 2 = Should not, 3 = May or may not; 4 = Should; and 5 = Definitely should.

Farmers responded to the frequency of linkage execution on a 3-point Likert type scale with: 1 = Often, 2 = Sometimes, and 3 = Never.

Farmer respondents believed that they "should:"

- communicate to extension agents problems faced in their farms;
- participate to meetings organized by extension agents;
- call for extension agents anytime they experience problems in their farms;
- seek suggestions from extension workers to improve production and productivity;
- use extension agents' advice to improve production and productivity.

They also felt they "may or may not:"

- wait for extension workers to provide them with information on latest innovations;

- pay regular visits to extension post in order to get latest agricultural news;
- seek assistance from extension workers during sales of agricultural output.

Regarding the frequencies of executing the task, farmer respondents indicated they "often:"

- communicate to extension agents problems they faced in their farms;
- participated in meetings organized by extension agents;
- called for extension workers anytime they experienced problems in their farms;
- used change agents' advice to improve the production and productivity of their farms.

But they only "sometimes:"

- waited for agents to provide information on latest innovations;
- regularly paid visit to agricultural post for latest news related to agriculture;
- sought suggestions from change agents to improve production and productivity;
- sought assistance from extension workers during the sales of agricultural outputs.

Farmers believed they "should" have close linkages with extension agents. And they "sometimes" carried out activities that indicated such linkages.

Extension Agents with Farmers. Table 12 summarizes the extension agent respondent perception of linkages with farmers.

Table 12. Means and standard deviations for extension agents perception of linkages and frequency of linkage execution with farmers.

Items	Linkage Perception (n = 163)		Frequency of Linkage Execution (n = 163)	
	Mean	SD	Mean	SD
Transfer to farmers latest agricultural research materials (seeds, plants)	3.834	1.210	1.380	0.685
Interpret to farmers recent research findings	3.933	1.097	1.411	0.614
Organize demonstration sessions to present to farmers latest research findings	3.115	1.521	2.086	0.868
Assist farmers during sales of agricultural output	2.798	1.466	2.086	0.854
Distribute agricultural inputs to farmers	3.706	1.444	1.307	0.712
Encourage farmers to join the farmer cooperatives of UCCAO	4.294	0.828	1.160	0.469
Encourage farmers to join modern agricultural groups (M.A.G.)	4.209	0.861	1.239	0.552
Develop leadership among members of UCCAO & MAG	3.914	1.093	1.479	0.882

Table 12 (cont.d)

Items	Linkage Perception (n = 163)		Frequency of Linkage Execution (n = 163)	
	Mean	S.D.	Mean	S.D.
Request advice from farmers to improve the extension programs	3.368	1.315	1.767	0.723
Composite Means	3.464	1.204	1.657	0.706

Extension agents responded to the perception of linkage with farmers on a 5-point Likert type scale with: 1 = Definitely should not; 2 = Should not; 3 = May or may not; 4 = Should; and 5 = Definitely should.

Extension agents responded to the frequency of linkage execution on a 3-point Likert type scale with: 1 = Often; 2 = Sometimes; and 3 = Never.

Extension workers respondents felt they "should:"

- transfer to farmers latest agricultural research materials (seeds);
- interpret to farmers latest research findings;
- distribute agricultural inputs to farmers;
- encourage farmers to join UCCAO and form MAG;
- develop leadership among members of UCCAO and MAG.

They equally believed they "may or may not:"

- organize demonstration sessions to present to farmers latest research findings;

- assist farmers during sales of agricultural products;
- request advice from farmers to improve extension programs.

Results also indicated that extension workers "often:"

- transferred and interpreted to farmers agricultural innovations;
- distributed agricultural inputs to farmers;
- encouraged them to join UCCAO and form MAG.

Nevertheless, they "sometimes:"

- organized result demonstrations to present to farmers latest research findings;
- assisted farmers during sales of agricultural output.
- requested advice from farmers to improve extension programs;
- developed leadership among members of UCCAO and MAG.

Like farmers, extension agents believed they "should" develop better linkages with farmers. Even though they never organized result demonstrations to present latest research results to farmers, they often transferred and interpreted those results to their clients, result demonstration being left to researchers. Extension workers strongly felt they should not be involved in the marketing of farmers' agricultural output.

Extension Agents with Researchers. Table 13 summarizes the extension agent perception of linkages with researchers.

Table 13. Means and standard deviation for extension agent perception of linkages and frequency of linkage execution with researchers.

Items	Linkage Perception (n = 163)		Frequency of Linkage Execution (n = 163)	
	Mean	SD	Mean	SD
Communicate to agricultural researchers problems arising in local farms	3.706	1.329	1.669	0.776
Assist researchers in obtaining cooperation of farmers during field demonstrations and field days	3.681	1.337	1.693	0.816
Use agricultural researchers' advice to improve the extension programs	3.871	1.063	1.528	0.712
Composite Means	3.753	1.243	1.630	0.768

Extension agents responded to the perception of linkage with researchers on a 5-point Likert-type scale with: 1 = Definitely should not; 2 = Should not; 3 = May or may not; 4 = Should; 5 = Definitely should.

Extension agents responded to the frequency of linkage execution on a 3-point Likert-type scale with: 1 = Often; 2 = Sometimes; and 3 = Never.

Extension agent respondents perceived they "should" and therefore "sometimes:"

- communicated farmer problems to researchers;

- assisted researchers in obtaining cooperation of farmers to participate in field demonstrations and field days;

- used researchers' advice to improve their extension programs.

Researchers with Extension Agents. Table 14 summarizes the perception of linkages between researchers and extension agents.

Table 14. Means and standard deviations for researcher perception of linkages and frequency of linkage execution with extension agents.

Items	Linkage Perception (n = 25)		Frequency of Linkage Execution (n = 25)	
	Mean	SD	Mean	SD
Communicate to extension agents latest research results	4.360	0.843	1.480	0.700
Interpret to extension workers latest research results	4.280	1.114	1.480	0.755
Resquest help from extension agents to improve the research programs	3.320	1.191	2.120	0.765
Use extension agents' advice to improve the research programs	3.840	0.967	1.960	0.662
Composite Means	3.950	1.029	1.760	0.720

Researchers responded to the perception of linkage with extension agents on a 5-point Likert-type scale with: 1 = Definitely should not; 2 = Should not; 3 = May or may not; 4 = Should; and 5 = Definitely should.

Researchers responded to the frequency of linkage execution activity on a 3-point Likert type-scale with: 1 = Often; 2 = Sometimes; and 3 = Never.

Researcher respondents believed they "definitely should" and therefore "often" communicated and interpreted latest research results to extension agents.

They also felt they "should" and thus "sometimes" used extension agents' advice to improve research programs.

Finally, they felt they "may or may not" request help from extension workers in order to improve research program. Nevertheless, they "sometimes" called upon extension agents to improve research programs.

In general, researchers believed they should be closely linked to extension agents, even though the former felt they should not request help from the latter to improve research programs.

Researchers with Farmers. Table 15 summarizes the researchers respondent perception of linkages with farmers and the frequency of execution of linkage activity between the two groups.

Table 15. Means and standard deviation for researcher perception of linkages and frequency of linkage execution with farmers.

Items	Linkage Perception (n = 25)		Frequency of Linkage Execution (n = 25)	
	Mean	SD	Mean	SD
Communicate to farmers latest research results	3.720	1.114	1.600	0.693
Interpret to farmers latest research results	2.920	1.428	1.680	0.835
Organize result demonstration on farmers' fields	3.720	1.184	1.920	0.796
Request help from farmers to solve research problems	3.360	1.222	2.040	0.720
Use farmers' advice to improve research programs	4.040	0.958	1.800	0.632
Composite Means	3.932	1.195	1.808	0.732

Researchers responded to the perception of linkage with farmers on a 5-point Likert-type scale with: 1 = Definitely should not; 2 = should not; 3 = May or may not; 4 = Should; and 5 = Definitely should.

Researchers responded to the frequency of linkage execution on a 3-point Likert-type scale with 1 = Often; 2 = Sometiems; and 3 = Never.

Researcher respondents believed they "should:"

- communicate latest research results to farmers;
- organize result demonstrations on farmers' fields;

- use farmers' advice to improve research programs.

They equally felt they "may or may not:"

- interpret research results to farmers, interpretation being left to extension agents;
- request help from farmers to solve agricultural research problems.

Meanwhile, researchers "often" communicated latest findings to farmers and they only "sometimes:"

- interpreted research findings to farmers;
- organized result demonstrations on farmers' fields;
- requested help from farmers to solve research problems;
- used farmers' advice to improve research programs.

In general, researchers felt they "should" have effective linkages with farmers. They did not perceive farmers should be called upon to help in resolving agricultural research problems.

Farmers with Researchers. Table 16 summarizes the farmer respondent perception of linkages with agricultural researchers and the frequency of linkage execution with that respondent subgroup.

Table 16. Means and standard deviations for farmer perceptions of linkages and frequency of linkage execution with researchers.

Items	Linkage Perception (n = 224)		Frequency of Linkage Execution (n = 224)	
	Mean	SD	Mean	SD
Communicate to researchers problems arising in the unit of production	3.103	1.465	2.036	0.896
Participate to result demonstrations organized by researchers	3.201	1.479	1.955	0.920
Request help from agricultural researchers to improve production and productivity	3.174	1.446	2.027	0.860
Composite Means	3.160	1.464	2.006	0.892

Farmers responded to the perception of linkages with researchers on a 5-point Likert type scale with: 1 = Definitely should; 2 = Should not; 3 = May or may not; 4 = Should, 5 = Definitely should.

Farmers responded to the frequency of linkage execution on a 3-point Likert-type scale with: 1 = Often; 2 = Sometimes; and 3 = Never.

Farmer respondents believed they "may or may not:"

- communicate to researchers problems faced in farms;
- participate in result demonstrations organized by researchers;

-

orgar

the l

"neve

produ

influ

latte

and

Camer

farme

on

backg

farme

susta

devel

This

from t

- request help from researchers to improve production and productivity.

Although they "sometimes" participated in result demonstrations organized by researchers, farmer respondents "never" communicated to the latter problems they faced in the units of production. Also, they "never" requested help from agricultural researchers to improve production and productivity.

Farmer respondents' perception of linkages with researchers is influenced by the fact that some of them hardly had contact with the latter.

The three respondent groups strongly felt effective linkages among and between them were necessary not only for themselves, but for the Cameroonian agricultural system as a whole.

Current Formal and Informal Linkages Between Members of the Subystems Under Study

Informal linkages between researchers, extension agents and farmers were reported by respondents. These linkages often were based on personal relationships and facilitated by cultural, ethnic backgrounds and work locations. Researchers, extension agents and farmers from one area (e.g. province) were more likely to develop and sustain informal linkages than with peers from farther locations.

Also, Anglophone/Francophone researchers were more likely to develop informal linkages with Anglophone/Francophone extension agents. This is true for people from the same province and more so of those from the same or close ethnic groups. Informal linkages were reported

to b

inte

"Bir

were

crea

Agro

fiel

comm

enha

exte

agri

(198

agri

were

subg

char

betw

diss

this

test

to be developed during social activities. Often only those with common interest engaged in common social activities, as an old adage says: "Birds of the same feathers flock together."

Formal linakges between researchers, extension agents and farmers were addressed in Chapter II. They were strengthened by the recent creation of the Training and Liaison Unit within the Institute of Agronomic Research. Through many activities (socio-economic surveys, field trials, training, etc.), the unit was intended to foster communication linkages between IRA, the extension services, and to enhance two-way flow of information between agricultural researchers, extension agents and farmers.

TLU was created as an attempt to strengthen linkages between agricultural subsystems. According to Kelso and Gervais (1983), Revol (1984), official channels between agricultural research and agricultural extension seemed unworkable.

Comparison of Perception Response Means for Members of Subgroups of the Survey Population

The third research question was designed to determine if there were significant differences between response means for members of subgroups within each three survey population identifiable by personal characteristics on selected terms and/or conditions about linkages between members of organizations involved in the development and dissemination of agricultural innovations. The tables presented in this section displays the results of one-way analysis of variance tests on individual items of Part III of the questionnaire. Each table

indicates the degree of freedom, the sum of squares, the mean squares, the group mean, the standard deviation, the F statistic and the significance level.

Personal characteristics chosen to determine the significant differences between subgroups of the survey population differed from one group to another.

Farmer Group

Farmer personal characteristics, used to determine if there were significant differences within this survey population, regarding selected terms and/or conditions between organizations involved in the development and dissemination of agricultural innovations were: position, gender, age, levels of education and income.

Tables 17-21 display the results of one-way analysis of variance tests on individual variables of Part III of the questionnaires answered by farmers. T-tests between subgroups were computed if the significance level were found to be less than or equal to .05.

Table 17 displays the results of one-way ANOVA on the farmer perception of linkages between members of subsystems involved in the development and dissemination of agricultural innovations by position held in the community.

Table 17. ANOVA table of farmer perception of linkages between members of organizations involved in the development and dissemination of

Table 17. ANOVA table of farmer perception of linkages between members of organizations involved in the development and dissemination of agricultural innovations by position in the community

Variables	DF	Sum of Squares	Mean Squares	Mean	Standard Deviation	F Statistic	Significance Level
Participation in result demonstrations will increase practical skills	4	3.654	0.914			0.978	0.579
	219	204.560	0.934	4.161	0.964		
	223	208.214					
Collaboration between researchers and extension agents will yield benefits to farmers	4	2.928	0.732			0.757	0.557
	219	211.911	0.968	4.223	0.979		
	223	214.839					
Collaboration between farmers will improve the profession	4	0.106	0.026			0.021	0.997
	219	277.608	1.268	4.036	1.113		
	223	277.714					
Collaboration between researchers and farmers is a prerequisite to agricultural development	4	4.311	1.078			0.794	0.532
	219	297.117	1.357	3.893	1.160		
	223	301.429					
Collaboration between researchers, extension agents and farmers is a prerequisite to agricultural development	4	1.058	0.264				
	219	339.781	1.552	4.362	0.891	0.170	0.951
	223	340.839					
Integration of agricultural research, extension and education in one administrative unit will boost the country's agricultural development	4	8.337	2.084			1.526	0.195
	219	299.194	1.366	3.844	1.172		
	223	307.531					

Table 17. (cont'd)

Variables	DF	Sum of Squares	Mean Squares	Mean	Standard Deviation	F Statistic	Significance Level
Integration of agricultural research, extension and education in one administrative unit will require a lot of resources (human & financial)	4 213 223	2.279 248.223 250.496	0.568 1.133	3.683	1.057	0.501	0.738
Integration of agricultural research, extension and education in one administrative unit will lead to better use of scarce resources	4 219 223	2.721 273.832 276.554	0.680 1.250	3.705	1.111	0.544	0.707
Integration of agricultural research, extension and education in one administrative unit will improve services actually rendered by each component	4 219 223	8.618 240.914 249.531	2.154 1.100	3.844	1.055	1.958	0.101
Integration of agricultural research, extension and education in one administrative unit will deteriorate services actually rendered by each component	4 219 223	4.863 340.776 345.638	1.216 1.556	2.540	1.242	0.781	0.541

Table 17. (cont'd)

Table 17. (cont'd)

Variables	DF	Sum of Squares	Mean Squares	Mean	Standard Deviation	F Statistic	Significance Level
Assignment of teaching, research and extension responsibilities to one individual will be mutually beneficial to the Institute of Agronomic Research, the Extension Service, the Agricultural Education subsystem and the production system	4 219 223	1.058 339.781 340.839	0.264 1.552	3.348	1.234	0.170	0.951
Collaboration between teacher in agriculture and agricultural researchers will yield high benefit to farmers	4 219 223	4.995 232.751 237.746	1.249 1.063	4.121	1.030	1.175	0.322

*Farmers responded to these items on a 5-point Likert-type scale with:
1 = Strongly disagree, 2 = Disagree, 3 = Undecided; 4 = Agree; 5 = Strongly agree.

*P < .05

*Critical F value at the .05 level was 2.37

Whatever the position held in the community, there were no significant differences within farmer respondent subgroups on whether assigning teaching, research and extension to one individual would mutually benefit the Institute of Agronomic Research, the Extension Service, the Agricultural Education and the production subsystem. There were no differences within farmer respondent subgroups about the outcome of a potential integration of Agricultural and Extension Education, the agricultural research in one administrative unit. Farmer respondents believed that such a move would not deteriorate services currently offered by separate components.

Table 18 displays the results of one-way ANOVA on the farmer perception of linkages between members of subsystems involved in the development and dissemination of agricultural innovations by gender.

One respondent out of 224 farmer respondents failed to indicate his/her sex. Results indicated that there were no differences within farmer respondent subgroups, based on gender on issues related to the perception of current linkages between members of subsystems that are engaged in the development and dissemination of agricultural innovations in Cameroon.

Table 18. ANOVA table of farmer perception of linkages between members of

Table 18. ANOVA table of farmer perception of linkages between members of organizations involved in the development and dissemination of agricultural innovations by gender

Variables	DF	Sum of Squares	Mean Squares	Mean	Standard Deviation	F Statistic	Significance Level
Participation in result demonstrations will improve practical skills	2 221 223	2.439 205.775 208.214	1.220 0.931	4.161	0.964	1.310	0.271
Collaboration between agricultural researchers and extension agents will yield benefits to farmers	2 221 223	2.281 212.558 214.839	1.140 0.962	4.223	0.979	1.186	0.307
Collaboration among farmers will improve the profession	2 221 223	7.173 270.541 277.714	3.587 1.224	4.036	1.113	2.930	0.054
Collaboration between farmers and agricultural researchers is a prerequisite to agricultural development	2 221 223	0.309 301.120 301.429	0.154 1.363	3.893	1.160	0.113	0.893
Collaboration between agric. researchers, extension agents and farmers is a prerequisite to agricultural development	2 221 223	1.652 176.057 177.710	0.826 0.797	4.362	0.891	1.037	0.357
Integration of agricultural research, extension and education in one administrative unit will boost the agricultural development	2 221 223	2.523 305.008 307.531	1.261 1.380	3.844	1.172	0.914	0.595

Table 18. (cont'd)

Variables	DF	Sum of Squares	Mean Squares	Mean	Standard Deviation	F Statistic	Significance Level
Integration of agricultural research, extension and education in one administrative unit will require a lot of resources (human & financial)	2 221 223	0.151 250.344 250.496	0.076 1.133	3.683	1.057	0.067	0.937
Integration of agricultural research, extension and education in one administrative unit will lead to better use of scarce resources	2 221 223	1.320 275.233 276.554	0.660 1.245	3.705	1.111	0.530	0.595
Integration of agricultural research, extension and education in one administrative unit will improve services actually rendered by separate components	2 221 223	0.778 248.753 249.531	0.389 1.126	3.844	1.055	0.346	0.713
Integration of agricultural research, extension and education in one administrative unit will deteriorate services actually rendered by separate components	2 221 223	0.340 345.298 345.638	0.170 1.562	2.540	1.242	0.109	0.897

Table 18. (cont'd)

Variables	DF	Sum of Squares	Mean Squares	Mean	Standard Deviation	F Statistic	Significance Level
Assignment of teaching, research and extension responsibilities to one individual will be mutaully beneficial to the Institute of Agronomic Research, the Extension Service, the Agricultural Education subsystem and the production system	2 221 223	4.943 335.896 340.839	2.471 1.520	3.348	1.234	1.626	0.197
Collaboration between teachers in agriculture and agricultural researchers is a prerequisite to agricultural development	2 221 223	3.112 234.633 237.746	1.556 1.062	4.121	1.030	1.466	0.232

*Farmers responded to these items on a 5-point Likert-type scale with:
1 = Strongly disagree, 2 = Disagree, 3 = Undecided; 4 = Agree; 5 = Strongly agree.

*P < .05

*Critical F value (2,221) at the .05 significance level was 3.00

Table 19 displays the results of one-way ANOVA of farmer respondent perception of linkages between members of subsystems involved in the development and dissemination of agricultural innovations by age categories.

Table 19. ANOVA table of farmer perception of linkages between members of organizations involved in the development and dissemination of agricultural innovations by age

Variables	DF	Sum of Squares	Mean Squares	Mean	Standard Deviation	F Statistic	Significance Level
Participation in result demonstrations will improve your practical skills	6	3.683	0.614			0.648	0.694
	215	203.799	0.948	4.161	0.964		
	221	207.482					
Collaboration between agricultural researchers and extension agents will yield benefits to farmers	6	7.664	1.277			1.330	0.244
	215	206.521	0.961	4.223	0.979		
	221	214.185					
Collaboration among farmers will improve the profession	6	3.873	0.645			0.507	0.804
	215	273.839	1.274	4.036	1.113		
	221	277.712					
Collaboration between farmers and agricultural researchers is a prerequisite to agricultural development	6	5.015	0.851			0.619	0.717
	215	295.512	1.374	3.893	1.160		
	221	300.617					
Collaboration between agric. researchers, extension agents and farmers is a prerequisite to agricultural development	6	6.856	1.143			1.440	0.200
	215	170.590	0.793	4.362	0.891		
	221	177.446					
Integration of agricultural research, extension and education in one administrative unit will boost the country's agricultural development	6	8.762	1.460			1.051	0.394
	215	298.720	1.389	3.844	1.172		
	221	307.482					

Table 19. (cont'd)

Variables	DF	Sum of Squares	Mean Squares	Mean	Standard Deviation	F Statistic	Significance Level
Integration of agricultural research, extension and education in one administrative unit will require a lot of resources (human & financial)	6 215 221	9.438 240.855 250.293	1.573 1.120	3.683	1.057	1.404	0.213
Integration of agricultural research, extension and education in one administrative unit will lead to a better utilization of scarce resources	6 215 221	12.194 262.185 274.378	2.032 1.219	3.705	1.111	1.667	0.130
Integration of agricultural research, extension and education in one administrative unit will improve services actually rendered by separate components	6 215 221	1.240 248.242 249.482	0.207 1.155	3.844	1.055	0.179	0.981
Integration of agricultural research, extension and education in one administrative unit will deteriorate services presently rendered by separate components	6 215 221	12.233 328.902 341.135	2.039 1.530	2.540	1.242	1.333	0.243

Table 19. (cont'd)

Table 19. (cont'd)

Variables	DF	Sum of Squares	Mean Squares	Mean	Standard Deviation	F Statistic	Significance Level
Assignment of teaching, research and extension responsibilities to one individual will be mutually beneficial to the Institute of Agronomic Research, the Extension Service, the Agricultural Education and the production subsystems	6 215 221	15.199 325.094 340.293	2.533 1.512	3.348	1.234	1.675	0.128
Collaboration between teachers in agriculture and agricultural researchers is a prerequisite to agricultural development	6 215 221	6.719 228.997 235.716	1.120 1.065	4.121	1.030	1.051	0.393

*Farmers responded to these items on a 5-point Likert-type scale with:
1 = Strongly disagree, 2 = Disagree, 3 = Undecided; 4 = Agree; 5 = Strongly agree.

*P < .05

*Critical F value (6.215) at the .05 significance level was 2.10

Results of Table 19 indicated that there were no significant differences in farmer respondent perception of linkages among and between members of agricultural subsystems, involved in the development and dissemination of agricultural innovations, based on age categories. Young, middle age and older farmers did not differ significantly on their opinions.

Table 20 summarizes the farmer perception of linkages among and between members of agricultural subsystems, involved in the development and dissemination of agricultural innovations based on the level of education.

Table 20. ANOVA table of farmer perception of linkages between members of organizations involved in the development and dissemination of agricultural innovations by level of education

Variables	DF	Sum of Squares	Mean Squares	Mean	Standard Deviation	F Statistic	Significance Level
Participation in result demonstrations will improve your practical skills	6	5.611	0.935			1.002	0.426
	217	202.603	0.934	4.161	0.964		
	223	208.214					
Collaboration between agricultural researchers and extension agents will yield high benefits to farmers	6	9.251	1.542			1.627	0.140
	217	205.589	0.947	4.223	0.979		
	223	214.839					
Collaboration among farmers will improve the profession	6	5.584	0.931			0.742	0.618
	217	272.131	1.254	4.036	1.113		
	223	277.714					
Collaboration between farmers and agricultural researchers is a prerequisite to agricultural development	6	7.449	1.242			0.916	0.515
	217	293.980	1.355	3.893	1.160		
	223	301.429					
Collaboration between agric. researchers, extension agents and farmers is a prerequisite to agricultural development	6	2.763	0.460			0.571	0.755
	217	174.947	0.806	4.362	0.891		
	223	177.710					
Integration of agricultural research, extension and education in one administrative unit will boost the country's agricultural development	6	13.163	2.194			1.617	0.143
	217	294.338	1.357	3.844	1.172		
	223	307.531					

Table 20. (cont'd)

Table 20. (cont'd)

Variables	DF	Sum of Squares	Mean Squares	Mean	Standard Deviation	F Statistic	Significance Level
Integration of agricultural research, extension and education in one administrative unit will require a lot of resources (human & financial)	6 217 223	2.067 248.429 250.496	0.344 1.145	3.683	1.057	0.301	0.935
Integration of agricultural research, extension and education in one administrative unit will lead to a better utilization of scarce resources	6 217 223	6.955 269.598 276.554	1.159 1.242	3.705	1.111	0.933	0.527
Integration of agricultural research, extension and education in one administrative unit will improve services actually rendered by separate components	6 217 223	5.907 243.625 249.531	0.984 1.123	3.844	1.055	0.877	0.514
Integration of agricultural research, extension and education in one administrative unit will deteriorate services presently rendered by separate components	6 217 223	9.257 336.381 345.638	1.543 1.550	2.540	1.242	0.995	0.570

Table 20. (cont'd)

Variables	DF	Sum of Squares	Mean Squares	Mean	Standard Deviation	F Statistic	Significance Level
Assignment of teaching, research and extension responsibilities to one individual will be mutually beneficial to the Institute of Agronomic Research, the Extension Service, the Agricultural Education and the production subsystems	6 217 223	11.383 329.457 340.839	1.897 1.518	3.348	1.234	1.250	0.281
Collaboration between teachers in agriculture and agricultural researchers is a prerequisite to agricultural development	6 217 223	9.523 228.223 237.746	1.587 1.052	4.121	1.030	1.509	0.175

*Farmers responded to these items on a 5-point Likert-type scale with:
1 = Strongly disagree, 2 = Disagree, 3 = Undecided; 4 = Agree; 5 = Strongly agree.

*P < .05

*Critical F value (6.217) at the .05 significance level was 2.10

Results summarized in the previous table indicate that there were no significant differences within farmer subgroups, differentiated by their level of education on selected terms and/or conditions about perception of linkages among and between members of agricultural subystems, involved in the development and dissemination of agricultural innovations. So, the educational level could not be used to assess opinion differences between farmer respondents.

Table 21 displays the results of one-way ANOVA of farmer respondent perception of linkages among and between members of organizations that are involved in the development and dissemination of agricultural innovations by the level of income.

Table 21. ANOVA table of farmer perception of linkages between members of organizations involved in the development and dissemination of agricultural innovations by level of income

Variables	DF	Sum of Squares	Mean Squares	Mean	Standard Deviation	F Statistic	Significance Level
Participation in result demonstrations will improve your practical skills	6	2.671	0.445			0.470	0.831
	217	205.544	0.947	4.161	0.979		
	223	208.214					
Collaboration between agricultural researchers and extension agents will yield high benefits to farmers	6	10.400	1.733			1.840	0.092
	217	204.439	0.942	4.223	0.979		
	223	214.839					
Collaboration between farmers will improve the profession	6	6.660	1.110			0.889	0.505
	217	271.054	1.249	4.036	1.113		
	223	277.714					
Collaboration between farmers and agricultural researchers is a prerequisite to agricultural development	6	8.867	1.478			1.096	0.365
	217	292.561	1.348	3.893	1.160		
	223	301.429					
Collaboration between agric. researchers, extension agents and farmers is a prerequisite to agricultural development	6	5.747	0.958			1.209	0.303
	217	171.963	0.792	4.362	0.891		
	223	177.710					
Integration of agricultural research, extension and education in one administrative unit will boost the country's agricultural development	6	8.352	1.392			1.010	0.420
	217	299.179	1.379	3.844	1.172		
	223	307.531					

Table 21. (cont'd)

Variables	DF	Sum of Squares	Mean Squares	Mean	Standard Deviation	F Statistic	Significance Level
Integration of agricultural research, extension and education in one administrative unit will require a lot of resources (human & financial)	6 217 223	1.831 248.665 250.496	0.305 1.146	3.683	1.057	0.266	0.951
Integration of agricultural research, extension and education in one administrative unit will lead to a better utilization of scarce resources	6 217 223	5.415 271.138 276.554	0.903 1.249	3.705	1.111	0.722	0.634
Integration of agricultural research, extension and education in one administrative unit will improve services actually rendered by separate components	6 217 223	6.397 243.135 249.531	1.066 1.120	3.844	1.055	0.952	0.540
Integration of agricultural research, extension and education in one administrative unit will deteriorate services presently rendered by separate components	6 217 223	0.764 344.874 345.638	0.127 1.589	2.540	1.242	0.080	0.997

Table 21. (cont'd)

Variables	DF	Sum of Squares	Mean Squares	Mean	Standard Deviation	F Statistic	Significance Level
Assignment of teaching, research and extension responsibilities to one individual will be mutually beneficial to the Institute of Agronomic Research, the Extension Service, the Agricultural Education and the production subsystems	6 217 223	11.897 328.943 340.839	1.983 1.516	3.348	1.234	1.308	0.254
Collaboration between teachers in agriculture and agricultural researchers is a prerequisite to agricultural development	6 217 223	6.740 231.006 237.746	1.123 1.065	4.121	1.030	1.055	0.330

*Farmers responded to these items on a 5-point Likert-type scale with:
1 = Strongly disagree, 2 = Disagree, 3 = Undecided; 4 = Agree; 5 = Strongly agree.

*P < .05

*Critical F value (6.217) at the .05 significance level was 2.10

Results summarized in Table 21 indicate that there were no significant differences within farmer subgroups, differentiated by their level of income on selected issues on the perception of linkages among and between members of the Cameroonian agricultural subsystems, involved in the development and dissemination of agricultural innovations.

In general, Tables 17 through 21 show no significant differences within farmer subgroups on their perception of selected terms and/or conditions about linkages between members of agricultural research, agricultural extension and education and the production subsystem. So, Paramount chiefs and other farmers, young and aged farmers, males and females, educated and uneducated fellows, those with low and high income, all expressed similar opinions on selected terms and/or conditions about linkages between members and agricultural subsystems.

Researcher Group

Agricultural researcher personal characteristics used to determine if there were significant differences within this survey population group, regarding selected terms and/or conditions about linkages between members and/or organizations involved in the development and dissemination of agricultural innovations were: position, gender, age, level of education, citizenship, number of years in profession.

Tables 22-24 summarize the results of one-way analysis of variance tests on individual variables of Part III of the questionnaire answered by researchers.

T-tests between subgroups were computed if the significance level was found to be less than or equal to .05.

Table 22 indicates the results of one-way ANOVA of researcher respondent perception of terms and/or conditions about linkages among and between members of agricultural subsystems, involved in the development and dissemination of agricultural innovations by the position at the Institute of Agronomic Research (IRA).

Table 22. ANOVA table of researcher perception of terms and/or conditions about linkages between members of agricultural subsystems by position in the Institute of Agronomic Research

Variables	DF	Sum of Squares	Mean Squares	Mean	Standard Deviation	F Statistic	Significance Level
Collaboration between researchers will improve the profession and services	4 17 21	13.522 22.342 35.864	3.380 1.314	4.320	1.224	2.572	0.075
Collaboration between agricultural researchers and teachers in agriculture is a prerequisite to agricultural development	4 17 21	13.493 27.825 41.318	3.373 1.637	3.760	1.365	2.061	0.131
Collaboration between agricultural researchers and extension agents is a prerequisite to agricultural development	4 17 21	10.738 22.217 32.955	2.684 1.307	4.160	1.189	2.054	0.132
Assignment of teaching, research and extension responsibilities to one individual will be mutually beneficial to the Institute of Agronomic Research, the agricultural and extension education and the production subsystems.	4 17 22	4.916 25.675 50.591	1.229 2.687	3.160	1.641	0.457	0.768

Table 33 (cont'd)

Table 22. (cont'd)

Variables	DF	Sum of Squares	Mean Squares	Mean	Standard Deviation	F Statistic	Significance Level
Collaboration between farmers, agricultural researchers and agricultural extension agents is a prerequisite to agricultural development	4 17 21	10.738 22.217 32.955	2.684 1.307	4.160	1.189	2.054	0.132
Integration of agricultural research, extension and education in one administrative unit will boost the country's agricultural development	4 17 21	1.599 35.492 37.091	0.400 2.088	3.560	1.329	0.192	0.938
Integration of agricultural research, extension and education in one administrative unit will require a lot of resources (human & financial)	4 17 21	7.538 29.917 37.455	1.884 1.760	2.640	1.323	1.071	0.402
Integration of agricultural research, extension and education in one administrative unit will lead to a better utilization of scarce resources	4 17 21	4.481 22.292 26.773	1.120 1.311	3.760	1.069	0.854	0.512
Integration of agricultural research, extension and education in one administrative unit will improve services actually rendered by separate components	4 17 21	1.227 28.092 29.318	0.037 1.652	3.520	1.330	0.186	0.941

Table 22. (cont'd)

Variables	DF	Sum of Squares	Mean Squares	Mean	Standard Deviation	F Statistic	Significance Level
Integration of agricultural research, extension and education in one administrative unit will deteriorate services presently rendered by separate components	4 17 21	5.997 21.867 27.864	1.499 1.286	2.240	1.141	1.166	0.361

*Researchers responded to these items on a 5-point Likert-type scale with:
1 = Strongly disagree, 2 = Disagree, 3 = Undecided; 4 = Agree; 5 = Strongly agree.

*P < .05

*Critical F value (4.17) at the .05 significance level was 2.96

There were no significant differences within researchers' subgroups by position on perception of terms and/or conditions about linkages between the Institute of Agronomic Research, the extension subsystem, the agricultural education and farmers.

Like farmers, researchers expressed a neutral opinion (Mean = 3.16) whether or not assigning teaching, research and extension responsibilities to one individual would benefit the Institute of Agronomic Research, the agricultural extension and education, and the production subsystems.

They did not believe that the integration of agricultural research, extension and education in one administrative unit will require a lot of financial and human resources. The group mean score was 2.640.

They also expressed a negative opinion on whether the integration of agricultural research, extension and education in one administrative unit might deteriorate the services actually rendered by each component. The group mean score of the Likert-type scale was 2.240.

Table 23 displays the results of one-way ANOVA of researcher respondent perception of terms and/or conditions about linkages among and between members of agricultural subsystems involved in the development and dissemination of agricultural innovations by gender.

Table 23. ANOVA table of researcher perception of terms and/or conditions about linkages between members of agricultural subsystems by gender

Variables	DF	Sum of Squares	Mean Squares	Mean	Standard Deviation	F Statistic	Significance Level
Collaboration between researchers will improve the profession and services	1 23 24	5.940 31.500 37.440	5.940 1.370	4.320	1.224	4.337	0.056
Collaboration between agricultural researchers and teachers in agriculture is a prerequisite to agricultural development	1 23 24	6.939 39.621 46.560	6.939 1.723	3.760	1.365	4.028	0.054
Collaboration between agricultural researchers and extension agents is a pre-requisite to agricultural development	1 23 24	4.587 30.773 35.360	4.587 1.338	4.160	1.189	3.429	0.074
Assignment of teaching, research and extension responsibilities to one individual will be mutually beneficial to the Institute of Agronomic Research, the agricultural and extension educaton and the production subsystems.	1 23 24	2.330 65.030 67.367	2.330 2.827	3.160	1.641	0.824	0.623

Table 23. (cont'd)

Variables	DF	Sum of Squares	Mean Squares	Mean	Standard Deviation	F Statistic	Significance Level
Collaboration between farmers, agricultural researchers and agricultural extension agents is a prerequisite to agricultural development	1 23 24	4.587 30.773 35.360	4.587 1.338	4.160	1.189	3.429	0.074
Integration of agricultural research, extension and education in one administrative unit will boost the country's agricultural development	1 23 24	0.660 43.500 44.160	0.660 1.891	3.560	1.329	0.349	0.567
Integration of agricultural research, extension and education in one administrative unit will require a lot of resources (human & financial)	1 23 24	0.002 43.758 43.760	0.002 1.903	2.640	1.323	0.001	0.971
Integration of agricultural research, extension and education in one administrative unit will lead to a better utilization of scarce resources	1 23 24	0.196 28.364 28.560	0.196 1.233	3.760	1.069	0.159	0.695
Integration of agricultural research, extension and education in one administrative unit will improve services actually rendered by separate components	1 23 24	0.785 43.555 44.240	0.785 1.889	3.520	1.330	0.416	0.532

Table 23. (cont'd)

Variables	DF	Sum of Squares	Mean Squares	Mean	Standard Deviation	F Statistic	Significance Level
Integration of agricultural research, extension and education in one administrative unit will deteriorate services presently rendered by separate components	1 23 24	0.030 32.530 32.560	0.030 1.414	2.240	1.141	0.021	0.881

*Researchers responded to these items on a 5-point Likert-type scale with:
1 = Strongly disagree, 2 = Disagree, 3 = Undecided; 4 = Agree; 5 = Strongly agree.

*P < .05

*Critical F value (1.23) at the .05 significance level was 4.28

sig

cor

lea

res

wer

and

bet

the

res

and

dev

sub

The previous ANOVA table indicates that there was statistically significant difference between male and female researchers on the condition whether increased collaboration between researchers might lead to the improvement of the research profession and services. Male researchers "strongly agreed" (mean = 4.500) while female counterparts were rather undecided (mean = 3.000).

There were no statistically significant differennces between male and female researchers on the remaining items about linkages among and between members of the Cameroonian agricultural subsystems, involved in the development and dissemination of agricultural innovations.

Table 24 displays the results of one-way ANOVA of researcher respondent perception of terms and/or conditions about linkages among and between members of agricultural subsystems, involved in the development and dissmemination of agricultural innovations by age subgroups.

Table 24. ANOVA table of researcher perception of terms and/or conditions about linkages between members of agricultural subsystems by age

Variables	DF	Sum of Squares	Mean Squares	Mean	Standard Deviation	F Statistic	Significance Level
Collaboration between researchers will improve the profession and services	4 18 22	14.280 22.589 36.870	3.570 1.255	4.320	1.224	2.845	0.054
Collaboration between agricultural researchers and teachers in agriculture is a prerequisite to agricultural development	4 18 22	9.935 36.500 46.435	2.484 2.028	3.760	1.365	1.225	0.335
Collaboration between agricultural researchers and extension agents is a pre-requisite to agricultural development	4 18 22	8.965 26.339 35.304	2.241 1.463	4.160	1.189	1.532	0.235
Assignment of teaching, research and extension responsibilities to one individual will be mutually beneficial to the Institute of Agronomic Research, the agricultural and extension educaton and the production subsystems.	4 18 22	15.362 50.464 65.826	3.840 2.824	3.160	1.641	1.370	0.283

Table 24. (cont'd)

Variables	DF	Sum of Squares	Mean Squares	Mean	Standard Deviation	F Statistic	Significance Level
Collaboration between farmers, agricultural researchers and agricultural extenson agents is a prerequisite to agricultural development	4 18 22	8.965 26.339 35.304	2.241 1.463	4.160	1.189	1.532	0.235
Integration of agricultural research, extension and education in one administrative unit will boost the country's agricultural development	4 18 22	2.280 36.589 43.217	0.570 2.033	3.560	1.329	0.280	0.886
Integration of agricultural research, extension and education in one administrative unit will require a lot of resources (human & financial)	4 18 22	11.967 31.250 43.217	2.992 1.736	2.640	1.323	1.723	0.188
Integration of agricultural research, extension and education in one administrative unit will lead to a better utilization of scarce resources	4 18 22	4.144 20.464 24.069	1.036 1.137	3.760	1.069	0.911	0.520
Integration of agricultural research, extension and education in one administrative unit will improve services actually rendered by separate components	4 18 22	3.764 37.714 41.478	0.941 2.095	3.520	1.330	0.449	0.774

Table 24. (cont'd)

Variables	DF	Sum of Squares	Mean Squares	Mean	Standard Deviation	F Statistic	Significance Level
Integration of agricultural research, extension and education in one administrative unit will deteriorate services presently rendered by separate components	4 18 22	2.109 26.500 28.609	0.527 1.472	2.240	1.141	0.358	0.836

*Researchers responded to these items on a 5-point Likert-type scale with:
1 = Strongly disagree, 2 = Disagree, 3 = Undecided; 4 = Agree; 5 = Strongly agree.

*P < .05

*Critical F value (1.23) at the .05 significance level was 4.28

There were no significant differences within researcher group stratified by age subgroups in the perception of linkages between members of agricultural subsystems involved in the development and dissemination of agricultural innovations.

ANOVA tests were also computed to determine if there were significant differences on researcher subgroups perception of terms and conditions related to linkages between Cameroonian agricultural subsystems.

Personal characteristics used in the tests were: level of education, citizenship and number of years in the research profession. Results obtained from these tests indicated no differences in researcher subgroups, differentiated by the above personal and situational characteristics on their perception of statements about linkages between agricultural subsystems involved in the development and dissemination of innovations.

Extension Agent Group

Extension agents' personal characteristics used to determine if there were significant differences within this survey population group, regarding selected terms and/or conditions about linkages between Cameroonian agricultural subsystems were: position within the extension service, gender, age, level of education, number of years in the profession.

Tables 25-27 display the results of one-way analysis of variance test on dependent variables of Part III of the research questionnaire.

T-tests between subgroups were computed if the significance level were found to be less than or equal to .05.

Table 25 displays the results of one-way ANOVA of extension agent respondent perception of terms and/or conditions about linkages between members of agricultural subsystems by position in the extension service.

Some respondents failed to report their position. Significant differences of opinion about linkages occurred between this extension agent subgroup and others on two items. Nevertheless, those respondents with position unknown and other subgroups expressed similar opinion on the majority of issues in the table.

Table 25. ANOVA table of extension agent perception of linkages between agricultural subsystems by position in the Extension Service.

Variables	DF	Sum of Squares	Mean Squares	Mean	Standard Deviation	F Statistic	Significance Level	t-test[1]
Formal education in an agricultural school will increase your knowledge	5 155 160	8.142 112.417 120.559	1.628 0.725	4.417	0.820	2.245	0.052	
Formal education in an agricultural school will improve your professional competence	5 156 161	14.558 181.053 195.661	2.912 1.161	4.104	1.054	2.509	0.032	1X4
Formal training will be as beneficial to you as to your organization: the extension service	5 155 160	5.738 98.473 104.211	1.148 0.635	4.491	0.794	1.807	0.114	----
Collaboration between agricultural researchers and extension agents is a prerequisite to agricultural development	5 156 161	8.425 104.075 112.500	1.685 0.665	4.546	0.728	2.526	0.031	1X3 1X4 1X5 1X6
Collaboration between agricultural researchers, extension agents and farmers is a prerequisite to agricultural development	5 156 161	5.621 86.656 32.278	1.124 0.555	4.491	0.668	2.024	0.077	----

Table 25. (cont'd)

Variables	DF	Sum of Squares	Mean Squares	Mean	Standard Deviation	F Statistic	Significance Level	t-test[1]
Collaboration between extension agents and teachers in agriculture is a prerequisite to agricultural development	5 156 161	8.428 162.121 170.549	1.686 1.039	4.276	0.935	1.622	0.156	----
Assignment of teaching, research and extension responsibilities to one individual will be mutually beneficial to IRA, the agricultural extension and education subsystems	5 155 160	8.537 253.587 262.124	1.707 1.636	3.485	1.274	1.044	0.395	
Integration of agricultural research, extension and education in one administrative unit will boost the country's agricultural development	5 156 161	17.708 272.069 279.778	3.542 1.744	4.006	1.280	2.031	0.076	---
Integration of agricultural research, extension and education in one administrative unit will require a lot of resources (human & financial)	5 156 161	1.866 302.480 304.346	0.373 1.939	3.546	1.344	0.192	0.963	---

Table 25. (cont'd)

Variables	DF	Sum of Squares	Mean Squares	Mean	Standard Deviation	F Statistic	Significance Level	t-test[1]
Integration of agricultural research, extension and education in one administrative unit will lead to a better utilization of scare resources	5 156 161	13.874 234.990 248.864	2.775 1.506	3.828	1.186	1.842	0.107	----
Integration of agricultural research, extension and education in one administrative unit will improve the services actually rendered by separate components	5 155 160	3.869 200.913 204.783	0.774 1.296	3.902	1.125	0.597	0.706	---
Integration of agricultural research, extension and education in one administrative unit will deteriorate the services actually rendered by separate components	5 156 161	17.331 233.755 251.086	3.466 1.498	2.252	1.240	2.313	0.056	---

*Extension workers responded to these items on a 5-point Likert-type scale with:
1 = Strongly disagree, 2 = Disagree, 3 = Undecided; 4 = Agree; 5 = Strongly agree.

*Critical F value at the .05 significance level was 2.21

Table 25. (cont'd)

---

[1]t-test means Significant t-test between groups P < .05

*1 = Position unknown, 2 = Divisional delegates of agriculture, 3 = Subdivisional delegates of agriculture, 4 = Chief of agricultural posts, 5 = Agricultural monitor, 6 = Other (i.e. chief sectour PDRPO).

Extension agents, grouped by their positions in the extension service, positively perceived most of the issues raised in Part III of the questionnaire. Nevertheless, they expressed a neutral opinion about the consequences of assigning teaching, research and extension responsibilities to one person. The group mean was 3.485.

Extension workers also believed that an integration of agricultural extension, research and education in one administrative unit would not negatively affect the services actually offered by separate components. The group mean was 2.252.

There were significant differences between group one (position unknown) and group four (chief of agricultural posts) on the perception of the item "Formal education in an agricultural school will improve your professional competence." Respondents who did not indicate their position expressed a neutral opinion (mean = 3.250, SD = 1.753) while chiefs of agricultural posts strongly supported the statement (mean = 4.522, SD = 0.593).

Significant differences within extension agents differentiated by position appeared on the following item: "Collaboration between agricultural researchers and extension agents is a prerequisite to agricultural development." There were significant differences between:

- Group one (position unknown) and group three (subdivisional delegates of agriculture).
- Group one (position unknown) and group four (chiefs of agricultural posts).
- Group one (position unknown) and group five (agricultural monitors).
- Group one (position unknown) and group six (others).

Respondents whose positions were not known did express a neutral opinion while the other groups (subdivisional delegates of agriculture, chiefs of agricultural posts, agricultural monitors and "other") strongly agreed that such a collaboration was a sine qua non condition for effective agricultural development.

Table 26 expresses the results one one-way ANOVA of extension agent respondent perception of terms and/or conditions about linkages between members of agricultural subsystems by gender.

Some of the respondents did not report their gender. Statistically significant differences on opinion about linkages betweem members of agricultural subsystems occurred between the subgroup "gender unknown" and three others on two items.

There were no statistically significant differences between the subgroup "gender unknown" and others on the majority of issues raised in Table 26.

Table 26. ANOVA table of extension agent perception of linkages between members of agricultural subsystems by gender.

Variables	DF	Sum of Squares	Mean Squares	Mean	Standard Deviation	F Statistic	Significance Level	t-test[1]
Formal education in an agricultural school will increase your knowledge	2 160 162	3.315 117.765 121.080	1.657 0.736	4.417	0.820	2.252	0.106	---
Formal education in an agricultural school will improve your professional competence	2 161 163	1.242 196.727 197.970	0.621 1.222	4.014	1.054	0.508	0.608	---
Formal training will be as beneficial to you as to your organization: the extension service	2 160 162	2.270 102.442 104.712	1.135 0.640	4.491	0.794	1.773	0.171	----
Collaboration between agricultural researchers and extension agents is a prerequisite to agricul-turnal development	2 156 163	8.909 104.084 112.994	4.455 0.646	4.546	0.728	6.891	0.002	1X2 1X3
Collaboration between agricultural researchers, extension agents and farmers is a prerequisite to agricultural develop-ment	2 160 162	7.188 257.524 264.712	3.594 1.610	4.491	0.668	2.233	0.108	----

Table 26. (cont'd)

Variables	DF	Sum of Squares	Mean Squares	Mean	Standard Deviation	F Statistic	Significance Level	t-test[1]
Collaboration between extension agents and teachers in agriculture is a prerequisite to agricultural development	2 161 163	10.650 160.545 171.195	5.395 0.997	4.276	0.935	5.340	0.006	1&2 1&3
Assignment of teaching, research and extension responsibilities to one individual will be mutually beneficial to IRA, the agricultural extension and education subsystems	2 160 162	7.188 257.524 264.712	3.594 1.610	3.485	1.274	2.233	0.108	---
Integration of agricultural research, extension and education in one administrative unit will boost the country's agricultural development	2 161 163	5.587 286.194 291.780	2.793 1.778	4.006	1.280	1.571	0.206	---
Integration of agricultural research, extension and education in one administrative unit will require a lot of resources (human & financial)	2 161 163	1.781 307.066 308.848	0.891 1.907	3.546	1.344	0.467	0.634	---

Table 26. (cont'd)

Variables	DF	Sum of Squares	Mean Squares	Mean	Standard Deviation	F Statistic	Significance Level	t-test[1]
Integration of agricultural research, extension and education in one administrative unit will lead to a better utilization of scarce resources	2 161 163	5.812 245.139 250.951	2.906 1.523	3.828	1.186	1.909	0.149	---
Integration of agricultural research, extension and education in one administrative unit will improve the services actually rendered by separate components	2 160 162	1.870 204.927 206.798	0.935 1.281	3.902	1.125	0.730	0.512	---
Integration of agricultural research, extension and education in one administrative unit will deteriorate the services actually rendered by separate components	2 161 163	3.587 250.510 254.098	1.794 1.556	2.252	1.240	1.153	0.318	---

*Extension agents responded to these items on a 5-point Likert-type scale with:
1 = Strongly disagree, 2 = Disagree, 3 = Undecided, 4 = Agree, 5 = Strongly agree.

*Critical F (2.161) value at the .05 significance level was 3.00

Table 26. (cont'd)

---

[1]t-test means Significant t-test between groups P < .05.

*Group 1 = Gender unknown, Group 2 = Male; Group 3 = Female.

Extension agent respondents, divided into subgroups by gender, generally had the same perception about terms and/or conditions about linkages between agricultural subsystems.

Significant differences occurred between group one (gender unknown) and group two (male) and finally between group one (gender unknown) and group three (female) on the item: "Collaboration between agricultural researchers and extension agents is a prerequisite to agricultural development."

Respondents who did not specify their gender were undecided (mean = 3.200) while both male and female respondents strongly agreed with the statement. Means were 4.552 (male respondents) and 4.400 (female respondents.

Likewise, nonrespondents differed from male and female respondents on the following statement: "Collaboration between extension agents and teachers in agriculture is a prerequisite to agricultural development." Respondents who did not indicate their sex disagreed with the statement while males agreed, and female respondents strongly agreed. Means on the 5-point Likert type scale were: 2.800 (gender unknown) 4.273 (male respondents) and 4.400 (female respondents).

Table 27 displays the results of one-way ANOVA of extension agent respondent perception of terms and/or conditions about linkages between members of agricultural subsystems by age subgroups. As in previous cases, certain extension agent respondents did not report their age category.

Table 27. ANOVA table of extension agent perception of terms and/or conditions about linkages between agricultural subsystems by age group.

Variables	DF	Sum of Squares	Mean Squares	Mean	Standard Deviation	F Statistic	Significance Level	t-test[1]
Formal education at an agricultural school will increase your knowledge	7 155 162	11.553 109.527 121.080	1.650 0.707	4.417	0.820	2.336	0.027	1X2, 1X3 1X4, 1X5 1X6, 2X7 3X7, 4X7 6X7
Formal education in an agricultural school will improve your professional competence	7 156 163	7.848 190.122 197.970	1.121 1.219	4.104	1.054	0.920	0.506	---
Formal training will be as beneficial to you as to your organization: the extension service	7 155 162	3.832 100.880 104.712	0.547 0.651	4.491	0.794	0.841	0.556	----
Collaboration between agricultural researchers and extension agents is a prerequisite to agricul-turnal development	7 156 163	17.865 95.129 112.994	2.552 0.610	4.546	0.728	4.185	0.000	1X2, 1X3 1X4, 1X5 1X6, 1X8 3X7, 5X7 6X7
Collaboration between agricultural researchers, extension agents and farmers is a prerequisite to agricultural develop-ment	7 156 163	9.600 83.180 92.780	1.371 0.533	4.491	0.668	2.572	0.015	1X2, 1X3 1X4, 1X5 1X6, 4X6 6X7, 6X8

Table 27. (cont'd)

Variables	DF	Sum of Squares	Mean Squares	Mean	Standard Deviation	F Statistic	Significance Level	t-test[1]
Collaboration between extension agents and teachers in agriculture is a prerequisite to agricultural development	7 156 163	23.194 148.001 171.195	3.313 0.949	4.276	0.935	3.492	0.002	1X3, 1X4 1X5, 1X6 1X7, 2X6
Assignment of teaching, research and extension responsibilities to one individual will be mutually beneficial to IRA, the agricultural extension and education subsystems	7 155 162	25.778 238.934 264.712	3.683 1.542	3.485	1.274	2.389	0.024	2X6, 3X6 4X6, 4X7 5X7, 6X7 6X8
Integration of agricultural research, extension and education in one administrative unit will boost the country's agricultural development	7 156 163	35.974 255.807 291.780	5.139 1.640	4.006	1.280	3.134	0.004	1X3 1X4 1X5 1X6 1X7 2X3
Integration of agricultural research, extension and education in one administrative unit will require a lot of resources (human & financial)	7 156 163	11.120 297.728 308.848	1.589 1.909	3.546	1.344	0.832	0.563	---

Table 27. (cont'd)

Variables	DF	Sum of Squares	Mean Squares	Mean	Standard Deviation	F Statistic	Significance Level	t-test[1]
Integration of agricultural research, extension and education in one administrative unit will lead to a better utilization of scarce resources	7 156 163	33.664 217.288 250.951	4.809 1.393	3.828	1.186	3.453	0.002	1X3 1X4 1X5 1X6 1X7 2X6
Integration of agricultural research, extension and education in one administrative unit will improve the services actually rendered by separate components	7 155 162	9.479 197.319 206.798	1.354 1.273	3.902	1.125	1.064	0.390	---
Integration of agricultural research, extension and education in one administrative unit will deteriorate the services actually rendered by separate components	7 156 163	13.760 240.338 254.098	1.966 1.541	2.252	1.240	1.276	0.265	---

*Extension agents responded to these items on a 5-point Likert-type scale with:
1 = Strongly disagree, 2 = Disagree, 3 = Undecided; 4 = Agree; 5 = Strongly agree.

Table 27 (cont'd)

---

*Critical F (7.156) value at the .05 significance level was 2.01

[1]t-test means Significant t-test between groups P < .05

*Group 1 = Age category unknown, Group 2 = 25 years or less, Group 3 = 26-29, Group 4 = 30-34, Group 5 = 35-39, Group 6 = 40-44, Group 7 = 45-49, Group 8 = 50-54.

There were statistically significant differences on seven out of twelve items. Therefore, the variable age seems to be a significant factor on how people perceive issues related to their activities. For instance, young and aged extension agents do not have the same perception about the outcomes of formal education. Aged agents believe that they have had enough experiences and may not necessarily rely on formal training for the improvement of their competencies. Young agents, on the other hand, perceive that they need formal training for knowledge improvement.

Agents who did not report their age often differed from other age groups on opinion perception.

In more details, there were statistically significant differences in perception of the following: "Formal education at an agricultural school will increase your knowledge" within the following age subgroups:

- Group one (age category unknown) and group two (25 years or less)
- Group one (age category unknown) and group three (26-29)
- Group one (age category unknown) and group four (30-34)
- Group one (age category unknown) and group five (35-39)
- Group one (age category unknown) and group six (40-44)
- Group two (25 or less) and group seven (45-49)
- Group three (26-29) and group seven (45-49)
- Group four (30-34) and group seven (45-49)
- Group six (40-44) and group seven (45-49).

There were significiant differences between the subgroup whose age category was unknown and age subgroups from 25 years or less to the age group range (40-44). Those respondents with age category unknown were undecided (Mean = 3.000) while peers up to age 44 strongly agreed that formal training might increase their knowledge.

Also, significant differences were noticed between group two (25 or under) and group seven (45-49). The first age group (25 or under) respondents "strongly agreed" while the older peers (45-49 years) group only "agreed."

Respondents from age groups three, four, and six also strongly perceived that more education would increase their knowledge, while those from age group seven, as previously noticed "agreed" but not with a strong feeling. Subgroup means were: 3.000 (age category unknown); 4.714 (25 years or under); 4.423 (26-29); 4.459 (30-34); 4.304 (35-39), 4.778 (40-44); 3.667 (45-49); 4.500 (50-54).

There were not enough cases in group eight (55 years and over) to allow ANOVA to be computed. High ranking civil servants retire at 55 years of age. The second item in which differences occurred was "Collaboration between agricultural researchers and extension agents is a prerequisite to agricultural development." Significant differences in perception occurred between subgroup "age category unknown" and groups two (25 years or under), three (26-29), four (30-34), five (35-39), six (40-44) and eight (50-54). Those whose age category was unknown expressed a neutral opinion. While other groups (two, three, four, five, six and eight) strongly perceived that a collaboration between researchers and extension workers was among other things a sine qua non condition for the agricultural development of the country.

Statistically significant opinion differences occurred between subgroup seven (45-49) and the following subgroups: three (26-29), five (35-39) and six (40-44) regarding the consequences that will result from increased collaboration between agricultural researchers

and agricultural extension agents. Respondents from subgroup seven (45-49) positively believed that such a collaboration will yield positive results to the concerned services. Peers from subgroups three (26-29), five (35-39) and six (40-44) strongly agreed that such a move was imperative to agricultural and rural development.

The third major differences between age subgroups occurred on the following item: "Collaboration between agricultural researchers, extension agents and farmers is a prerequisite to agricultural development." Significant differences on the perception of the above item occurred between "subgroup age category unknown" (group one) and groups two (25 years or under), three (26-29), four (30-34), five (35-39) and six (40-44).

Regarding the differences between those who did not indicate their age category and subgroups two, three, four, five and six, the formers' perception was neutral while the latters positively (strongly) perceived that collaboration between extension agents, researchers from the Institute of Agronomic Research (IRA) and farmers was a prerequisite to agricultural development. The age subgroup means were: 3.500 (nonrespondents), 4.571 (25 years or under), 4.538 (26-29). 4.393 (30-34). 4.565 (35-39), 5.000 (40-44). Significant differences also occurred between group six (40-44) and groups four (30-34), seven (45-49) and eight (50-54). Respondents from age subgroup six (40-44) "strongly agreed" (Mean = 5.000) while respondents of subgroups four, seven and eight only supported that linkages between researchers, extension agents and farmers were necessary for agricultural development.

The fourth research item on which there were significant differences between age subgroups was: "Collaboration between agricultural extension agents and teachers in agriculture is a prerequisite to agricultural development." Once more, nonrespondents expressed different opinions from subgroups three, four, five, six and seven. Respondents who did not indicate their age category did not support the assertion whereby a collaboration between agricultural extension workers and teachers in agriculture was a prerequisite to agricultural development. This subgroup's mean score on a five-point Likert type scale was 2.250. Nonrespondents' perception was thus different from their peers from subgroups three, four, five and seven.

Extension agents from age subgroups three (26-29), four (30-34), five (35-39) and seven (45-49) "agreed" that linkages between them and teachers in agriculture were one of the conditions for effective agricultural development. Respondents from age subgroup seven (45-49) rather "strongly agreed" that such a collaboration was a prerequisite to agricultural development. Significant differences in perception of the item also occurred between age subgroup two (25 years or under) and six (40-44). Members from the age subgroup two were "undecided" while those of the age subgroup six "strongly agreed" with the statement. Age subgroup mean scores were: 2.250 (nonrespondents), 3.571 (25 years or under), 4.308 (26-29), 4.262 (30-34), 4.261 (35-39), 4.889 (40-44), 4.165 (45-59).

There were significant differences between extension agent age subgroups about the perception of the research items: "Perception of assignment of teaching, research and extension responsibilities to one

individual." Major differences appeared to be between the following subgroups:

1. Group six (40-44) and two (25 years or under), seven (45-49), three (26-29), four (30-35), and eight (50-54).
2. Group seven (45-49) and four (30-35), five (35-39).

It was observed that:

1. Respondents from age range 29 or less were "undecided."
2. Middle age agents (30-39 years) "agreed" that, assigning teaching, research and teaching responsibilities to one individual could be beneficial to organizations involved in the development and dissemination of agricultural innovatins.
3. The age range (40-44) "strongly" supported the assertion while their peers from the last age range (45-54) reacted rather "negatively" to the proposition. The latter group thus perceived that assigning teaching, research and extension responsibilities to one scientist would rather harm the current institutions.
4. Nonrespondents joined the middle age range to support the statement.

In more details, group six (40-44) differed from groups two and three. The former "strongly agreed" with the item while the latter groups expressed a neutral position. The respondents' mean scores were 4.444 (Group six), 2.857 (Group two) and 3.346 (Group three).

Moreover, respondents from group six "strongly agreed" and instead their peers from group four were in accord with the item without any

additional adverb to strengthen their position. The mean scores on the 5-point Likert type scale were: 4.444 (group six), 3.557 (group four), and 3.696 (group five).

In addition, significant differences were found to exist between group six (40-44) and group seven (45-49), and group six and group eight (50-54).

As already indicated, respondents from group six positively strongly supported the term while peers from groups seven and eight had a contrary opinion. The latter groups negatively perceived that assigning teaching, research and extension responsibilities to one individual could be beneficial to IRA, the extension service, farmers and agricultural education.

Likewise, significant differences occurred between group seven and groups four and five. The former did not support the term while respondents from groups four and five expressed a positive opinion. The mean scores on the 5-point Likert scale were: 2.500 (group seven), 2.000 (group eight), 3.557 (group four), 3.696 (group five).

Differences also occurred on the perception of the item: "Integration of agricultural research, extension and education in one administrative unit will boost the country's agricultural development."

Significant differences appeared between the following extension agent age range groups:

1. Age category unknown (group one) and groups three, four, five, six and seven.
2. Group two and groups three and six.

Respondents who did not report their age category differed from other groups by the fact that they "strongly" perceived that integrating the research and extension and education in one administrative unit will not lead to the development of the Cameroonian agriculture. Extension agents from age range (26-54) rather positively felt that such a move could boost the country's agricultural development.

The mean scores on a 5-point Likert-type scale were: 1.500 (group one), 4.173 (group three), 3.951 (group four), 4.043 (group five), 4.444 (group six), 3.833 (group seven) and 4.500 (group eight).

Differences also occurred between group two and group three. Respondents from age range groups two (25 years or under) were "undecided" (mean scores = 3.000) while, peers from group three agreed that it might be a help to the country's agricultural development. Respondents from group six, instead "strongly" supported the assertion, while those of group two were neutral.

Differences occurred on the perception of the item: "Integration of agricultural research, extension and education in one administrative unit will lead to a better utilization of scarce resources." There were significant differences between "age category unknown" (group one) and respondents from groups three, four, five, six and seven. The "age category unknown" group negatively reacted to the statement, while other groups approved the proposition.

Mean scores on a 5-point Likert-type scale were: 1.500 (group one), 3.865 (group three), 3.836 (group four), 3.957 (group five),

4.556 (group six), 3.667 (group seven). Differences also occurred betwen group two (25 years or under) and group six (40-44).

Respondents from group two were "undecided" whether or not an integration of agricultural research, agricultural extension and education could lead to a better utilization of scarce resources. On the other hand, respondents from group six "strongly" believed that such a move could lead to better use of available resources.

ANOVA tests were also computed to determine if significant differences existed within the extension agent level of education subgroups, and the number of years in the service subgroups.

Results indicated that there were no differences in perception of issues raised in the study by extension agents' level of education or by the number of years they have served.

Perception by Respondent Group of Linkages Between Members of Agricultural Subsystems Through Collaboration and Integration

This section was intended to provide respondent group perception of linkages between members of Cameroonian agricultural susystems through collaboration and integration. It also provided information about the fourth research question: "Are there significant differences between response means for members by population groups on selected individual perception statements and selected terms and/or condition about linkages among and between members of agricultural subsystems being studied?"

Tables 28 and 29 show the results of the analysis of variance (ANOVA) tests. They summarize the total score mean and its standard deviation, each respondent group mean and its standard deviation, the F

statistic, the level of significance and the significant t-tests between groups if the significance level were found to be less than or equal to .05.

Perception by Respondent Groups of Linkages Between Members of Agricultural Subsystems Through Collaboration

Table 28 indicates the results of one-way ANOVA of the perceptions by the three respondent groups (farmers, extension agents and researchers) of linkages between members of agricultural subsystems through collaboration. Opinion differences between the three respondent groups occurred on four items out of seven.

Table 28. Perception of linkages through collaboration between members of the agricultural subsystems by respondent groups.

Variables	Total Mean SD	Researcher Mean SD	Ext.Agent Mean SD	Farmer Mean SD	F Probability	Level of Significance	t-test[1]
Collaboration between peers (researchers, extension agents or farmers) may lead to the improvement of services and the profession	4.190 1.044	4.320 1.224	4.414 0.702	4.036 1.113	7.708	0.001	(2X3)
Collaboration between agricultural researchers and teachers in agriculture is a prerequisite to agricultural development	4.105 1.148	3.808 1.386	4.160 1.190	4.100 1.091	1.059	0.349	---
Collaboration between researchers and extension agents is a prerequisite to agricultural development	4.095 1.368	0.192 0.981	4.494 0.886	4.258 0.925	256.206	0.000	(1X2) (1X3) (2X3)
Collaboration between researchers and farmers is a prerequisite to agricultural development	2.424 2.110	3.500 1.581	0.340 1.170	3.893 1.160	358.267	0.000	(1X2) (2X3)

Table 28. (cont'd)

Variables	Total Mean SD	Researcher Mean SD	Ext.Agent Mean SD	Farmer Mean SD	F Probability	Level of Significance	t-test[1]
Collaboration between researchers, farmers and extension agents is a prerequisite to agricultural development	4.385 0.882	4.160 1.189	4.491 0.668	4.362 0.891	1.440	0.237	---
Collaboration between teachers in agriculture and extension agents is a prerequisite to agricultural development	3.159 2.060	0.192 0.981	4.276 0.935	2.814 2.180	62.163	0.000	(1X2) (1X3) (2X3)
Assignment of teaching, responsibilities to one individual will be mutually beneficial to IRA, the Extension Service and the Production Subsystems	3.339 1.347	3.160 1.641	3.485 1.274	3.348 1.234	0.727	0.511	---

-Researchers, extension agents and farmers responded to the variables on a 5-point Likert type scale with:
1 = Strongly disagree, 2 = Disagree, 3 = Undecided; 4 = Agree; 5 = Strongly agree.

Table 28. (cont'd)

-Critical F value (2,406) at the .05 significance level was 3.00.

[1]t-test means Significant t-test between groups P < .05.

Group 1 = Researcher, Group 2 = Extension Agent, Group 3 = Farmer.

Researchers, farmers and extension agents, all positively believed that "Collaboration between peers might lead to the improvement of services and the profession." Nevertheless, statistically significant differences occurred between farmers and extension agents. Farmers "agreed" (mean score = 4.036) while extension agents "strongly agreed" (mean score = 4.414).

There was a general consensus between the three groups about the fact that a collaboration between agricultural researchers and teachers in agriculture was a prerequisite to agricultural development. All positively supported the statement. Mean scores were: 3.808 (researchers), 4.160 (extension agents) and 4.100 (farmers).

The three respondent groups differently believed that a collaboration between researchers and extension agents was a sine qua non condition for agricultural development. Differences occurred between: researchers and farmers, researchers and extension agents, and between farmers and extension agents. Researchers did not believe that such a collaboration could help in agricultural development (mean scores = 0.192) while farmers believed it was necessary for such a collaboration to take place in order for the country's agriculture to move ahead (means scores = 4.258).

Likewise, statistically significant differences occurred between researchers and extension agents. The latter "strongly agreed" with the condition statement while the former, as already said, were reluctant. Mean scores were 0.192 (researchers), 4.494 (extension agents). Although both extension agents and farmers supported the statement, there was a slight difference between the two groups.

Extension workers "strongly agreed" while farmers only "agreed" that researchers and teachers in agriculture ought to collaborate if their contributions to agricultural development were to be effective. Mean scores were: 4.494 (extension workers) and 4.258 (farmers). Also, respondent groups expressed disagreement about the condition by which a collaboration between researchers and farmers was a prerequisite to agricultural development. Extension agents disassociated themselves from researchers and farmers. Extension agents did not perceive that such a move was necessary for agriculture to be developed. The two other groups who were concerned with the condition agreed that they should collaborate. Mean scores were: 3.500 (researchers), 0.340 (extension agents) and 3.893 (farmers).

All three respondent groups strongly believed that a close collaboration between them was a prerequisite to agricultural development. Mean scores were: 4.160 (researchers), 4.491 (extension agents) and 4.362 (farmers). Nevertheless, researchers' mean scores were the lowest while extension agents scored the highest. There were significant differences between respondent groups whether a collaboration between teachers in agriculture and extension agents was a prerequisite to agricultural development. Differences occurred between researchers and extension agents, researchers and farmers, and extension agents and farmers. Researchers did not perceive that such a condition was necessary while extension agents' opinion was rather positive. Mean scores for both groups were 0.192 (researchers) and 4.276 (extension agents). Farmers were undecided whether such a move could contribute to agricultural development. Their mean scores were

2.814. Extension agents, rather expressed a positive opinion about the condition. Their mean scores were 4.276 compared to others; they were the only group to express a positive attitude about the statement. Researchers "disagreed" while farmers could not express any opinion. Neither negative, nor positive.

There was a general perception consensus between respondent groups on whether assigning teaching, research and extension responsibilities to one individual could be mutually beneficial to the Institute of Agronomic Research, the Extension service, the Agricultural education and the production subsystem. None of the three groups expressed any opinion. All were cautious and undecided. Mean scores were: 3.160 (researchers), 3.485 (extension agents), and 3.348 (farmers). Researchers scored the lowest while extension agents scored the highest.

Perception by Respondent Groups of Linkages Between Members of Agricultural Subsystems Through Integration

Table 29 displays the results of one-way ANOVA of the respondent groups perception of linkages between agricultural subsystems through integration in one administrative unit. Statistically significant differences occurred between the three respondent groups on one research item out of five.

Table 29. Perception of linkages through integration in the same administrative unit of agricultural research, extension and education subsystems by respondent group.

Variables	Total Mean SD	Researcher Mean SD	Ext.Agent Mean SD	Farmer Mean SD	F Probability	Level of Significance	t-test[1]
Integration of agricultural research, and education in one administrative unit will boost the country's agricultural development	3.920 1.224	3.560 1.329	4.006 1.280	3.844 1.172	1.853	0.156	---
Integration of agricultural research, extension and education in one administrative unit will require a lot of resources (financial & human)	3.551 1.259	2.640 1.323	3.546 1.344	3.683 1.057	7.925	0.001	(1X2) (1X3)
Integration of agricultural research, extension and education in one administrative unit will lead to a better utilization of scarce resources	3.734 1.183	3.760 1.069	3.828 1.186	3.705 1.111	0.436	0.653	---

Table 29. (cont'd)

Variables	Total Mean	Researcher Mean	Ext.Agent Mean	Farmer Mean	F Probability	Level of Significance	t-test[1]
Integration of agricultural research, extension and education in one administrative unit will improve the services actually rendered by separate components	3.805 1.171	3.520 1.330	3.902 1.125	3.844 1.055	1.012	0.366	---
Integration of agricultural research, extension and education in one administrative unit will deteriorate the services presently rendered by separate components	2.378 1.271	2.240 1.141	2.252 1.240	2.540 1.242	1.605	0.200	---

-Researchers, extension agents and farmers responded to the variables on a 5-point Likert type scale with:
1 = Strongly disagree, 2 = Disagree, 3 = Undecided, 4 = Agree, 5 = Strongly agree.

-Critical F value 2.406 at the significance level was 3.00.

[1]t-test means Significant t-test between groups $P < .05$.

-Group 1 = Researcher, Group 2 = Extension Agent, Group 3 = Farmer.

The three respondent groups positively believed that the linkages between agricultural research, extension and education through integration in one administrative unit could boost the country's agricultural development. Mean scores on the item were: 3.560 (researchers), 4.006 (extension agents) and 3.844 (farmers). Extension agents expressed the highest positive attitude, while researchers' was the lowest.

There were significant differences between the three respondent groups whether improving linkages between the Institute of Agronomic Research, the Extension Service and the Agricultural Education through integration of the above subsystems into one administrative unit would require a lot of financial and human resources. Differences occurred between researchers and farmers, and researchers and extension agents. Researchers were "undecided," while extension agents felt that such a move could require extra resources. The mean scores for the two groups were: 2.640 (researchers) and 3.546 (extension agents). Likewise, disagreements happened between researchers and farmers. The latter positively perceived an increase in needed resources if it could happen to agricultural research, extension and education to be in one administrative unit, while researchers, more cautious, did not express any opinion. The mean scores were: 2.640 (researchers) and 3.683 (farmers). All respondent groups believed that a possible integration of agricultural research, extension and education in one administrative unit will lead to a better utilization of scarce resources but also, could improve the services actually rendered by separate components.

The most positive attitude was expressed by extension agents and the least by the agricultural researchers.

There was also a general agreement between respondent groups whether an integration of agricultural research, extension and education in one administrative unit could rather deteriorate services currently offered by the three subsystems in different units. All negatively believed this could happen. The least disagreement was expressed by farmers (mean scores = 2.540), while the strongest disagreement came from researchers (mean scores = 2.240). Extension agents were closer in their disagreement to researchers than to farmers. Their mean score was 2.252.

This supports the two aforesaid statements which indicated that respondents perceived that such an integration could only help in better utilizing scarce resources, while improving the services each subsystem currently offered to its clients.

Summary of Written Comments by Respondent Group

Several respondents from each of the three groups provided a written response to the last questionnaire statement: "Are there final comments or suggestions that you would like to make?" The number and percentage of comments received were:

- Researchers: 11 comments (44.00% of the total)
- Extension Workers: 129 comments (79.15% of the total)
- Farmers: 183 comments (81.25% of the total)

Comments from the last item of the questionnaire for the three respondent groups are presented in Appendix D. The following will

provide a brief discussion of the major ideas expressed by members of each group.

Researcher Group

Researchers' comments all indicated that a summary of this study should be made available to Cameroonian policy makers and officials of the concerned organizations. Other comments included: (1) linkages between organizations and farmers, (2) the dissemination of "good" innovations, (3) problems encountered by technicians of research, and (4) perceived problems of Cameroonian agriculture in general.

Linkages Between Organizations and Farmers

Three members of the researcher group indicated that the questionnaire dealt more with discussion on linkages between organizations than between farmers and organizations.

The Dissemination of "good" Innovations

Three researchers made comments about the dissemination of "good" innovations. According to them, "good" innovations have no problem with any institution regarding their dissemination. Most of the time farmers themselves spread or steal "good" innovations even outside formal organizations' rules.

Problems of Research Technicians

Two technicians of research reported that despite their dedication, hard work, commitment and contribution to the advancement of agricultural research in Cameroon, they are not recognized as researchers and therefore not rewarded. A Chief of Station indicated

that this problem was nowadays a "cancer" in the agricultural research subsystem. It is the main cause of burnout among technicians of research. Thus, making it hard to conduct sufficient on-site experiments without support from this personnel category.

Researchers' Perception of Problems of the Cameroonian Agricultural System

Eight researchers made comments that linkages alone between organizations could not boost the country's agriculture. Other problems to be solved were:

- Lack of sufficient research resources (human and financial) despite many efforts deployed by the Government. Three suggested that it was time for the private sector and parastatal organizations to begin supporting agricultural research.
- Between research and extension, there is no linking body, either individuals or organizations; this situation makes hard to transfer research results to potential users, since researchers do not have enough means to reach farmers.
- Researchers did perceive that the Cameroonian extension service and agricultural parastatal organizations were not appropriate and adapted tools for education of farmers and development of the country in general. It was also reported that there were a lot of idle staff in offices at the central, administrative and supervisory levels of the extension services. Without an appropriate use of potentialities of such staff, there are few prospects for farmer education and agricultural and rural development.

Although only eight out of 25 researcher respondents made the comments, it is believed that they were issues to be raised. Nevertheless, the comments complemented the quantitative data obtained on researchers' perception of linkages among and between subsystems involved in the development and dissemination of agricultural innovations in Cameroon.

Extension Agent Group

In addition to comments made by researchers and farmers, extension agents criticized the current agricultural education system. Their comments were summarized in the following sections:

- Linkages with farmers and researchers
- Marketing of agricultural outputs
- Supply of agricultural input
- Support material for extension services
- Duplication of extension services
- Agricultural education system

Linkages with Farmers and Researchers. Most respondents who made comments (123 cases out of 163 respondents) indicated that they hardly collaborated with researchers. They also reported that researchers often carried out field trials in their zones without prior notice and possible involvement; and when trials failed, researchers quietly left the area. Researcher intervention in local communities without cooperation of extension agents was perceived as a source of confusion to farmers who were unable to distinguish researchers and extension agents; and also, they did not know who was supposed to do what.

Regarding their linkages with researchers, extension agents mentioned that feedback from farms and extension services was used to improve research programs and the development of relevant research results. They often referred to maize variety Z290, which is highly productive but very sensitive to insects. In less than six months, a farmer may lose a yearly harvest in storehouse. An extension agent indicated that he first reported the case in 1978. By 1986, the time this study was conducted, he had not heard from researchers. Although other maize varieties were tested, the popular variety diseeminated by researchers remained the Z290.

The comments on Arabica coffee "Java" variety are reported in Appendix D.

Extension workers claimed to have a good working relationship with farmers. They both were very good friends as long as the extension agents could help farmers solve their daily problems. But once the extension agents were unable to help, they became "temporary" enemies.

Marketing of Agricultural Outputs

Extension agents confirmed farmers' allegations about cheating during the transport and selling of Arabica coffee. They also indicated that producer price was low and seriously influenced their activities. Farmers often asked the following question: What will be the advantages (financial) of adopting the proposed innovations? Extension agents claimed to be considered by farmers as co-conspirators with unskilled agents of cooperatives who mistreated them during the sales of coffee. If extension agents were not accomplices of

cooperative agents, they would intervene and help during that critical stage, instead of helping only during the phase of production.

Supply of Agricultural Inputs

Extension workers also confirmed farmers' assertions whereby there were delays in agricultural input deliveries. They, too, indicated that agricultural credit was not available; and once it became available there were inequities in distribution. Extension agents reported that those who had access to farmer loans were not even farmers. The main problem resulted from the collaterals requested by the farmer credit agency: the National Funds of Rural Development (FONADER).

Support Materials for Extension Services

Extension agents reported that they were poorly equipped. Some were given bicycles which were of no use because of the landscape. The West Province is a mountanous area.

Some offices were not yet built. Few extension agents claimed to lack office stationaries. Those of the Rural Development Project of the West Province reported that fuel and car maintenance allowances were inadequate to properly carry out their duties.

Duplication of Extension Services

Extension workers reported that often there were many change agents competing to gain the trust of farmers. Agents from organizations such as SAFEL (Societe' Africaine des Fruits et Legumes) promoted the cultivation of legumes (green beans, cabbages, etc.).

Those of the PDRPO (Rural Development Project of the West Province) emphasized the cultivation of Arabica coffee and food crops such as maize. There was neither coordination nor cooperation between agents of these subsystems and others.

Agricultural Education System

Agents from administrative and supervisory levels reported that today's graduates were poorly trained. They often were unable to identify and solve problems. It happened that some could not differentiate between larva and insects. They, too, indicated that the main employer, the state, paid more attention to degree held than to technical know-how. Remuneration was based on the degree and little attention was paid to the professional competence.

Extension agents also noted that programs of agricultural schools were not relevant to the Cameroonian context. Important courses such as leadership were not taught in the regional colleges of agriculture. Such courses might help in preventing unhealthy behaviors toward farmers and colleagues. Extension workers indicated that the current program of the competitive entrance exam to the University Centre of Dschang did not take into consideration, the poor programs of institutions that trained those who are now in the field.

They reported that in-service training was poor. A 15-year old extension veteran indicated he never assisted an in-service training session. They strongly indicated that in-service training was as important as pre-service training.

Extension agents recommended:

- The number of research stations and antenna should be increased in order to adapt research results to local situations.

- Researchers should consider using feedback from farmers and extension agents to improve the research programs.

- Researchers, extension agents and farmers should frequently meet to discuss agricultural problems.

- Provision should be made to make agricultural inputs available to farmers at the right time and in the right place.

- Cooperatives should adopt a more humane attitude toward farmers.

- Producer price of coffee should be increased.

- Extension services should be properly equipped.

- There should be more collaboration between agents operating in the same community.

- The status of extension workers should be upgraded.

- Farmer needs should be considered by research institutions, extension services and agricultural training institutions.

Farmer Group

Like researchers, farmers commended the study and suggested that a summary of results be made available to all stakeholders of the Cameroonian agricultural system.

Their comments focused on the following areas:

- Linkages with Researchers and Extension Agents
- Supply of Agricultural Inputs
- Marketing of Agricultural Outputs
- Problems Faced by Family Farm

Linkages with Researchers and Extension Agents

Almost all those who made comments indicated that they had excellent working relationships with extension agents despite their

limited number. Most of them reported never having had contact with researchers. They thus recommended that researchers should make themselves more visible and adapt the research programs to farmers' needs.

Farmers indicated that, if the agricultural monitor of their locality were aware of any innovation, it was certain that all the community would have it.

Supply of Agricultural Inputs

Farmers indicated that fertilizers and pesticides were supplied in limited quantity and reached them with little lead time for use when needed. When applied late on crops, the effects were reduced.

They also claimed to have little access to farm loans distributed by the National Funds of Rural Development (FONADER), the sole source of farm credit in the country.

Farmers mentioned that small farm equipment was more and more expensive and scarce. They recommended that the sale of fertilizers and pesticides be "liberated" and let to the free market. The Cooperative is unable to supply its members with inputs, and those who are not members are unable to acquire fertilizers and pesticide supplies.

Marketing of Agricultural Outputs

Respondents who made comments indicated that everything grown by farmers were paid at low prices (i.e. coffee, beans, maize, tomatoes, etc.). The main concern was on the price paid for Arabica coffee. All

contended that they did not make any profit from growing Arabica coffee, and often reported that "the price paid to us is too low." Not only was the price low, but they felt mistreated by the buyer agency: the Cooperative. They reported that the marketer did not execute the government price policy by paying to them what it ought to be paid. Cooperative agents were accused as being impolite; farmers felt the buyers did not even realize that it took body energy to produce what is brought to the cooperative. They thus recommended that:

- The price paid for agricultural products be increased.
- Extension agents should be involved in the sales of coffee, mainly at the weighing station.

Family Farm Problems

Most respondents claimed that farm life was tougher now than 20 years ago. They were worried about the future of the farm after they died. "I have a family of 39 members, but nobody is interested in farming," one farmer said. They recommended that policy makers should create incentives in order to attract and maintain more young people in farming.

More comments in their original forms are in Appendix D.

CHAPTER V

SUMMARY, CONCLUSIONS, IMPLICATIONS, LIMITATIONS, RECOMMENDATIONS

Introduction

A review of the research problem, objectives, procedures and summary of findings is presented in the first section of this chapter. The conclusions that were reached are included in the second section. The third section contains implications that were drawn based upon the difference the findings and conclusions make to the body of knowledge, and the way findings of this effort will be disseminated to appropriate stakeholders, as requested by many respondents. The fourth section presents the foreseen and unforeseen limitations, and the author's speculation on what could have been if the study have been conducted "under the best of all possible worlds" conditions. The last section contains recommendations for future research efforts to be attempted in this area, but also some new research problems suggested by the conclusions and implications discussions.

Summary

Today, Cameroonians are proud to be safe from hunger that affects many African and Third World Countries. The Colonial and later the

Independent Governments always have paid special attention to the agricultural and rural sectors. So much, so that food surplus is available for export to other countries in addition to formal cash crops.

But, for more than a decade, there have been continuous decreases in the production of certain food crops such as cocoyams, and cash crops such as cocoa and coffee. Officially, decreases have been attributed to: (1) aging of farms and farmers, (2) drought that has continuously affected the African continent since 1973, (3) crop diseases and pests, and (4) prices paid to the producers.

Recently, evaluation of the Cameroonian agricultural system conducted by USAID consultants (Kelso & Gervais, 1983) and FAO (Revol, 1984) indicated that one of the major factors that has led to the decrease of cocoa and coffee productions could be attributed to the weak, ineffective and unworkable linkages between and among Cameroonian agricultural subsystems and more specifically among three groups: the Institute of Agronomic Research, the agricultural extension and education and the production subsystem.

The purpose of the study was to: (1) assess the perceived current formal and informal linkages among and between subsystems involved in the development and dissemination of agricultural innovations, and (2) examine the three respondent groups' perception of the current linkages among and between the aforesaid agricultural subsystems.

Three groups were identified from within a strategically selected survey population in Cameroon to supply opinion responses and information on a self-delivered questionnaire, for structured and

unstructured personal interviews. The three groups were: (1) agricultural researchers of the Institute of Agronomic Research "IRA", (2) Extension Agents from the Ministry of Agriculture "MINAGRI" and the Rural Development Project of the West "PDRPO," and (3) farmers from the West Province (Bamboutos, Mifi and Nun Divisions). Opinions on the linkages between agricultural subsystems were measured. A major contribution of this study was that strategies from the field of social systems were used as the basis for studying the interrelationships of research, extension and production as three components of the Cameroonian agricultural system. This study has contributed knowledge that may be applied to situations that are of immediate concern to stakeholders in various organizations (international and national) that have responsibilities for planning Cameroonian agricultural and rural development.

Measurements of perception characteristics were the primary means used to provide information that would assist in generating answers to the research questions. Data from the 412 questionnaires distributed to eligible members of the sample population (83.56% return rate) were analyzed using: (1) frequencies and measures of central tendency and dispersion, and (2) one-way analysis of variance (ANOVA) and t-tests. The four research questions which guided the research process have been used to organize the major findings which were described in Chapter IV.

Research Question 1: What are the selected personal characteristics of the survey population, members of the three groups under study?

The summary of this research question focuses on the researcher, extension worker and farmer respondents.

Researchers: The researcher respondents were mainly Cameroonians (68.0%) although approximately one-third (32.0%) were expatriates. More than two-fifths (44.0%) held Ph.D.'s in various disciplines related to agricultural and social sciences. Generally, the researchers were male (88.0%) and 35 to 44 years of age (60.0%). More than one-half (52.0%) of the researcher respondents had responsibilities for research related to maize while only 12.0% dealt with Arabica coffee. Nearly one-fourth (24.0%) of the researchers had administrative responsibilities and preferred to be identified as administrators. Three-fifths (60.0%) indicated they reported their research results in English language while 24.0% indicated they communicated in English and/or French with farmers. Also, one-fifth (20.0%) of researchers indicated they communiated in English and/or French with extension workers.

Extension Workers. All of the extension worker respondents were Cameroonian nationals. More than two-thirds (69.9%) were 26 to 34 years of age. Most were males (94.5%); however, there were females (3.1%). Generally, the extension worker respondents held the First School Leaving Certificate (41.1%) even though a few had higher level education achievements (e.g. agricultural engineer) (3.1%). The largest number (44.2%) were agricultural monitors (front-line extension workers); however, 6.7% were in administrative/supervisory positions. Nearly one-half (46.6%) reported they served more than 1,000 farmers. Local dialects and/or Pidgin English were the main languages used to communicate with farmers (58.9%) while French was reported by 82.2% as the language for communicating with researchers.

Farmers. More than three-fifths (61.2%) of the farmer respondents had less than four years of formal education. Generally, the farmers were male (85.3%) and more than 50 years old (40.2%). Most of the farmers produced both maize and Arabica coffee. About two-fifths (41.5%) had been farming maize and Arabica coffee for more than 20 years. Nearly seven out of every ten farmers (68.3%) reported they communicated with extension workers in their local dialect and/or Pidgin English. More than two-thirds (71.5%) reported they had contacts with researchers while 16.5% indicated they had never had any contact with researchers. Most of the farmers (68.3%) indicated they had not adopted a new variety of Arabica coffee during the past two years but 62.0% reported they had adopted the maize variety Z290 during the same period.

Research Question 2: What is the perceived current state of linkages among and between respondents of the three groups studied?

Each of the respondent groups were asked questions to determine their perceptions about the importance of linkages within their

group and with each of the two other groups. In addition, they were asked to identify how often such interaction/linkage took place.

Importance of linkage within groups. Respondents in all three groups indicated positive response regarding the importance of linkages within each group. On the scale from "definitely should not" to "definitely should" (a five-point Likert type scale), the means for all three groups were greater than 3.0 as shown in Table 30. Researchers perceived the highest level of importance for linkage within their group (mean = 4.3); extension workers and farmers perceived linkages important but not at as high a level of importance (mean = 3.8 and 3.3 respectively).

Frequency of linkage within groups. Respondents in all three groups indicated positive responses regarding the frequency with which they communicated with other persons within their groups. On a three-point scale ("often" to "never") the group means fell between "often" and "sometimes" with the greater frequency expressed by the researchers (mean = 1.4) and lesser frequencies expressed by the extension workers (mean = 1.5) and farmers (mean = 1.8).

Importance of linkage between groups. Respondents in all three groups reported positive responses regarding the importance of linkage between their group and with each of the two other groups. On the scale from "definitely should not" to "definitely should" (a five-point scale), the means for all groups were greater than 3.0 as shown in Table 30. Researchers perceived the highest level of importance for linkage between their group and the two others (mean = 3.9). Farmers perceived the lowest level of importance of linkage with researchers (mean = 3.2). Their perception of the level of importance of linkage with extension workers was higher (mean = 3.7) than the perceived level of importance of linkage with researchers. Extension workers perceived linkages with farmers and reseachers important (means = 3.5 and 3.7 respectively), but not at as high a level of importance as the one expressed by researchers with the two other groups.

Frequency of linkage between groups. Respondents in all three groups indicated positive responses regarding the frequency with which they communicated with other persons from each of the two other groups. On a three-point scale ("often" to "never"), the group means fell between "often" and "sometimes" with the greater frequency expressed by farmers regarding their linkage with extension workers (mean = 1.5) and lesser frequencies expressed by the farmers regarding their linkages with researchers (mean = 2.0). Extension workers expressed the same level of linkage frequency with each of the two other groups (mean = 1.6). Researchers expressed frequent linkages with both extension

agents (mean = 1.7) and farmers (mean = 1.8) even though farmers expressed they hardly communicated with researchers (mean = 2.0). Table 30 displays the summary of composite means and standard deviations of the perceived importance of linkage among and between groups and the frequency with which such interaction takes place.

Table 30. Summary of number of respondents by group, composite means and standard deviations of the linkage perception and framework of linkage execution among and between survey groups.

	Linkage Perception			Frequency of Linkage Execution		
	No.	Mean	S.D.	No.	Mean	S.D.
Within Respondent Groups:						
- Farmer Group	224	3.3	1.2	224	1.8	0.7
- Extension Agent Group	163	3.8	1.2	163	1.5	0.7
- Researcher Group	25	4.3	0.7	25	1.4	0.6
Between Respondent Groups:						
- Farmers with extension agents	224	3.7	1.0	224	1.5	0.7
- Extension agents with farmers	163	3.5	1.2	163	1.6	0.7
- Extension agents with researchers	163	3.7	1.2	163	1.6	0.8
- Researchers with extension agents	25	3.9	1.0	25	1.7	0.7
- Researchers with farmers	25	3.9	1.2	25	1.8	0.7
- Farmers with researchers	224	3.2	1.5	224	2.0	0.9

- Farmers, extension agents and researchers responded to the perception of linkages among and between survey groups on a 5-point Likert-type scale with: 1 = Definitely should not; 2 = Should not; 3 = May or may not; 4 = Should; and 5 = Definitely should.

- Farmers, extension agents and researchers responded to the frequency of linkage execution within and between survey groups on a 3-point Likert-type scale with: 1 = Often; 2 = Sometimes; and 3 = Never.

Research Question 3: Are there significant differences between response means for members of subgroups within each three survey population groups, identifiable by personal or situational characteristics on selected terms and/or conditions about linkages among and between agricultural subsystems, involved in the development and dissemination of agricultural innovations in Cameroon?

Personal characteristics used to test differences within groups were: position, gender, age, level of education, level of income, citizenship, and number of years in the profession. For farmer group, the personal or situational characteristics on which respondents were tested if there were differences were: gender, position, age, educational level and level of income. As far as the extension worker group was concerned, personal characteristics used to test for differences included: position, gender, age, level of education and number of years in the profession.

For research group, personal characteristics used to determine intra-group were: position, age, level of education, citizenship, number of years in the profession.

1. There were no significant differences within farmer subgroups identifiable by gender, position, age, educational level and income on their perception of selected terms and/or conditions about linkages between and among agricultural subsystems involved in the development and dissemination of agricultural innovations.

2. There were no significant differences within researcher subgroups identifiable by position, age, level of education, citizenship at birth, and number of years in the profession on their perception of linkages among and between agricultural subsystems involved in the development and dissemination of agricultural innovations.

3. There were differences between male and female researchers on the perception of whether linkages through collaboration with peers would lead to an improvement of the research profession and services. Female researchers were undecided while their male counterparts positively perceived such a collaboration to be necessary.

4. There were no significant differences within extension agent subgroups, identifiable by their level of education and the number of years in the profession on their perception of terms and/or conditions about linkages among and between agricultural subsystems involved in the development and dissemination of agricultural innovations.

5. Meanwhile, significant differences occurred within extension worker subgroups identifiable by position, gender and age on terms and/or conditions about linkages among and between

agricultural subsystems involved in the development and dissemination of agricultural innovations.

Statistically significant differences occurrred between extension worker respondents who did not indicate their position, age and gender, and their peers who did indicate such personal characteristics. In the situations where differences occurred, respondents who failed to report their position within the extension subsystem, their age category or their gender expressed a neutral opinion while others positively perceived either that formal training was one of the many ways to improve their professional competencies or that collaboration between researchers and extension workers was one of the prerequisites to agricultural and rural development.

Research Question 4: Are there significant differences between response means by population groups on selected individual perception statements and selected terms and/or conditions about linkages among and between agricultural subsystems involved in the development and dissemination of agricultural innovations in Cameroon?

Respondents were asked to express their opinions about linkages among and between agricultural subsystems involved in the development and dissemination of agricultural innovations on a five-point Likert type scale ("strongly disagree," "disagree," "undecided," "agree," and "strongly agree").

1. Agricultural researchers, farmers and extension agents, all perceived that linkages with peers through collaboration was a sine qua non condition for agricultural and rural development. Such an approach was perceived to lead to the improvement of services and the professions.

2. The opinions expressed by members of all three respondent groups tended to fall in the "no opinion/undecided" range regarding whether assigning teaching, research and extension responsibilities to one individual could mutually benefit the Institute of Agronomic Research, the Extension Service, the Agricultural Education and the Production Subsystem.

3. The respondent groups perceived that linkages between agricultural subsystems involved in the development and dissemination of agricultural innovations through their integration in one administrative unit would:
   - boost the country's agricultural development
   - lead to a better utilization of scarce resources
   - improve services currently offered by each component in separate units.

Therefore, respondents expressed a strong desire for effective linkages within Cameroonian agricultural subystems as advocated by social system theorists Loomis (1960), Axinn and Thorat (1972), Havelock (1973), Lionberger and Gwinn (1982).

Conclusions

The central focus of this study was directed to the relationships between, within and among three key groups for agricultural and rural development. The findings were helpful in arriving at some overall conclusions regarding the extent to which linkages were perceived to be important and taking place.

Conclusion No. 1:

Farmers, researchers and extension workers, as identifiable groups, perceived that collaboration among peers and between groups was important for the development and dissemination of agricultural innovations. Such intra-group and inter-group linkages were perceived to be a means for improving services to potential users and to the professions. This is a reaffirmation of conclusions drawn by many researchers in other countries (Axinn & Thorat, 1972; Feller et al., 1984; Cernea et al., 1985). Although it is quite generally accepted, there appears to be considerable variation in the extent to which such linkage is achieved in Cameroon as well as other countries.

Conclusion No. 2:

The extent to which activities are carried out which represent linkages between members of different groups are perceived differently by members of the different groups. In other words, the perceptions of farmers regarding linkages with researchers and extension workers are

not the same as the perceptions of the researchers and extension workers. An example might be the use of on-farm research which could involve researchers, extension workers, and farmers. The extent of involvement of the key actors from the three groups could vary considerably, so much so as to leave one or more of the groups perceiving little or no involvement.

Conclusion No. 3:

The perceived roles of the extension workers appear to impose limitations on their activities. Cameroonian farmers in the region studied typically produce maize, Arabica coffee and other crops such as vegetables and fruits. When research activities, and subsequent recommendations focus on specific crops such as maize and Arabica coffee, the extension worker is ill-equipped (technologically) to work with the farmers' overall farming programs. When the extension agent is not involved in the marketing process, the farmer perceives that the extension worker is not helpful when help is needed.

Conclusion No. 4:

The extension worker group, formal bridge between farmers and researchers, is perceived not to be equidistant from both groups, but closer to farmer group than to researchers. Because of such a perceived position, the extension worker group faces some handicapts as effective linkers within the Cameroonian agricultural technology development and transfer system. The factors which seem to place the extension workers closer to farmmers may enhance the transfer of

agricultural technologies to farmers but inhibit the feed-backs to researchers.

Conclusion No. 5:

Farmers, extension workers and researchers generally perceived that linkages between, within and among groups could be improved by integrating the research, agricultural and extension education subsystems in one administrative unit. They believed that such a move would: boost the country's agricultural and rural development, lead to a better utilization of scarce resources (financial and human) and improve the services currently offered by these subsystems to their clients. This is a reaffirmation of conclusions drawn by scholars in other countries about the positive effects of integrating various components of agricultural subsystems (Havelock, 1971; Axinn & Thorat, 1972; Axinn, 1978; Lionberger & Gwin, 1982; Cernea et al., 1985).

Implications and Discussion

A number of implications concerning agricultural researchers/ extension agents and farmers' perception of linkages between Cameroonian organizations involved in the development and dissemination of agricultural innovations have been drawn from this study.

To interpret these implications, the reader should be reminded, however, that because the study design was based on a survey population that represented only one nonrandomly selected segment of the much larger target population, the degree to which findings and conclusions can be generalized to a broader situation is limited. Seven major implications are stated and briefly discussed .

Need for Effective Linkages

The need for effective linkages between the Institute of Agronomic Research (IRA), the Extension Service and the production subsystem is beyond dispute. Unless agricultural researchers and extension workers at all levels (administrative, supervisory and operational) have a clear understanding of national priorities and the operational parameters of their work, their contribution and ultimately that of farmers to national goals is likely to be vitiated.

National agricultural development policy should indicate the contribution of researchers, extension workers and farmers to agricultural development and to the country's particular development strategy, and should show how the three groups are interrelated in terms of policy implementation.

For agricultural research as for extension, basic parameters should be established. For instance, these might include its professional and technical orientation, basic work responsibility and management principles, criteria by which its effectiveness should be monitored, ways in which extension contributes to national policy formulation and implementation, and the basic institutional arrangements for its linkages to other agricultural subsystems (such as supply, marketing and research).

Parameters defined for research could be similar: the criteria for effectiveness and accountability, responsibilities with regard to national development policy, institutional linkages with other subsystems.

Marketing of Agricultural Outputs

Marketing of agricultural outputs is as important to farmers as to the governance. On one hand, the farmer perceives in the marketing subsystem a source of reward for hard labor. On the other hand, the government perceives the marketing component of the agricultural system as a source of foreign exchanges and taxes for development purposes. Extension agents, the sole governance representatives in remote rural areas of the country should be involved helping solve problems and constraints in the marketing of agricultural products.

Need for Farmer Incentives

Farmers frequently have priorities different from those of national government (Tchouamo, 1981, p. 12). It is believed that a national policy with farm level implications is likely to be only as successful as the degree to which it coincides with the interest of (and incentives received) farmers. A national policy is unlikely to find acceptance with producers unless there are appropriate economic incentives for them to follow it. The decrease in Arabica coffee production in the West Province is a clear message that farmers are no longer motivated to grow that crop. A high ranking researcher reported to the author many occasions in which farmers have categorically rejected his instructions even though they were normal routine in coffee farm maintenance. The cultivation of Arabica coffee is in danger in the West Province. Unless serious rewarding incentives are taken by policy makers and the marketing agency UCCAO, there is little doubt that this crop is threatened for disappearance.

The effectiveness of extension activities related to adoption of appropriate technology for various crops can be seriously limited when the pricing policies make production unprofitable.

Qualifications and Evaluation

The impact of both agricultural research and agricultural extension activities depends to some extent on the quality of their staff. There is no doubt that the quality agricultural research and extension activities is intimately related to the personnel policies adopted by both subsystems. So, any personnel policies for both organizations should be to attract, motivate, train and retain qualified, hard working and conscientious staff. Efforts should be made to ensure that the personnel policy of either service does not hinder the necessary interaction between the two staffs as currently noticed.

Distinctive skills of extension workers as well as of agricultural research personnel (research technicians and researchers) should be recognized and rewarded. It also is important to identify appropriate measures of effectiveness and accountability for each subsystem. For instance, an extension worker's effectiveness may be evaluated primarily by use of job-related factors and secondarily by use of situational factors. The job-related factors (primary) may include job duties such as program planning, promotion and implementation; results and process oriented; and familiarity with appropriate technology. In addition, evaluation of performance by extension workers should take into consideration situational factors such as budget problems,

availability of supplies and equipment, weather conditions, policy changes, transportation and others.

The Cameroonian research evaluations should account for the extent to which research results are appropriate for an adopted by farmers. The roles for extension workers and farmers in priority setting and in various stages of research from design to field tests need to be more clearly identified. Otherwise this could be a major constraint on the effectiveness of both extension and research subsystems and on the linkages between the two fields. Agricultural research, extension and education need to take account of farmers' needs and priorities. In a review of extension subsystem's services, a major consideration is the extent to which the system effectively serves its clients: the farmers. So, a review of agricultural research should have the same orientation. Not only do agricultural researchers and extension agents need to know farmers' needs if research and extension activities are to be relevant and have some chance of success, but both subsystems need to have a key role in making farmers' needs and priorities known to the governance body.

Administration and Organization

Although agricultural research, extension and education have interests in common and a high degree of interdependence, combining the three functions in one administrative unit is likely, under the current Cameroonian situation, to be less satisfactory than having separate subsystems responsible for each. Since the three agricultural subsystems (research, extension and education) are ultimately concerned

with the same objectives: improving the productivity, production and income of farmers and, through them the agricultural and rural sectors, the need for communication, cooperation and coordination is self-evident. Despite their intrinsic interdependence, various forces promote their separation such as researchers' different professional orientations and cultural values, different means of accountability, different methodologies, the advantages of organizational bases to promote appropriate resource allocations for all.

The absence of physical resources is probably not the significant constraint impeding effective linkage between extension agents and researchers, rather the critical factors are: (1) the attitudes and interests of staff; (2) institutional arrangements; (3) established traditions for program delivery; (4) absence in Cameroon of a universally held philosophy for agricultural and rural development; and (5) the image held by the general public based on the reports available through the mass media.

Chapter I of this study dealt at length with the inadequate institutional linkages between Cameroonian agricultural subsystems.

Agricultural researchers lacked trust in each other and did not believe in the capabilities of extension agents and farmers to be good sources of information.

Even among themselves, their individual capabilities were perceived to be linked to the place where the degree was earned. American graduates believed they have had a better training than colleagues trained in Europe. The latter, on the other hand, perceived American graduates to be less qualified to handle the job.

Cameroonian agricultural and rural development stakeholders also lack a clear philosophy of development.

Boyle (1981), Lionberger (1982) report that all people need a set of ideals to guide them in their work. The most important part in an agricultural system philosophy is a belief of the workers (policy-makers, suppliers, marketers, extension agents, farmers, researchers) in mutual capabilities of peers.

Stakeholders should believe in the capabilities of farmers. Respect for the farmer's capability gives reason for another belief. That is belief that policy-makers, agricultural input suppliers, marketers, extension agents and researchers should listen to what farmers have to say about why they do things a certain way, problems they want help on, and problems they see in marketing of agricultural output, supply of agricultural input (fertilizers, pesticides, loans) and in innovations (i.e. Java coffee variety, maize Z290). Thus, they should be involved in making decision on what research should be done, what inputs are needed and when they should be supplied, how much should be paid to the agricultural output (taking into consideration the cost of production), what the extension programs should be, and how the programs should be carried out in their communities.

Agricultural system is not strongly linked to the mass media.

Mass media (television, radio, newspapers) pay little and make few reports on agricultural system, the backbone of the country's economy. Members of the agricultural system have little access to mass media for the diffusion of agricultural innovations, and for market information.

There is no question that before channels can serve as means for getting information to potential users, appropriate linkages have to be established with researchers, marketers, suppliers and extension sources of information on a continuing basis. So, proper linkages with the Cameroonian mass media outlets will have to be strengthened. There is no doubt that the communication needs of the agricultural system and other systems in the country cannot be done by national broadcast alone. The contribution of the private sector in this respect is imperative.

Agricultural Education Institutions

Another important issue for research, extension and production linkages is the role of agricultural training institutions (the University Centre of Dschang, the Regional Colleges of Agriculture and the Technical Schools of Agriculture). They have an undisputed primary function of providing the basic manpower for extension and research, and also contribute to periodic updating of staff by being directly involved in training. Given the basic role in the development of extension and research staff, agricultural training institutions have a crucial contribution to make fostering effective linkages between the two subsystems. In doing so, a significant contribution of agricultural training institutions will be to ensure that the intrinsic interdependence of agricultural subsystems is acknowledged at all levels of institution education and training activities.

Additional Studies

The advocates of reforms of the current Cameroonian agricultural system should make careful studies before taking any action. All stakeholders (farmers, suppliers, researchers, teachers in agriculture, extension workers, policy makers, etc.) should be allowed to provide inputs on the direction they would like changes to take. Recommended linkages should be specific to the country's administrative, socio-cultural and agro-economic conditions.

Limitations

As in any investigation, mainly those that have an exploratory aspect attached to them, foreseen and unforeseen limitations are unavoidable. Listed below are limitations that were recognizable at the completion of the study.

1. The nonprobability sampling technique limited the generalizability of conclusions that can be made to larger populations. No similarity between agricultural researchers of maize and coffee programs of IRA, maize and Arabica coffee farmers of the West Province, extension workers and those operating in other IRA research programs, or crops and province is assumed in this study. Those who wish to apply these results, research programs and crops in other provinces must be aware of this limitation.

2. Most farmers have had no or limited linkages with agricultural researchers. Because of the limited interactions, some indicated

that it was not possible to provide informed responses to certain questionnaire items.

3. Some respondents, especially the extension agents, and within this group the agricultural monitors, remarked that certain questionnaire (design, language, format, etc.) items were not at their level. Others indicated that it was developed in an American style that is not quite familiar to them. A third group stressed that answering the questionnaire items was a challenge but an excellent learning experience.

4. Perceptions by farmers, extension agents and researchers was sought to be representative of the opinions of a group of people that contribute to the Cameroonian agricultural development (i.e. increase in output for export, and food for export and domestic consumption). Opinions of other stakeholders such as teachers in agriculture, suppliers of agricultural inputs, marketers of agricultural output, policy makers, or farmers growing other crops such as cocoa, cotton, etc. might differ.

5. The general information on perception of institutional linkages may yield contradictive data or data with low information value. It depends on the quality of institutions. There may be very good team work in a single institution even when it is big, if at least minimal democratic rules can be integrated and the contributions of individuals can be generated. Under other conditions the cooperation within smaller units, separate in administrative organization, may be easier and more fruitful.

Recommendations

There are two general recommendations which appear to be most readily recognized from the findings and conclusions of this study. One of the recommendations relates to the improvement of the linkages within, between and among the groups studied; and the other relates to additional research which is needed.

Improving Linkages

Measures should be taken to strengthen institutional linkages between subsystems of the agricultural system. Although financial resources may be a limitation, it is quite likely that the most critical factors are the attitudes and interests of the staffs of all subsystems and the shortcomings of the policies and practices for intra- and inter-institutional arrangements. A range of alternatives could help in improving linkages within, between and among Cameroonian agricultural subsystems.

One of the alternatives which should be given consideration is the use of committees to strengthen the interaction among the three subsystems (researchers, extension workers, and farmers) in joint planning sessions on such topics as (a) proposed agricultural policies and goals for the short-range and long-range; (b) problems faced by farmers for production and marketing; (c) local and/or region specific conditions which affect implementation and achievement of proposed targets for various crops; and (d) other high priority matters.

Before establishing such committees, it would be important to look at alternative models for such committees within other sectors of

Cameroon. If necessary, the looking should extend to other countries which may have demonstrated success with greater linkage among the various subsystems. In any case, the adaptation to the Cameroonian situation would be most important.

Another factor to consider in relation to the use of committees as a vehicle to improve linkage would be to look at the use of committees on a volunteer basis as well as to consider formally appointed committees. The use of voluntary committees at the various levels could be tried as one means of improving communication. The frequency of meetings, length of meetings and especially the agenda for meetings could be locally determined. The results of such meetings should be communicated in appropriate manners. Expectations should be kept modest at the beginning so that the mutual trust among the committee members could be enhanced. Also, there should be openness for the meetings so that supervisors and others would have no reason to fear the outcomes from such groups.

A second type of activity for improving linkage might be in the area of planning and conducting on-farm trials. In order to develop and sustain effective linkages among farmers, extension workers, and researchers, current policies for on-farm trials should be reviewed and modified. The modifications should result in getting the trials carried out in a joint manner with knowledge of the farmers and extension workers in that geographical area.

A third type of activity to be considered is frequent workshops in which extension workers, researchers and farmers are able to equally present and discuss immediate concerns related to their own

institutions and roles. Contracts established in such environment might increase understanding of concerns and improve the mutual respect among the workers in the institutions.

A fourth type of activity would be in the area of raising the status of researchers and extension agents within the overall Cameroonian agricultural system. The perception of low status can have rather negative consequences on performance by persons regardless of level. It is appropriate to recognize and to reward the distinctive skills of research technicians and extension workers. Attempts to raise the status generally involves many factors such as measures of effectiveness and accountability as well as civil service employment and advancement rules.

Future Research

As with any study, several gaps in the literature have been noted and many researchers have called for additional studies in the area of knowledge development and dissemination. The role of extension agents and agencies has been the focal point of many conferences and papers with a general lack of agreement on positive models; but a general agreement on the inadequacies of the present arrangements within most developing countries. However, only some of the reports and discussions have utilized the systems approach to their analyses.

The results of this research provide support for the approach taken by the Technology Department and Transfer Systems in Agriculture project. That project is focused on development of an inductive model

for determining the functioning of a system as viewed from different points within the system (or subsystem) (Swanson, no date).

Additional insights could be gained about the linkages within the agricultural system by studying the key groups in the agricultural inputs, marketing, and policy-making subsystems. Such studies might identify strengths and weaknesses in the present arrangements for communication within, between, and among those three subsystems studied in this research.

Another area for research is the present patterns for dissemination of information from research. Many developments have been made in recent years regarding the printing, taping, and visualizing of information. Such a study might help to identify the target groups for various kinds of information from research and other reports and determine what is and what should be as perceived by those groups.

Another area to be explored by future research is the farmer receptivity to research derived recommendations. Statistical valid sampling and surveys should be carried out to assess farmer's receptivity to research derived recommendations, and to identify gaps between adopted innovations and recommended packages, but also gaps in both research and extension supports to agricultural and rural development.

LIST OF REFERENCES

Axinn, G.H. (1978). New strategies for rural development. East Lansing, MI: Rural Life Associates.

Axinn, G.H., & Thorat, S. (1972). Modernizing world agriculture - A comparative study of agricultural extension education systems. New York: Praeger.

Axinn, G.H., Axinn, N.W., Goldenberg, T., & Tuso, H. (1976). Non-formal education and rural development, programs, of studies in non-formal education. Supplementary Paper No. 7, Michigan State University, East Lansing, MI.

Ayuk-Takem, J.A., & Ngong-Nassah, E.N. (1980). How to grow maize for high yields. Technical Bulletin No. I/84/IRA. Bambui: Ministry of Higher Education and Scientific Research.

Ayuk-Takem, J.A. (1982). Some highlights about the cereals programme of the Institute of Agronomic Research. Bambui: Ministry of Higher Education and Scientific Research, Institute of Agronomic Research.

Ayuk-Takem, J.A., Eckebil, J.P., & Cheda, H.R. (1985). Problems and potentials of maize (Zea Mays L). Research and production in Cameroon. Revue Science et Technique, 2(4), 5-16.

Babbie, E. The practice of social research (3rd ed). (1983). Belmont, CA: Wadsworth Publishing Co.

Baldwin, I.L. (1970, September 22). A system of services to support agricultural development. The Asian Agricultural College University Seminar, Bangkok.

Bateson, N. (1984). Data construction in social surveys - Contemporary social research series. London: George Allen and UNWIN Pub., Ltd.

Beal, G.M., Blount, R.C., Powers, R.C., & Johnson, W.J. (1966). Social actions and interaction. Ames, IA: The Iowa State University Press.

Beeftu, A. (1985). Field staff training for development in East Africa: A case study in one PVO. Unpublished doctoral dissertation, Michigan State University, East Lansing, MI.

Bennis, W.G., Benne, K.D., & Chin, R. (1966). The planning of change. New York: Holt, Rinehart and Winston.

Benor, D., Harrison, J.Q., & Baxter, M. (1984). Agricultural extension: The training and visit system. Washington, DC: The World Bank.

Benson, D.K., & Benson, J.L. (1975). A guide to survey research terms. The Bonchmark Program, Academy for Contemporary Problems. Columbus, OH.

Bertrand, A.L. (1967). Basic sociology: An introduction to theory and method. New York: Meredith Publishing Co.

Blackburn, D.J. (Ed.). (1984). Extension handbook. University of Guelph, Canada.

Boone, E.J., Dolan, R.J., & Shearon, R.W. (1971). Programming in the cooperative extension service - A conceptual schema. Raleigh, NC: North Carolina State University Extension Service.

Borg, W.R., & Gall, M.D. (1983). Educational research, an introduction (4th ed). New York: Longman.

Boyle, P. (1981). Planning better programs. New York: Mc-Graw Hill Book Co.

Bradburn, N.M., & Sudman, S. (1986). Asking questions: A practical guide to questionnaire design. San Francisco, CA: Jossey-Bass Publishers.

Cernea, M.M., Coulter, J.K., & Russell, J.F.A. (1985). Research-extension-farmer: A two-way continuum for agricultural development. Washington, DC: The World Bank.

Chin, R. (1964). Models of and ideas about changing. In W. C. (Ed.) Media and educational innovation. University of Nebraska Extension Division and University of Nebraska Press.

Claar, J.B. (1985, Jan.). Technical liaison and support personnel in technology dissemination. Interpacks, University of Illinois, Urbana, IL.

Clausen, A.W. (1984). Toward sustained development in Sub-Saharan Africa: A joint program of action. Washington, DC: The World Bank.

Cole, M.J. (1979). The role of the change agent in the cooperative extension service. Unpublished manuscript, University of Florida, Gainesville.

Cole, J.M., & Cole, M.F. Advisory councils: A theoretical and practical guide for program planners. Englewood Cliffs, NJ: Prentice-Hall, Inc.

Ekani, T.S. (1986, April-May-June). Gros plan sur l' U.C.C.A.O., Cameroon Agriculture. Revue trimestrielle du Ministere de l' agriculture, No. 002, Yaounde, 6-15.

Ennis, P.H. (1961). The social structure of communication systems: A theoretical proposal. Studies in Public Communications, 3, 120-144.

Fear, F.A., & Thullen, M. (1984). Guidelines for designing and conducting master's and doctoral research in community development. East Lansing, MI: Department of Resource Development, Michigan State University.

Feller, I., Kaltreider, L., Madden, P., Moore, D., & Sims, L. (1984). The agricultural technology delivery system: A study of the transfer of agricultural and food-related technologies. A document-based review of organizations and their linkages, Vol. 1. Institute for Policy Research and Evaluation. The Pennsylvania State University, University Park, PA.

Feller, I., Kaltreider, L., Madden, P., Moore, D., Sims, L., & Rusinko, D. (1984). The agricultural technology delivery system: A study of the transfer of agricultural and food-related technologies. Surveys of organizations and their linkages, Vol. 2. Institute for Policy Research and Evaluation. The Pennsylvania State University, University Park, PA.

Feller, I., Kaltreider, L., Madden, P., Moore, D., Sims, L., & Hendrickson, J. (1984). The agricultural technology delivery system: A study of the transfer of agricultural and food-related technologies. Research and extension in human nutrition, food science, and home economics, Vol. 2, Chap. 16. Institute for Policy Research and Evaluation. The Pennsylvania State University, University Park, PA.

Feller, I., Kaltreider, L., Madden, P., Moore, D., & Sims, L. (1984). The agricultural technology delivery system: A study of the transfer of agricultural and food-related technologies. Review of previous case studies, Vol. 3. Institute for Policy Research and Evaluation. The Pennsylvania State University, University Park, PA.

Feller, I., Kaltreider, L., Madden, P., Moore, D., Sims, L., & Rusinko, C. (1984). The agricultural technology delivery system: A study of the transfer of agricultural and food-related technologies. Case studies of organizational linkages and

technology transfer, Vol. 4. Institute for Policy Research and Evaluation. The Pennsylvania State University, University Park, PA.

Feller, I., Kaltreider, L., Madden, P., Moore, D., & Sims, L. (1984). The agricultural technology delivery system: A study of the transfer of agricultural and food-related technologies. Overall study report: Findings and recommendations, Vol. 5. Institute for Policy Research and Evaluation. The Pennsylvania State University, University Park, PA.

Feller, I., Kaltreider, L., Madden, P., Moore, D., & Sims, L. (1984). The agricultural technology delivery system: A study of the transfer of agricultural and food-related technologies. Executive summary: Findings, policy, issues, and options. Institute for Policy Research and Evaluation. The Pennsylvania State University, University Park, PA.

Franklin, R. (1968). Toward the style of the community change educator. Paper written for the Appalachian Center of West Virginia University, Morgantown, WV.

George, S. (1984). Ill fares the land. Essays on food, hunger, and power. Washington, DC: Institute for Policy Studies.

Getzels, J.W., Lipham, J.M., & Campbell, R.F. (1968). Educational administration as a social process. New York: Harper and Row.

Gould, J., & Kolb, W.L. (1964). A dictionary of the social sciences. New York: The Free Press.

Griffiths, D.E. (1964). The nature and meaning of theory. In D.E. Griffiths (Ed.), Behavioral science and educational administration. Sixty-Third Yearbook of the National Society for the Study of Education, Part II. University of Chicago, IL.

Hall, R. (1977). Organizations: Structure and process (2nd ed.). Englewood, NJ: Prentice Hall.

Havelock, R.G. (1971). Planning for innovation through dissemination and utilization of knowledge. Center for Research on Utilization of Scientific Knowledge (CRUSK), the University of Michigan, Ann Arbor, MI.

Havelock, R.G., & Havelock, M.C. (1973). Training for change agents: A guide to the design of training programs in education and other fields. Center for Research on Utilization of Scientific Knowledge. Institute for Social Research, Ann Arbor, MI.

Hicks, H.G. (1972). The management of organizations: A systems and human approach. New York: McGraw Hill Book Co.

Hoffman, C.J. (1974). Community power structure, a concept useful in implementing change. In M.L. Collings (Ed.) The concept approach to programming in adult education with special application to extension education. Springfield, VA: U.S. Department of Commerce, National Information Service.

Hord, S.M. (1986, February). A synthesis of research on organizational collaboration. Educational Leadership, 22-26.

Houle, C.O. (1972). The design of education. San Francisco: CA: Jossey-Bass.

IRA. (1983). IRA Bambui station 1983 annual report. Ministry of Higher Education and Scientific Research, Centre de Recherche Agronomique de Nyombe, Bamenda.

Isaac, S., & Michael, W.B. (1981). Handbook in research and evaluation (2nd ed.). San Diego, CA: Author.

Kamajou, F. (1983). La Contribution du Secteur Agricole au Developpement Economique et Social du Cameroun. Communication au Seminaire sur l' Enseignement Agronomique Face au Developpment Economique et Social du Cameroun. Dschang, 17-20 Juillet.

Katz, D., & Kahn, R.L. (1966). The social psychology of organizations. New York: John Wiley and Sons.

Kelso, B.F., & Gervais, C.G. (1983). Study of the food crops component of the Cameroon extension program and the feasibility of establishing technical support centers. Yaounde: USAID/MINAGRI.

Kom, D. (1977). The cooperative movement in the Cameroon. In P. Gutking & P. Waterman. African social studies: A radical reader. London: Monthly Review Press.

Lionberger, H.F., & Gwin, P.H. (1982). Communication strategies: A guide for agricultural change agents. Dansville, IL: The Interstate Printers and Publishers, Inc.

Lippitt, R., Watson, J., & Westley, B. (1959). The dynamics of planned change. New York: Harcourt Brace and World, Inc.

Loomis, C.P. (1960). Social systems. New York: Van Nostrand-Reinhold.

Loomis, C.P., & Beegle, J.A. (1950). Rural social systems. New York: Prentice-Hall, Inc.

Loomis, C.P., & Loomis, Z.K. (1965). Modern social theories. New York: Van Nostrand-Reinhold.

Maratorana, S.V., & Kuhns, E. (1975). Managing academic change. San Francisco, CA: Jossey-Bass.

Maslow, A.H. (1970). Motivation and personality (2nd ed.). New York: Harper and Row.

Merriam, S.B., & Simpson, E.L. (1984). A guide to research for educators and trainers of adults. Malabar, FL: Robert E. Krieger Publishing Co.

MINAGRI. (1985). 1984 agricultural census. Yaounde: Department of Studies and Projects.

Morris, J.F. (1981). Managing induced rural development. Bloomington, IN: International Development Institute.

Ngong-Nassah, E.N. (1986). Summary information sheet for the Institute of Agronomic Research (I.R.A.) Bambui Station. Ministry of Higher Education and Scientific Research, I.R.A., Bambui.

Ngong-Nassah, E.N. (1986). Report on IRA station's activities during the financial year 85/86. Ministry of Higher Education and Scientific Research, I.R.A., Bambui.

Nyerere, J.K. (1967). Education for self reliance. Dar Es Salam: The Government Printer.

Orr, R. et al. (1964, Sept.-Oct.). The biomedical information complex viewed as a system. Federation Proceedings, 23(5).

Ouden, J.H.B. (1980). Incorporation and changes in the corporate household. The effects of coffee introduction and food crop commercialization in two Bamileke chiefdons, Cameroon. In C. Presvelou & Z. Spijkers (eds.) The household, women and agricultural development. Miscellaneous Papers 17, Lanbouwhogeschool, Wageningen, H. Veenman and Zonen B.V., 41-67.

Ouden, J.H.B. (1981, April). Changes in land tenure and land use in a Bamileke chiefdon, Cameroon 1900-1980: An historical analysis of changes in control over people, land and production. Society for Applied Anthropology 41st Annual Meeting, Edinburgh.

Parsons, T. (1964). The social system. The Free Press of Glencoe. New York: Collier-MacMillan, LTD.

Parsons, T. (1969). Essays in sociological theory pure and applied. Glencoe, IL: The Free Press.

Parsons, T. (1977). Social systems and the evolution of action theory. New York: The Free Press, Macmillan Publishers Co., Inc.

Parsons, T., & Shils, E.A. (1951). Toward a general theory of action. Cambridge, MA: Harvard University Press.

Patton, M.Q. (1982). Practical evaluation. Beverly Hills, CA: Sage Publications.

Payne, S.L. (1980). The art of asking questions. Princeton, NJ: Princeton U.P.

Prawl, W. (1986). National extension and training project to be implemented during the sixth Five-Year Development Plan. Department of Studies and Projects, Ministry of Agriculture, Government of Cameroon, Yaounde.

Prawl, W., Meldin, R., & Gross, J. (1984). Adult and continuing education through the Cooperative Extension Service. University of Missouri-Columbia, Columbia, MO.

Republic of Cameroon. (1984). Yearbook of agricultural statistics 1982/83. Ministry of Agriculture, Department of Studies and Projects, Division of Agricultural Statistics, Service of Agricultural Statistics, Yaounde.

Republic of Cameroon. (1985, Dec.). Cameroon in figures 1985. Ministry of the Plan and Regional Development. Department of Statistics and National Accounts, Yaounde.

Republic of Cameroon. (1985, Dec.). National seminar on extension and intervention in the rural area. Ministry of Agriculture, Department of Studies and Projects, Yaounde.

Republique du Cameroon. (1984). Decret No. 84/158 du 18 Avril 1984 Organisant le Ministere de l' Enseignement superieur et de la Recherche Scientifique. Yaounde.

Republique Unie du Cameroon. (1976). Plan Quinquenal de developement Economique, Social et Culturel (1976-1981). Ministere de l' Econnomie et du Plan, Agracam, Yaounde.

Revol, M. (1984, April). Evaluation de la Vulgarisation Agricole au Cameroun. Programme de Cooperation Technique, Organisation des Nations Unies Pour l' Alimentation et l' Agriculture. Rapport Consultation No. 2, TCP/CMP/2202, Rome.

Rogers, E.M. (1983). Diffusion of Innovations (3rd ed.). New York: The Free Press, MacMillan Publishing Co.

Santopolo, F.A. (1967). The extension worker - Change agent. A paper prepared for the Workshop for Area Directors in Extension, Lexington, KY.

Steele, R.E. (1986). Factors affecting practical agricultural training experiences for graduate students from developing countries. Unpublished Ph.D. Dissertation, Michigan State University, Department of Agricultural and Extension Education, East Lansing, MI.

Stiller, L.F.S.J., & Yadav, R.P. (1979). Planning for people: A study of Nepal's planning experience. Sahayogi Prakashan for Research Centre for Nepal and Asian Studies. Tribhuvan University, Sahayogi Press, Kathmandu, Nepal.

Sudman, S. (1976). Applied sampling. New York: Academic Press.

Swanson, B.E. (No date). Analyzing agricultural technology systems: A research report. Report on Technology Development and Tansfer Systems in Agriculture Project. INTERPAKS. Urbana, IL: University of Illinois.

Tankou, M. (1984). L'Histoire de la Politique Camerounaise en Matiere de Developpement Rural Depuis 1960. Communication au Seminaire sur les Organismes d' Intervention en Milieu Rural Dans le Processus de Developpement, Dschang, 15-20 Juillet.

Tannenbaum, R., Werschler, I.R., & Massarik, E. (1961). Leadership and organization: A behavioral science approach. New York: McGraw-Hill Book Co., Inc.

Tchala, A.F. (1983). De l' impact Potentiel des Recherches en Vulgarisation agricole et en Sociologie Rurale dans la Formation des Agents de Developpement Agricole. Communication au Seminaire sur: L'Enseignment Agronomique face au Developpement Economique et Social du Cameroun. CUDS, Dschang, 17-20 Juillet.

Tchala, A.F. (1985). Vers une Integration de l' Enseignment, De la Recherche et De la Vulganization Agricole au Cameroun: Le Cas du Centre Universitaire de Dschang. Seminaire sur la vulganisation et sa liaison avec la Recherche en Afrique de l' ouest. BIRD, C.C.C.E., FAC, USAID, Yamoussoukro, Cote d' Ivoire, 17-21 Fevrier.

Tchouamo, I.R. (1978). Relations entre les Structures Hierarchiques d'une Institution Rurale et l' organisation socio-economique de sa zone d' intervention: Cas de l' U.C.C.A.O. (Union Centrale des Cooperatives Agricoles de l'Ouest) au Cameroun. C.U.D.S., E.N.S.A., Yaounde.

Tchouamo, I.R. (1980). Cooperatives and development in the West-Province of Cameroon. Unpublished Master of Development Studies Thesis, I.S.S., The Hague, The Netherlands.

Tchouamo, I.R. (1981). La Communaute' villageoise et son Incidence sur le Development. le Germoir No. 2, Centre Universitaire de Dschang, Institut des Techniques Agricoles, Dschang, Mars, 22-24.

Tchouamo, I.R. (1981, Sept.-Oct.). Le Dilemme du Vulgarisateur Camerounais. Communication au 28eme cours sur la vulgarisation Agricole et le Developpement Rural, Centro Studi Agricoli, Borgo A. Mozzano, lucca, Italie.

Tchouamo, I.R. (1984). Quelgues Problemes de Management dans les organismes de Developpement Rural: Cas des Organismes d' Encadrement des Paysans. Communication au Seminaire International sur "Les Organismes d' Intervention en Milieu Rural Dans le Processus de Developpement." Centre Universitaire de Dschang, 15-21, Juillet.

Tchouamo, I.R. (1985, June). Relevance of the U.S. Extension Model in Another Culture. 7th Annual Institute for Studies of Non-Formal Education, Michigan State University, East Lansing, MI.

Tchouamo, I.R. (1986, April 9-11). Dilemma of extension agents in the Cameroon. Second Annual Conference Association for International Agriculture Education. National 4-H Center, Washington, D.C.

Though, A. (1982). Intentional changes: A fresh approach to helping people changes. Chicago, IL: Follette Publishing Company.

United Republic of Cameroon. (1979). Information Bulletin No. 2. Yaounde: CEPER.

United Republic of Cameroon. (1981). The fifth five-year economic social and cultural development plan (1981-1986). Yaounde: National Printing Press.

United Republic of Cameroon. (1982). Scientific and technical research in Cameroon. Yaounde: General Delegation for Scientific and Technical Research.

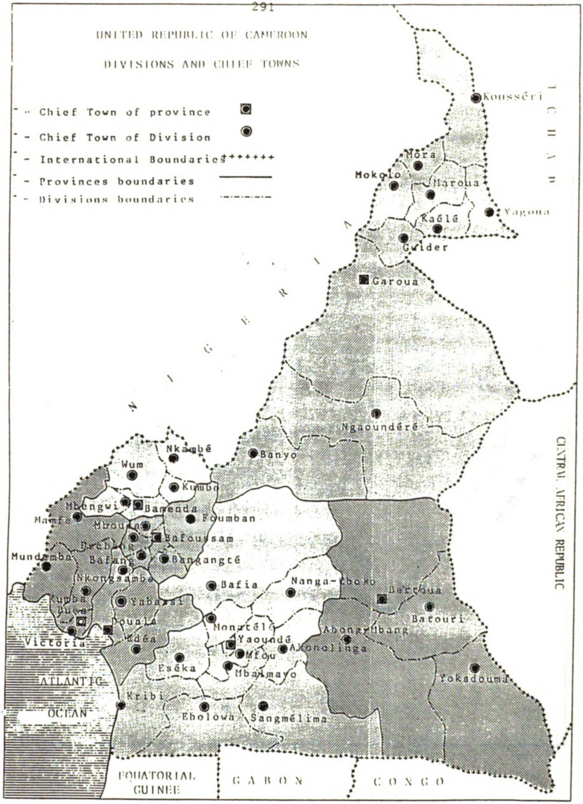
Van Gils, L. (1979). Methodologie de vulgarisation agricole. Tome V: La Recherche et la Vulgarisation Agricole, E.N.S.A./ CUDS, Yaounde.

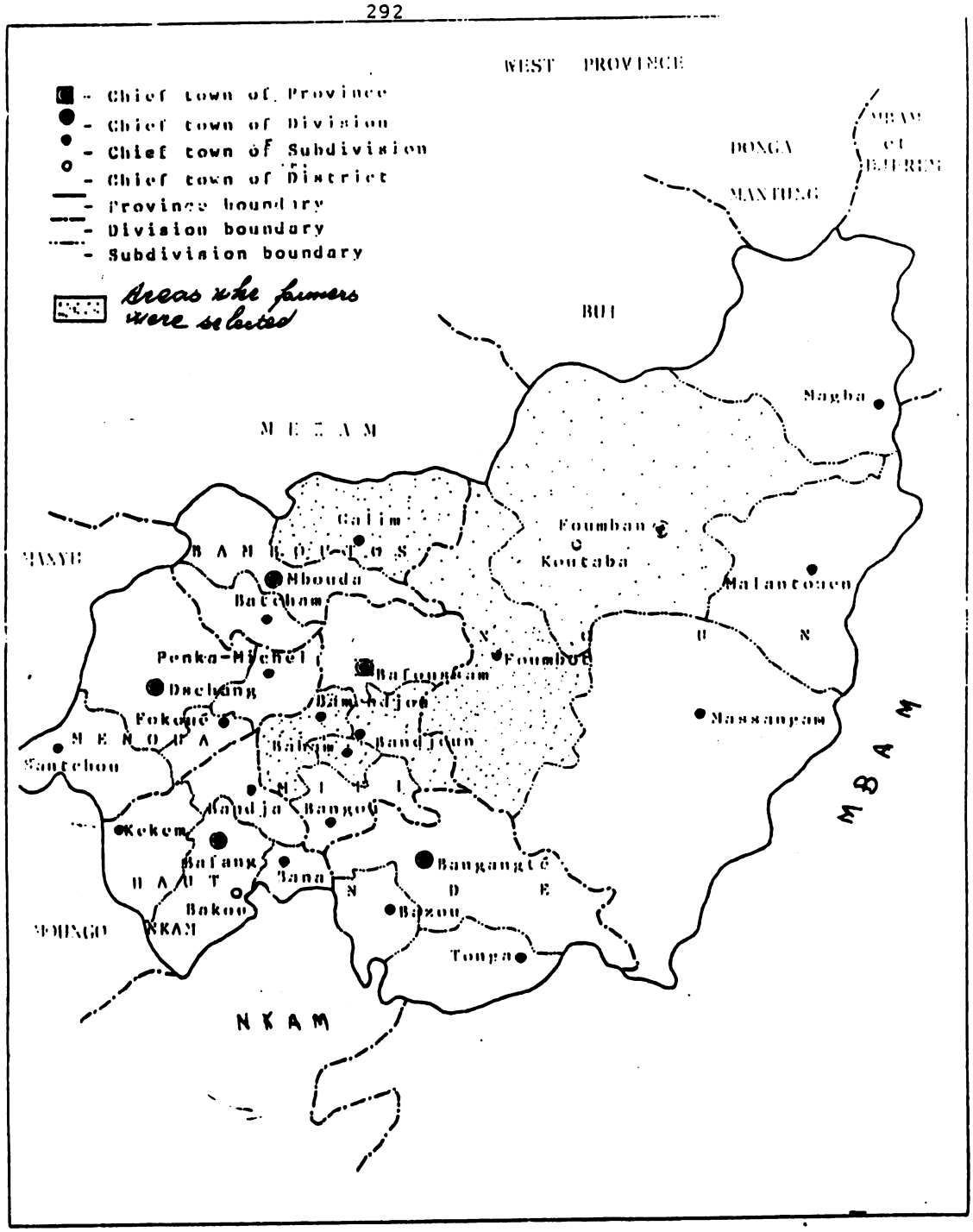
Zaltman, G., & Duncan, R. (1977). Strategies for planned change. New York: John Wiley and Sons.

APPENDICES

APPENDIX A

THE LOCATION OF THE STUDY

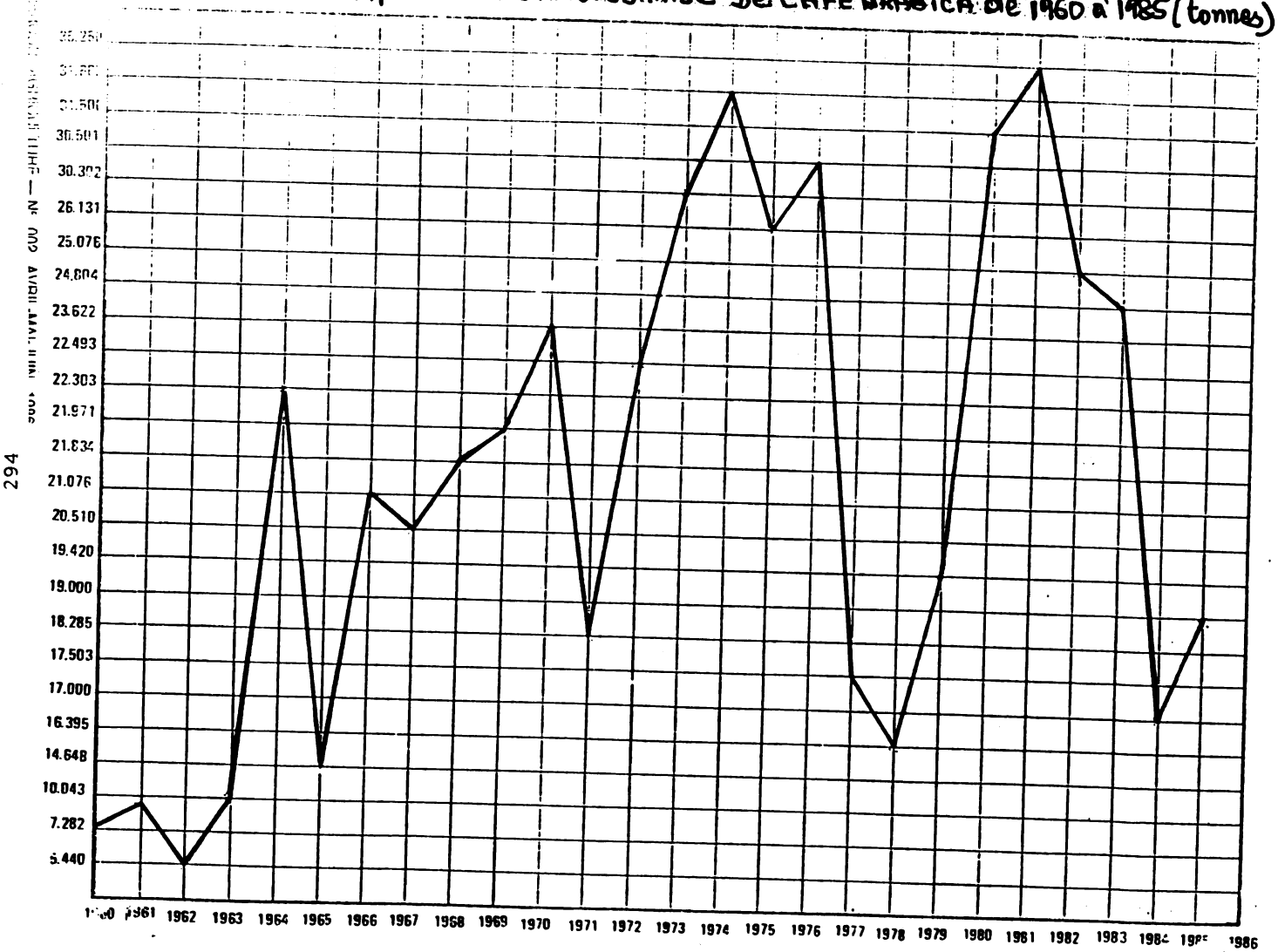

UNITED REPUBLIC OF CAMEROON
DIVISIONS AND CHIEF TOWNS
- Chief Town of province
- Chief Town of Division
- International Boundaries
- Provinces boundaries
- Divisions boundaries
TCHAD
NIGERIA
CENTRAL AFRICAN REPUBLIC
ATLANTIC OCEAN
EQUATORIAL GUINEE
GABON
CONGO
Kousséri
Mora
Mokolo
Maroua
Yagoua
Kaélé
Guider
Garoua
Ngaoundéré
Banyo
Nkambé
Wum
Kumbo
Mbengwi
Bamenda
Mamfe
Foumban
Mbouda
Bafoussam
Dschang
Mundemba
Bafang
Bangangté
Nkongsamba
Bafia
Nanga-Eboko
Bertoua
Kumba
Buea
Yabassi
Batouri
Douala
Victoria
Monatélé
Abong-Mbang
Edéa
Yaoundé
Akonolinga
Mfou
Eséka
Mbalmayo
Yokadouma
Kribi
Ebolowa
Sangmélima


WEST PROVINCE
- Chief town of Province
- Chief town of Division
- Chief town of Subdivision
- Chief town of District
- Province boundary
- Division boundary
- Subdivision boundary
Areas the farmers were selected
DONGA MANTUNG
BUI
MEZAM
Nagba
Galim
Foumban
Koutaba
Malantouen
Mbouda
Batcham
Penka-Michel
Bafoussam
Foumbot
Dschang
Fokoue
Massangam
MENOUA
Santchou
Kekem
Bafang
Bana
Bangangte
HAUT
Bakou
Bazou
Toupa
NKAM
MBAM

APPENDIX B

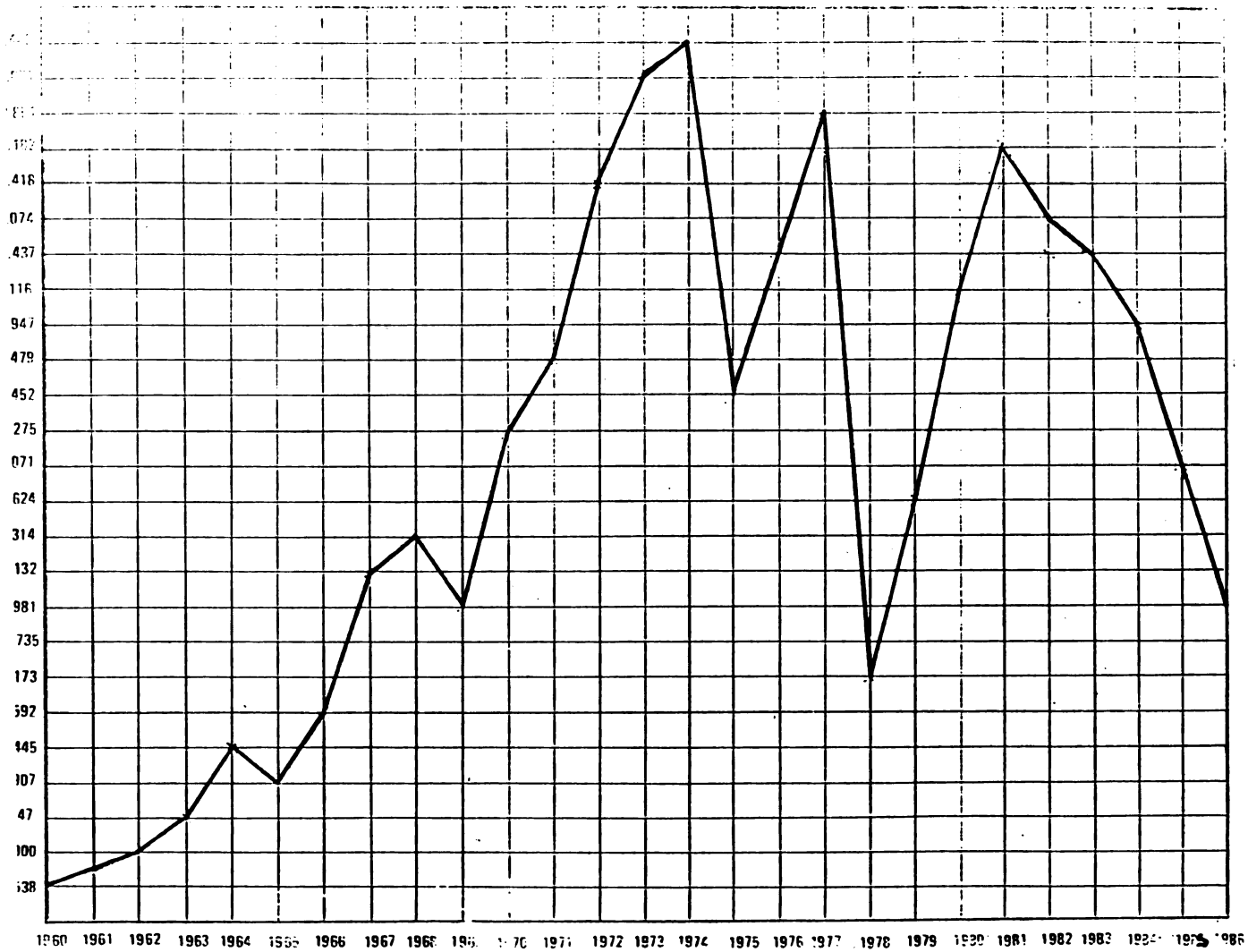
PRODUCTION FIGURES OF MAJOR EXPORT CROPS

Evolution de la production CAMEROUNAISE DE CAFE ARABICA de 1960 à 1985 (tonnes)

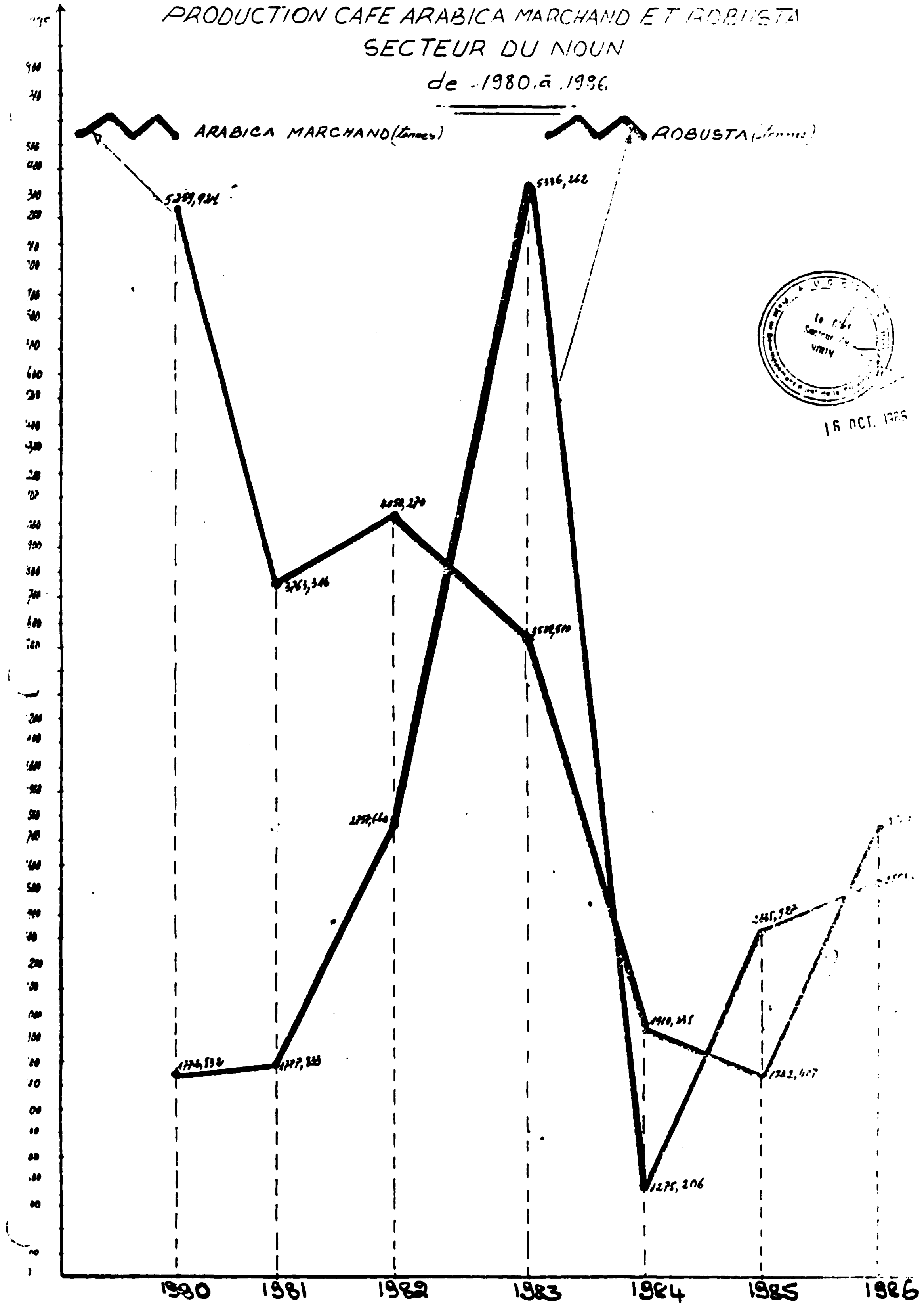


Evolution de la production de café arabica à l'U.C.C.A.O.

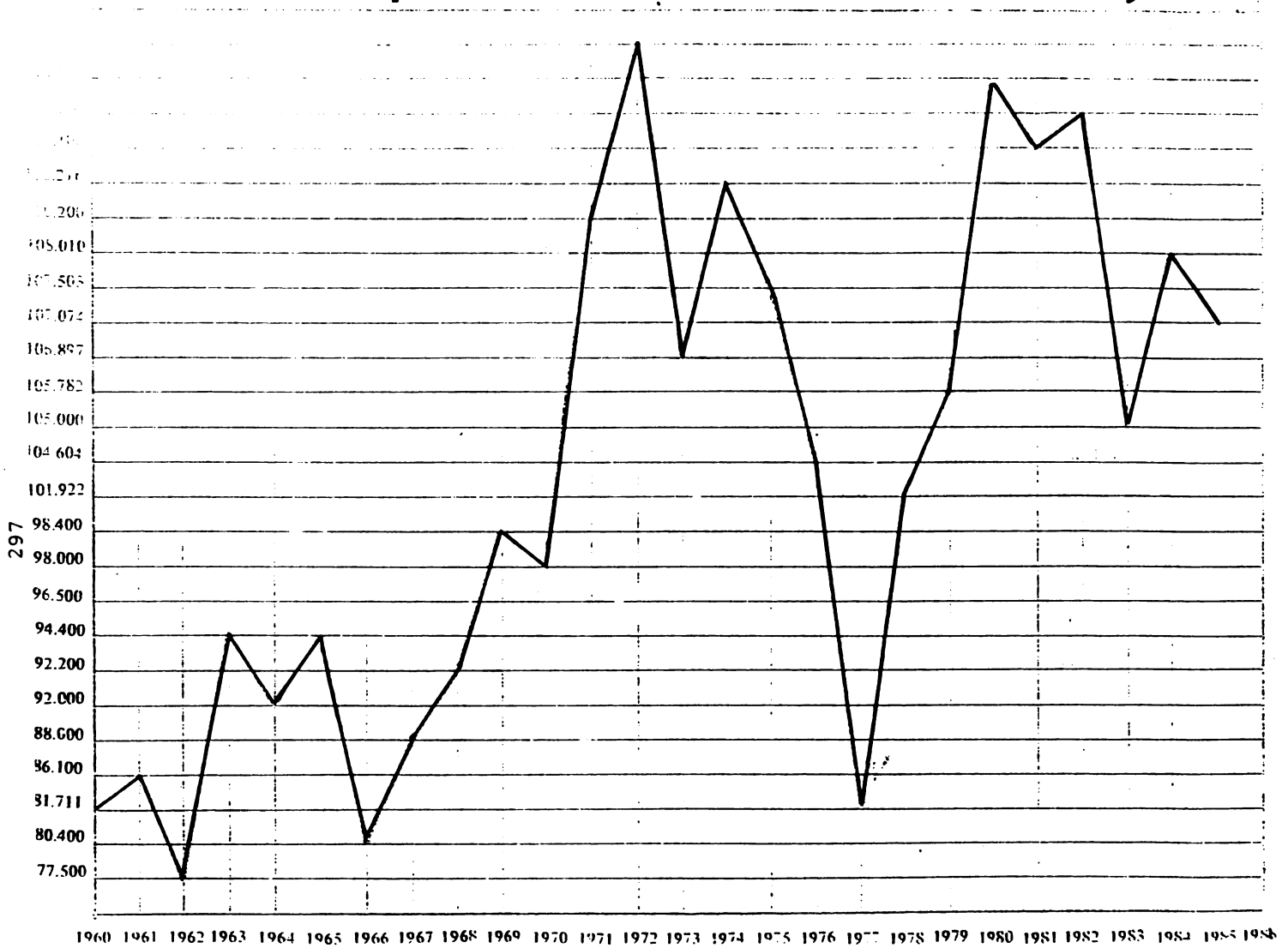
Source : UCCAO

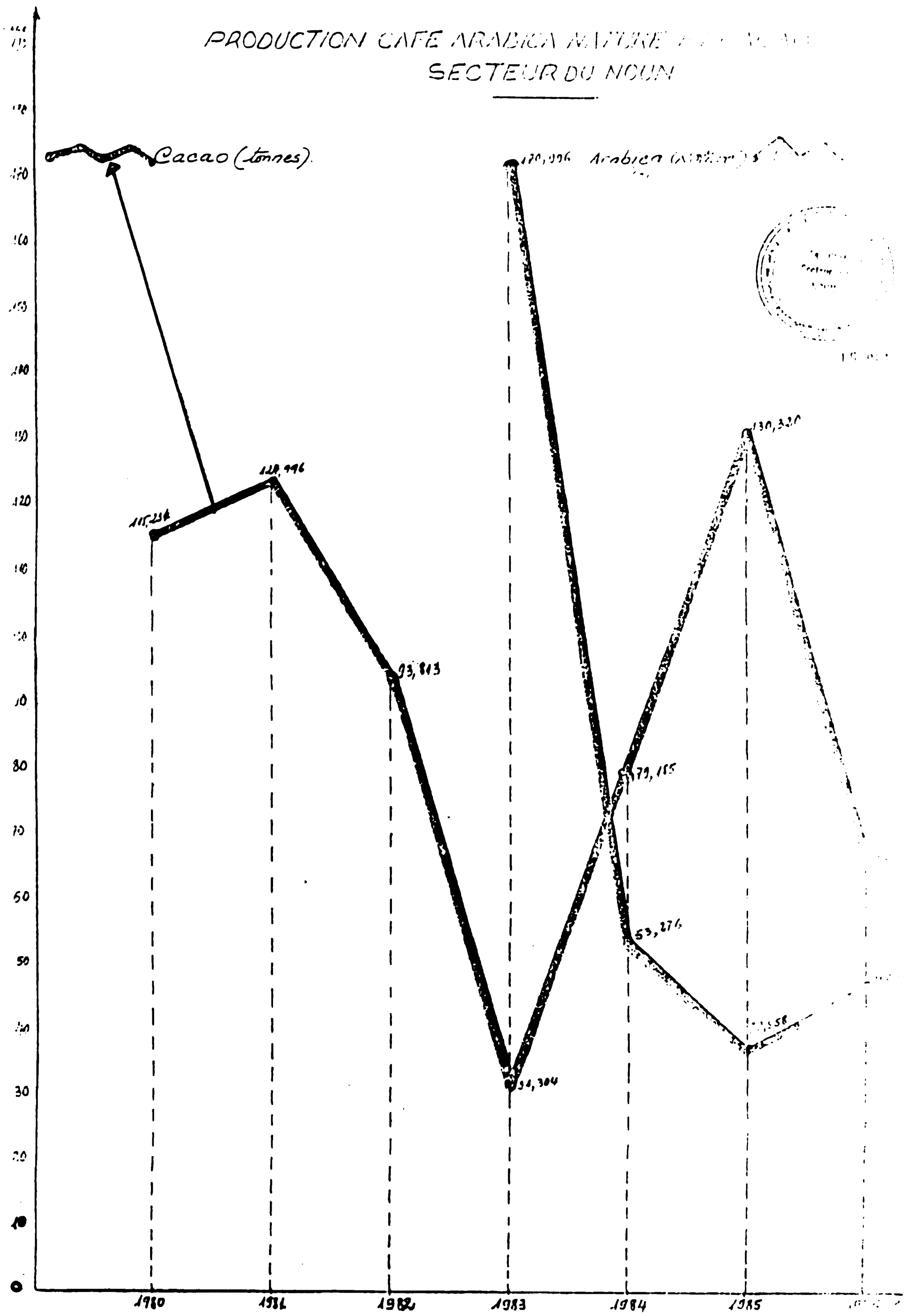


PRODUCTION CAFE ARABICA MARCHAND ET ROBUSTA
SECTEUR DU NOUN
de 1980 à 1986



Evolution de la production camerounaise de cacao de 1960 à 1985 (tonnes) .




PRODUCTION CAFE ARABICA
SECTEUR DU NOUN
Cacao (tonnes)
Arabica
115,234
124,996
93,813
31,304
79,155
53,276
130,320
0
10
30
50
60
70
80
120
1980
1981
1982
1983
1984
1985

APPENDIX C

QUESTIONNAIRE AND SURVEY MATERIALS

THE UNIVERSITY CENTRE OF DSCHANG

GENERAL DIRECTORATE

REPUBLIC OF CAMEROON

PEACE-WORK - FATHERLAND

N°..A6.../...1859..../CUDS/DG

TO WHOM IT MAY CONCERN

The researcher, currently a Ph.D. candidate in Agricultural and Extension Education at Michigan State University (Michigan, U.S.A.) is carrying a national survey that intends to assess :

- The current formal/informal linkages among the institute of agronomic research, the extension service and the production sub-system.

- The farmer/extension agent/researcher's perception of the current linkages among and between the above organizations.

The information gained in the study will be very useful for strengthening and improving the relationships among and between researchers, extension agents and farmers.

Only 15 mn of your precious time will be needed to complete the attached questionnaire. Your participation is voluntary. Your return of the completed questionnaire constitutes your consent to participate in this study.

All information is confidential and will be used for professional purposes only, if you are interested in receiving a summary of the results of this study after the data are tabulated, we would be pleased to include you on our reporting lists. To facilitate this and maintain confidentiality, write your name and address on a separate sheet and return to us with your questionnaire. Do not write your name or make any particular sign on the questionnaire.

We appreciate your willingness to share your opinions.

Sincerely,

The Director General of the University Centre of Dschang	The Guidance Committee Chairman	The Researcher
R. Owona	Dr. O. D. Meaders	I. R. Tchouamo

CENTRE UNIVERSITAIRE DE DSCHANG
DIRECTION GÉNÉRALE

REPUBLIQUE DU CAMEROUN
PAIX-TRAVAIL-PATRIE

N° A6 / 1859 /CUDS/DG/DGA

DSCHANG, LE 18 OCTOBRE 1986.

NOTE D'INTRODUCTION

Monsieur TCHOUAMO Isaac, enseignant au Centre Universitaire de Dschang est candidat au Ph.D. à l'Université d'Etat de Michigan (Etats-Unis d'Amérique).

Son projet de recherche se propose d'étudier :

- Les liens et relations formels et informels entre l'Institut de Recherche Agronomique, les Services de Vulgarisation Rurale et le Système Paysan ;

- Les Opinions des chercheurs, agents de développement rural et planteurs du caféier Arabica et/ou du maïs sur les liens et relations existant actuellement entre les organismes ci-dessus indiqués.

Les informations obtenues au cours de cette étude pourraient servir à améliorer les liens et relations qui existent entre chercheurs, agents de développement rural et planteurs.

Rien que 15 mn de votre précieux temps suffiraient pour remplir le questionnaire ci-joint. Votre participation à l'étude est absolument volontaire.

Toute information obtenue au cours de l'étude est confidentielle et ne sera utilisée qu'à des fins professionnelles. Au cas où vous désirez obtenir une copie du résumé de cette étude, nous ne serons que très heureux de vous inscrire sur notre liste. Pour nous faciliter la tâche et maintenir la confidentialité, prière écrire votre nom et adresse sur une feuille de papier séparée que vous nous retournerez en même temps que le questionnaire.

Nous apprécions votre engagement à partager vos opinions.

Sincèrement.

P. LE DIRECTEUR GENERAL
LE DIRECTEUR GENERAL ADJOINT,

Dr. J. DJOUKAM

Le Chercheur,

I.R. TCHOUAMO.

B 21/78...

23 SEP 1986

MESSAGE

From : The Director General of the University
Centre of Dschang

To : Chief of Station I.R.A. Bambui

Re : Dr. O. Donald Meaders and Isaac Tchouamo's visit.

Dear Sir,

This is to inform you that Dr. O. Donald Meaders, Professor at Michigan State University and Isaac Tchouamo, from the university Centre of Dschang will visit your institution on Friday, September 26, 1986.

They are expected to arrive at 10.00 a.m. They are conducting a research project, that intends to assess :

- The current formal and informal linkages among the Institute of Agronomie Research, the extension service and the farmers, with the maize and Arabica coffee as major crops.

So will you kindly invite your colleagues dealing with the above crops to meet with them on time above mentioned.

Sincerely.

Pour Le Directeur Général
et Par Délégation
Le Directeur Général-Adjoint

République du Cameroun
Centre Universitaire de Dschang

Dr. G. DJOUKAM

DGA

PERCEPTIONS BY FARMERS, EXTENSION AGENTS AND RESEARCHERS OF LINKAGES AMONG AND BETWEEN ORGANIZATIONS INVOLVED IN THE DEVELOPMENT AND DISSEMINATION OF AGRICULTURAL INNOVATIONS IN CAMEROON.

A SURVEY OF MAIZE AND/OR ARABICA COFFEE FARMERS

Department of Agricultural and Extension Education
Michigan State University
410 Agriculture Hall
East Lansing, MI 48824
U.S.A.

Department of Rural Education
The University Centre of Dschang
P.O. Box 110
Dschang
Cameroon

Questionnaire

This questionnaire is designed to assess the farmer's perception of linkages and interrelationships among organizations that are involved in the development and dissemination of agricultural innovations in Cameroon. The information gained in this study will be very useful for strengthening and improving the linkages among The Institute of Agronomic Research, The Extension Services and production subsystem. All information is confidential. All information will be used for professional purposes only. Your cooperation is needed and will be greatly appreciated.

Part I

A. Background Information (one response for each item)

1. What is your title or position?
   _____ 1. Paramount chief of the village (community).
   _____ 2. Chief of the quarter.
   _____ 3. Notable Dignitary in the community
   _____ 4. Farmer.
   _____ 5. Other (Specify)_____

2. Sex
   _____ 1. Male _____ 2 Female.

3. Age

_____ 1.	25 years or less	_____ 5.	40 - 44
_____ 2.	26 - 29	_____ 6.	45 - 49
_____ 3.	30 - 34	_____ 7.	50 - 54
_____ 4.	35 - 39	_____ 8.	55 and over

4. Education

_____ 1.	4 years or under	_____ 7.	Bachelor degree/ Equivalent
_____ 2.	5 - 6		
_____ 3.	7 - 9	_____ 8.	Agricultural Engineer/ Equivalent
_____ 4.	10 - 12		
_____ 5.	13 - 15	_____ 9.	Mater's degree/Equivalent
_____ 6.	15 and over but less than Bachelor degree.	_____10.	Ph.D./Equivalent
		_____11.	Other (Specify)_____

5. Number of years you have been engaged in farming, with special emphasis on growing hybrid maize.

_____ 1.	Less than 1 year	_____ 4.	10 - 14
_____ 2.	1 - 4	_____ 5.	15 - 19
_____ 3.	5 - 9	_____ 6.	20 and more.

6. Number of years you have been engaged in farming with special emphasis on growing Arabica Coffee.

_____ 1.	Less than 1 year	_____ 4.	10 - 14
_____ 2.	1 - 4	_____ 5.	15 - 19
_____ 3.	5 - 9	_____ 6.	20 and more.

7. What is the size of your farm?

_____ 1. Less than 1 ha	_____ 4. 10 - 14
_____ 2. 1 - 4	_____ 5. 15 - 19
_____ 3. 5 - 9	_____ 6. 20 and more.

8. What is the size of your family?

_____ 1. 5 or under	_____ 6. 25 - 29
_____ 2. 5 - 9	_____ 7. 30 - 34
_____ 3. 10 - 14	_____ 8. 35 - 39
_____ 4. 15 - 19	_____ 9. 40 - 44
_____ 5. 20 - 24	_____10. 45 or more

9. What was your income last year? (CFA Francs)

_____ 1. 100.000 CFA francs or under	_____ 4. 300.000-399.000
_____ 2. 100.000-199.000	_____ 5. 400.000-499.000
_____ 3. 200.000-299.000	_____ 6. 500.000 or more.

10. What is your major language(s) of communication with extension agents?

_____ 1. English	_____ 3. Both
_____ 2. French	_____ 4. Local dialect or Pidgin

11. What is your major language(s) of communication with researchers?

_____ 1. English	_____ 3. Both
_____ 2. French	_____ 4. Local dialect or Pidgin

12. Channel(s) of communication with Extension Agents.

_____ 1. Individual	_____ 4. Individual and group
_____ 2. Group	_____ 5. Individual and mass
_____ 3. Mass	_____ 6. Group and mass

13. Channel(s) of communication with researchers.

_____ 1. Individual	_____ 4. Individual and group
_____ 2. Group	_____ 5. Individual and mass
_____ 3. Mass	_____ 6. Group and mass

14. Have your adopted a new variety of arabica coffee for the past two years?

_____ 1. Yes	_____ 3. Do not remember
_____ 2. No	

15. Have you adopted a new variety of maize for the past two years?

_____ 1. Yes	_____ 3. Do not remember
_____ 2. No	

Part II:

Directions: Please circle a number from 1 through 5 on the scale to the right of each item, thereby indicating the extent to which you feel obligated to do the following things: Also circle the letter to the right of the number indicating how often you do each item.

To what extent do you feel obligated to do the following things?

1 = Definitely Should Not
2 = Should Not
3 = May or May Not
4 = Should
5 = Definitely Should

How often?

O = Often
S = Sometimes
N = Never

B. Planning and Implementing Dissemination of Research Results.

	How obligated?	How often?
16. Pass to extension agents problems arising from your farm.	1 2 3 4 5	O S N
17. Participate in meetings organized by extension agents.	1 2 3 4 5	O S N
18. Call on the extension agent anytime a problem arises in my farm.	1 2 3 4 5	O S N
19. Wait for the extension agent to give me the latest information on agricultural innovations.	1 2 3 4 5	O S N
20. Visit regularly the agricultural post for the latest news related to agriculture.	1 2 3 4 5	O S N
21. Seek suggestions from extension agents to improve my production.	1 2 3 4 5	O S N
22. Use the extension agent's advice to improve my production.	1 2 3 4 5	O S N
23. Seek assistance from extension agent during the sales of agricultural products.	1 2 3 4 5	O S N
24. Request help from your neighbor if you cannot solve a problem arising in your farm.	1 2 3 4 5	O S N

25. Help neighbor in case s/he has a problem in her/his farm.	1 2 3 4 5	O S N
26. Seek suggestions from neighbor in order to improve your production.	1 2 3 4 5	O S N
27. Use neighbor's advice to improve your production.	1 2 3 4 5	O S N
28. Pass to researchers problems arising from your farm.	1 2 3 4 5	O S N
29. Participate in result demonstrations organized by researchers.	1 2 3 4 5	O S N
30. Participate in seminars designed to present the latest research findings.	1 2 3 4 5	O S N
31. Adapt research findings to your local environment.	1 2 3 4 5	O S N
32. Request help from researchers anytime a problem arises in your farm (unit of production).	1 2 3 4 5	O S N
33. Seek suggestions from researchers to improve your production.	1 2 3 4 5	O S N
34. Use researcher's advice to improve your production.	1 2 3 4 5	O S N

Part III

Many inputs usually are listed as necessary for productivity in the agricultural sector . . . . But those inputs alone cannot bring to a nation such as Cameroon, an agriculture in which it can take pride and where those engaged in agriculture find dignity in their work. . . . the additional input, the crucial input. . . . . is the integration of research, and education/ extension with policy making body, with supply, with production and with marketing.

ANSWER EACH QUESTION THOUGHTFULLY. PROVIDE ADDITIONAL WRITTEN COMMENTS IN BLANK SPACES WHERE NEEDED.

The integration of agronomic research, agricultural and extension education with governance, with supply, with production and marketing have led some countries from food importing nations to powerful agricultural products exporting countries in the world. Using the following categories, circle the one response to each statement that best matches your opinion. Give careful thought about your own experience and current work.

SD = Strongly Disagree
D = Disagree
U = Undecided
A = Agree
SA = Strongly Agree.

35. Participation to result demonstration organized by extension agents and researcherswill increase your practical skills.	SD	D	U	A	SA
36. Seminars/demonstration activities organized by extension agents are better than those organized by researchers.	SD	D	U	A	SA
37. Collaboration between researchers and extension agents will yield high benefit to you.	SD	D	U	A	SA
38. Collaboration between farmers may lead to the improvement of the profession.	SD	D	U	A	SA
39. Collaboration between researchers (Institute of Agronomic Research) and teachers in agriculture (Regional Colleges of Agriculture, The University Centre of Dschang) is a prerequisite to agricultural development.	SD	D	U	A	SA
40. Collaboration between researchers and farmers is a prerequisite to agricultural development.	SD	D	U	A	SA
41. collaboration between researchers, extension agents and farmers is a prerequisite to agricultural development.	SD	D	U	A	SA
42. Assignment of teaching, research and extension responsibilities to one individual is mutually beneficial to the Institute of Agronomic Research, the Extension Service, the Agricultural Education and Farmers.	SD	D	U	A	SA
43. Integration of agronomic research, agricultural extension service and agricultural education (Regional Colleges of Agriculture, the University Centre of Dschang) in one administrative unit will boost the agricultural development.	SD	D	U	A	SA

44. Integration of agronomic research, agricultural extension and education in one administrative unit will require a lot of resources (financial and human).	SD D U A SA
45. Integration of agronomic research, agricultural and extension education in one administrative unit will lead to a better use of scarce resources (financial and human).	SD D U A SA
46. Integration of agronomic research, agricultural and extension education in one administrative unit will improve the services rendered by each individual component.	SD D U A SA
47. Integration of agronomic research, agricultural and extension education in one administrative unit will rather deteriorated the services actually rendered by each individual component.	SD D U A SA

We appreciate your willingness to share your opinion about linkages and interrelationships among organizations that are involved in the development and dissemination of agricultural innovations.

48. Are there any final comments or suggestions that you would like to make? Please use the space below to make your comments.

N.B.: If you are interested in receiving a summary of the results of this study after the data are tabulated, we would be pleased to include you on our reporting list. To facilitate this, and maintain confidentiality, write your name and address on a separate sheet and return to us with your questionnaire. Do not write your name on the questionnaire.

Thank you again.

PERCEPTIONS BY FARMERS, EXTENSION AGENTS AND RESEARCHERS OF LINKAGES AMONG AND BETWEEN ORGANIZATIONS INVOLVED IN THE DEVELOPMENT AND DISSEMINATION OF AGRICULTURAL INNOVATIONS IN CAMEROON.

A NATIONAL SURVEY OF EXTENSION AGENTS.

Department of Agricultural and Extension Education
Michigan State University
410 Agriculture Hall
East Lansing, MI 48824
U.S.A.

Department of Rural Education
The University Centre of Dschang
P.O. Box 110
Dschang
Cameroon

Questionnaire

This questionnaire is designed to assess the extension agent's perception of linkages and interrelationships among organizations that are involved in the development and dissemination of agricultural innovations in Cameroon. The information gained in this study will be very useful for strengthening and improving linkages among The Institute of Agronomic Research, Extension Services and production subsystem (Farmers). All information is confidential. All information will be used for professional purposes only. Your cooperation is needed and will be greatly appreciated.

Part I

A. Background Information (One response for each item)

1. What is your title or position?
   _____ 1. National Chief of Extension Service
   _____ 2. Provincial Delegate of Agriculture
   _____ 3. Provincial Chief of Agricultural Service
   _____ 4. Divisional Delegate of Agriculture
   _____ 5. Divisional Chief of Agricultural Service
   _____ 6. Sub-divisional Delegate of Agriculture
   _____ 7. Chief of Agricultural Post.
   _____ 8. Agricultural Monitor
   _____ 9. Other (Specify)_____

2. Sex
   _____ 1. Male _____ 2 Female.

3. Age
   _____ 1. 25 years or under _____ 5. 40 - 44
   _____ 2. 26 - 29 _____ 6. 45 - 49
   _____ 3. 30 - 34 _____ 7. 50 - 54
   _____ 4. 35 - 39 _____ 8. 55 years and over

4. Highest Academic Degree Earned
   _____ 1. Primary School Leaving Certificate (FSLC) or less. /Equivalent.
   _____ 2. Agricultural Conductor/Equivalent
   _____ 3. Technical Agricultural Agent/Equivalent
   _____ 4. Agricultural Technician/Equivalent
   _____ 5. Senior Agricultural Technician/Equivalent
   _____ 6. Ingenieur of Agricultural Works/Equivalent
   _____ 7. Agronomic Engineer/Equivalent
   _____ 8. Master's degree/Equivalent
   _____ 9. Ph.D. degree/Equivalent
   _____ 10. Other (Specify) _____

5. Number of years you have been an extension agent.
   _____ 1. Less than 1 year _____ 4. 10-14
   _____ 2. 1-4 _____ 5. 15-19
   _____ 3. 5-9 _____ 6. 20 and more.

6. What is the total number of farmers you actually serve?

_____	1. 99 or less	_____	7. 600-699
_____	2. 100-199	_____	8. 700-799
_____	3. 200-299	_____	9. 800-899
_____	4. 300-399	_____	10. 900-999
_____	5. 400-499	_____	11. 1000 or more.
_____	6. 500-599		

7. What is your major language(s) of communication with farmers?

_____	1. English	_____	3. Both.
_____	2. French	_____	4. Local dialect or Pidgin.

8. What is your major language(s) of communication with researchers?

_____	1. English	_____	3. Both.
_____	2. French	_____	4. Local dialect or Pidgin.

9. Your major channel(s) of communication with farmers.

_____	1. Individual	_____	4. Group and individual
_____	2. Group	_____	5. Individual and mass
_____	3. Mass	_____	6. Group and mass

10. Your major channel(s) of communication with researchers.

_____	1. Individual	_____	4. Group and individual
_____	2. Group	_____	5. Individual and mass
_____	3. Mass	_____	6. Group and mass

Part II:

Directions: Please circle a number from 1 through 5 on the scale to the right of each item, thereby indicating the extent to which you feel obligated to do the following things. Also circle the letter to the right of the number indicating how often you do each item.

To what extent do you feel obligated to do the following things?

1 = Definitely Should Not
2 = Should Not
3 = May or May Not
4 = Sould
5 = Definitely Should

How often?

O = Often
S = Sometimes
N = Never

B. Planning and Implementing Extension Programs.

	How obligated?	How often?
11. Transfer to farmers the most recent research findings.	1 2 3 4 5	O S N
12. Interpret to farmers the most recent		

agricultural research findings.	1 2 3 4 5	O S N
13. Pass to researchers questions arising from farmers.	1 2 3 4 5	O S N
14. Assist researchers to obtain cooperation of farmers in field test.	1 2 3 4 5	O S N
15. Organize seminars at which researchers present and demonstrate to farmers their latest findings.	1 2 3 4 5	O S N
16. Adapt more general findings to local needs.	1 2 3 4 5	O S N
17. Address problems not being addressed by researchers elsewhere.	1 2 3 4 5	O S N
18. Distribute agricultural inputs to farmers.	1 2 3 4 5	O S N
19. Help farmers fill the loan applications.	1 2 3 4 5	O S N
20. Collect Agricultural Statistical data.	1 2 3 4 5	O S N
21. Assist farmers during the sales of output.	1 2 3 4 5	O S N
22. Request help from colleagues if I cannot solve the problem.	1 2 3 4 5	O S N
23. Prepare for administrators and/or supervisors' visits.	1 2 3 4 5	O S N
C. <u>Advising Group Organizations</u>.		
24. Encourage farmers to become members of the cooperative (U.C.C.A.O.: Central Union of the Agricultural Cooperatives of the West).	1 2 3 4 5	O S N
25. Encourage farmers to form Agricultural Modern Groups (A.M.G.)	1 2 3 4 5	O S N
26. Encourage local youth to enroll in the "Young Farmer" program.	1 2 3 4 5	O S N
27. Involve traditional and modern officials in the activities of young farmers.	1 2 3 4 5	O S N
28. Work toward developing leadership among members of the cooperatives or (A.M.G.)	1 2 3 4 5	O S N

D. Working as an Educational Leader in the Community.

29. Represent the Minister of Agriculture in the Community.	1 2 3 4 5	O S N
30. Determine Community needs in agriculture.	1 2 3 4 5	O S N
31. Attend regularly local staff meetings.	1 2 3 4 5	O S N
32. Coordinate your program activities with other activities within the community.	1 2 3 4 5	O S N
33. Seek suggestions from colleagues to improve your own program.	1 2 3 4 5	O S N
34. Interpret agricultural policies to persons in the community.	1 2 3 4 5	O S N
35. Use superiors' advice to improve your program.	1 2 3 4 5	O S N
36. Use researchers' advice to improve your program.	1 2 3 4 5	O S N
37. Seek farmers' advice to improve your program.	1 2 3 4 5	O S N
38. Assist other extension agents in improving the quality of their program.	1 2 3 4 5	O S N

F. Working as a member of the profession.

39. Take courses (by correspondence) to improve professional skills.	1 2 3 4 5	O S N
40. Participate in seminars designed to improve your extension skills in technical areas.	1 2 3 4 5	O S N
41. Assist neighboring colleagues with extention problems.	1 2 3 4 5	O S N
42. Work on national initiative(s) to improve extension services.	1 2 3 4 5	O S N

Part III

Many inputs usually are listed as necessary for productivity in the agricultural sector . . . . But those inputs alone cannot bring to a nation such as Cameroon, an agriculture in which it can take pride and where those engaged in agriculture find dignity in their work. . . . the additional input, the crucial input. . . . . is the integration of research, and education/ extension with policy making body, with supply, with production (farmers) and with marketing.

ANSWER EACH QUESTION THOUGHTFULLY. PROVIDE ADDITIONAL WRITTEN COMMENTS IN BLANK SPACES WHERE NEEDED.

The integration of research, agricultural and extension education with governance, with supply, with production and marketing have led some countries from food importing nations to powerful agricultural products exporting countries in the world. Using the following categories, circle the <u>one</u> response to <u>each</u> statement that best matches your opinion. Give careful thought about your own experience and current work.

SD = Strongly Disagree
D = Disagree
U = Undecided
A = Agree
SA = Strongly Agree.

43. Going back to school will improve your knowledge and skills.	SD	D	U	A	SA
44. Going back to school will improve your professional competence.	SD	D	U	A	SA
45. More training will be beneficial to you and to your professional organization (the extension service.)	SD	D	U	A	SA
46. Collaboration between extension agents may lead to the improvement of extension service and the profession.	SD	D	U	A	SA
47. Collaboration between agricultural researchers and extension agents is a prerequisite to agricultural development.	SD	D	U	A	SA
48. Collaboration between agricultural researchers and teachers in agriculture is a prerequisite to agricultural development.	SD	D	U	A	SA
49. Collaboration between extension agents and teachers in agriculture is a prerequisite to agricultural development.	SD	D	U	A	SA

50. Collaboration between researchers, extension agents and farmers is a prerequisite to agricultural development.	SD	D	U	A	SA
51. An assignment of teaching, research and extension responsibilities to one individual is mutually beneficial to the Institute of Agronomic research, the extension service and the Agricultural Education subsystem and farmers.	SD	D	U	A	SA
52. Integration of Agronomic Research, Agricultural Extension Service and Agricultural Education in one administrative unit will boost the agricultural development.	SD	D	U	A	SA
53. Integration of Agronomic Research, Agricultural Education and Extension Service in one administrative unit will require a lot of resources.	SD	D	U	A	SA
54. Integration of Agricultural Research, Agricultural Education and Extension Service will lead to a better use of scarce resources (human and financial).	SD	D	U	A	SA
55. Integration of Agricultural Research, Agricultural Education and Extension Service will improve the services delivered by individual components.	SD	D	U	A	SA
56. Integration of Agricultural Research, Agricultural Education and Extension Service will rather deteriorate the services rendered by individual components.	SD	D	U	A	SA

We appreciate your willingness to share your opinion about linkages and interrelationship among organizations that are involved in the development and dissemination of agricultural innovations.

57. Are there any final comments or suggestions that you would like to make? Please use the space below to make your comments.

N.B.: If you are interested in receiving a summary of the results of this study after the data are tabulated, we would be pleased to include you on our reporting list. To facilitate this, and maintain confidentiality, write your name and address on a separate sheet and return to us with your questionnaire. Do not write your name on the questionnaire.

Thank you again.

PERCEPTIONS BY FARMERS, EXTENSION AGENTS AND RESEARCHERS OF LINKAGES AMONG AND BETWEEN ORGANIZATIONS INVOLVED IN THE DEVELOPMENT AND DISSEMINATION OF AGRICULTURAL INNOVATIONS IN CAMEROON.

A NATIONAL SURVEY OF RESEARCHERS

Department of Agricultural and Extension Education
Michigan State University
410 Agriculture Hall
East Lansing, MI 48824
U.S.A.

Department of Rural Education
The University Centre of Dschang
P.O. Box 110
Dschang
Cameroon

Questionnaire

This questionnaire is designed to assess the researcher's perception of linkages and interrelationships among organizations that are involved in the development and dissemination of agricultural innovations in Cameroon. The information gained in this study will be very useful for strengthening and improving the formal and informal linkages among the Institute of Agronomic Research, Extension Services and production subsystem (Farmers). All information is confidential. All information will be used for professional purposes only. Your cooperation is needed and will be greatly appreciated.

Part I

A. Background Information (one response for each item)

1. What is your title or position?
   _____ 1. Chief of Centre
   _____ 2. Chief of Station
   _____ 3. Chief of Antenna
   _____ 4. Technician of Research
   _____ 5. Assistant of Research
   _____ 6. "Charge" of Research
   _____ 7. Other (Specify)_____

2. Sex
   _____ 1. Male _____ 2 Female.

3. Age
   _____ 1. 25 or under _____ 5. 40 - 44
   _____ 2. 26 - 29 _____ 6. 45 - 49
   _____ 3. 30 - 34 _____ 7. 50 - 54
   _____ 4. 35 - 39 _____ 8. 55 and over

4. Citizenship at birth.
   _____ 1. Cameroonian _____ 2. Other (Specify)_____

5. Highest Academic Degree Earned
   _____ 1. Less than a Bachelor degree or "Ingenieur des Travaux"/Equivalent.
   _____ 2. Bachelor Degree/Equivalent
   _____ 3. Agronomic Engineer/Equivalent
   _____ 4. Master's degree/Equivalent
   _____ 5. Ph.D./Equivalent
   _____ 6. Other (Specify) _____

6. a. Number of years you have been a researcher.
   _____ 1. Less than 4 years _____ 4. 15-19
   _____ 2. 5-9 _____ 5. 20 and more.
   _____ 3. 10-14

6. b. Your current research responsibility is:
_____ 1. Arabica Coffee _____ 3. Both.
_____ 2. Maize _____ 4. Other (Specify)_____

7. In which language(s) do you report the research findings (results)?
_____ 1. English
_____ 2. French
_____ 3. Other (Specify) _____

8. What is your major language(s) of communication with farmers?
_____ 1. English _____ 3. Both.
_____ 2. French _____ 4. Other.

9. What is your major language(s) of communication with extension agents?
_____ 1. English _____ 3. Both.
_____ 2. French _____ 4. Other.

10. Your major channels of communication with farmers.
_____ 1. Individual _____ 4. Group and individual
_____ 2. Group _____ 5. Mass and individual
_____ 3. Mass _____ 6. Mass and group
_____ 7. Other (Specify)_____

11. Your major channels of communication with extension agents.
_____ 1. Individual _____ 4. Group and individual
_____ 2. Group _____ 5. Mass and individual
_____ 3. Mass _____ 6. Mass and group
_____ 7. Other (Specify)_____

12. In which area is your highest degree.
_____ 1. Genetics
_____ 2. Crop breeding
_____ 3. General Agronomy
_____ 4. Statistics
_____ 5. Biometrics
_____ 6. Other (Specify) _____

13. When did you begin the commercialization of the latest variety of maize.
_____ 1. Less than 1 year _____ 5.7 - 8
_____ 2. 1 - 2 _____ 6.9 - 10
_____ 3. 3 - 4 _____ 7.11 and more
_____ 4. 5 - 6 _____ 8.Does Not Apply

14. When did you begin the commercialization of the latest variety of Arabica coffee.
_____ 1. Less than 1 year _____ 5.7 - 8
_____ 2. 1 - 2 _____ 6.9 - 10
_____ 3. 3 - 4 _____ 7.11 and more
_____ 4. 5 - 6 _____ 8.Does Not Apply

Part II:

Directions: Please circle a number from 1 through 5 on the scale to the right of each item, thereby indicating the extent to which you feel obligated to do the following things. Also circle the letter to the right of the number indicating how often you do each item.

To what extent do you feel obligated to do the following things?

1 = Definitely Should Not
2 = Should Not
3 = May or May Not
4 = Should
5 = Definitely Should

How often?

O = Often
S = Sometimes
N = Never

B. Planning and Implementing Dissemination of Research Results.

	How obligated?	How often?
15. Transfer to farmers the most recent research results.	1 2 3 4 5	O S N
16. Transfer to extension agents the most recent research results.	1 2 3 4 5	O S N
17. Interpret to farmers the most recent research results.	1 2 3 4 5	O S N
18. Interpret to extension agents the most recent research results.	1 2 3 4 5	O S N
19. Organize seminars and meetings to demonstrate to farmers the most recent research results.	1 2 3 4 5	O S N
20. Organize seminars and meetings to demonstrate to extension agents the most recent research results.	1 2 3 4 5	O S N
21. Organize demonstration sessions on the research station's plot.	1 2 3 4 5	O S N
22. Organize demonstration sessions on farmers' plot.	1 2 3 4 5	O S N
23. Adapt general findings to local needs.	1 2 3 4 5	O S N
24. Request help from colleagues if I cannot solve a research problem.	1 2 3 4 5	O S N

25. Request help from extension agents if I cannot solve a research problem.	1 2 3 4 5	O S N
26. Request help from farmers if I cannot solve a research problem.	1 2 3 4 5	O S N
C. Working as a Member of a Professional Staff.		
27. Regularly attend staff meetings.	1 2 3 4 5	O S N
28. Seek suggestions from colleagues to improve your own program.	1 2 3 4 5	O S N
29. Use supervisors' advice to improve your own program.	1 2 3 4 5	O S N
30. Use extension agents' advice to improve your own program.	1 2 3 4 5	O S N
31. Use farmers' advice to improve your own program.	1 2 3 4 5	O S N
32. Assist other colleagues in improving the quality of their program.	1 2 3 4 5	O S N
D. Working as a member of the Profession.		
33. Take course(s) to improve your professional skills.	1 2 3 4 5	O S N
34. Participate in seminars/workshops designed to improve your professional skills.	1 2 3 4 5	O S N
35. Assist colleagues with research problems.	1 2 3 4 5	O S N
36. Work on national initiatives to improve the research profession and services.	1 2 3 4 5	O S N

Part III

Many inputs usually are listed as necessary for productivity in the agricultural sector . . . . But those inputs alone cannot bring to a nation such as Cameroon, an agriculture in which it can take pride and where those engaged in agriculture find dignity in their work. . . . the additional input, the crucial input. . . . . is the integration of research, and education/ extension with policy making body, with supply, with production farmers) and with marketing.

ANSWER EACH QUESTION THOUGHTFULLY. PROVIDE ADDITIONAL WRITTEN COMMENTS IN BLANK SPACES WHERE NEEDED.

The integration of research, agricultural and extension education with governance, with supply, with production and marketing have led some countries from food importing nations to powerful agricultural products exporting countries in the world. Using the following categories, circle the one response to each statement that best matches your opinion. Give careful thought about your own experience and current work.

SD = Strongly Disagree
D = Disagree
U = Undecided
A = Agree
SA = Strongly Agree.

37. Collaboration between researchers may lead to the improvement of the services of research and the profession.	SD	D	U	A	SA
38. Collaboration between researchers and teachers in agriculture (Regional Colleges of Agriculture, The University Centre of Dschang) is a prerequisite to agricultural development.	SD	D	U	A	SA
39. Collaboration between researchers and farmers in a prerequisite to agricultural development.	SD	D	U	A	SA
40. Collaboration between researchers, extension agents and farmers is a prerequisite to agricultural development.	SD	D	U	A	SA
41. Collaboration between researchers and extension agents will be beneficial to farmers.	SD	D	U	A	SA

42. Assignment of teaching, research and extension responsibilities to one individual is mutually beneficial to the Institute of Agronomic Research, the Extension Service, the Agricultural Education and farmers.	SD	D	U	A	SA
43. Integration of agronomic research, agricultural extension service and agricultural education (Regional Colleges of Agriculture, The University Centre of Dschang) in one administrative unit will boost the agricultural development.	SD	D	U	A	SA
44. Integration of agronomic research, agricultural extension service and agricultural education in one administrative unit will require a lot of resources (financial and human).	SD	D	U	A	SA
45. Integration of agronomic research, agricultural extension service and agricultural education in one administrative unit will lead to a better use of scarce resources (financial and human).	SD	D	U	A	SA
46. Integration of agronomic research, agricultural extension and agricultural education in one administrative unit will improve the services rendered by each individual component.	SD	D	U	A	SA
47. Integration of agronomic research, agricultural education and agricultural extension in one administrative unit will deteriorate the services actually rendered by each individual component.	SD	D	U	A	SA

We appreciate your willingness to share your opinion about linkages and interrelationship among organizations that are involved in the development and dissemination of agricultural innovations.

48. Are there any final comments or suggestions that you would like to make? Please use the space below to make your comments.

N.B.: If you are interested in receiving a summary of the results of this study after the data are tabulated, we would be pleased to include you on our reporting list. To facilitate this, and maintain confidentiality, write your name and address on a separate sheet and return to us with your questionnaire. Do not write your name on the questionnaire.

Thank you again.

PERCEPTION DES LINES ENTRE ORGANISMES CHARGES DE DEVELOPPER ET DE DIFFUSER LES INNOVATIONS AGRICOLES AU CAMEROUN PAR LES PLANTEURS, AGENTS DE VULGARISATION ET CHERCHEURS.

ENQUETE NATIONALE DES PLANTEURS DU MAIS ET CAFE ARABICA

Département de Vulgarisation et Education Rurales
Université d'Etat de Michigan
410 Agriculture Hall
East-Lansing, MI 48824
U.S.A.

Département d'Education Rurale
Centre Universitaire de Dschang
B.P. 110
Dschang
Cameroun

Questionnaire

Ce questionnaire est élaboré en vue d'estimer les perceptions des planteurs sur les liens entre organismes chargés de développer et de diffuser les innovations agricoles au Cameroun. Les informations obtenues au cours de cette étude pourront aider à améliorer les liens qui existent entre l'Institut de Recherche Agronomique, les Services de Vulgarisation et le Système Paysan.

Toute information est strictement confidentielle. Elle ne sera utilisée qu'à des fins professionnelles. Votre coopération est absolument nécessaire et sara grandement appréciée.

1ère Partie

A. Information générale (Prière cocher une réponse par question)

1. Quel est votre position dans la communauté?

_____ 1. Chef Supérieur
_____ 2. Chef du Quartier
_____ 3. Notable ou dignitaire de la communauté
_____ 4. Planteur
_____ 5. Autre (spécifier)_____

2. Sexe

_____ 1. Masculin _____ 2. Féminin

3. Age

_____ 1. 25 ans et moins _____ 5. 40 - 44
_____ 2. 26 - 29 _____ 6. 45 - 49
_____ 3. 30 - 34 _____ 7. 50 - 54
_____ 4. 35 - 39 _____ 8. 55 et plus.

4. Education.

_____ 1. 4 ans et moins /Equivalent _____ 4. 10 - 12/Equivalent
_____ 2. 4 - 6/Equivalent _____ 5. 13 - 15/Equivalent
_____ 3. 7 - 9/Equivalent _____ 6. 15 et plus/Equivalent

5. Nombre d'années dans la profession de planteur, avec accent particulier sur la culture du maïs.

_____ 1. Moins d'un an _____ 4. 10 - 14
_____ 2. 1 - 4 _____ 5. 15 - 19
_____ 3. 5 - 9 _____ 6. 20 ans et plus.

6. Nonbre d'années dans la profession de planteur, avec accent particulier sur la culture du café arabica.

_____ 1. Moins d'un an _____ 4. 10 - 14
_____ 2. 1 - 4 _____ 5. 15 - 19
_____ 3. 5 - 9 _____ 6. 20 ans et plus.

7. Taille de votre exploitation.

_____ 1. Moins d'un ha	_____ 4. 10 - 14
_____ 2. 1 - 4	_____ 5. 15 - 19
_____ 3. 5 - 9	_____ 6. 20 ha et plus.

8. Taille de votre famille.

_____ 1. Moins de 5 personnes	_____ 6. 25 - 29
_____ 2. 5 - 9	_____ 7. 30 - 34
_____ 3. 10 - 14	_____ 8. 35 - 39
_____ 4. 15 - 19	_____ 9. 40 - 44
_____ 5. 20 - 24	_____ 10. 45 personnes et plus.

9. Quel était votre revenu l'année dernière? (FCFA)

_____ 1. Moins de 100 000 francs	_____ 4. 300 000 - 399 999
_____ 2. 100 000 - 199 999	_____ 5. 400 000 - 499 999
_____ 3. 200 000 - 299 999	_____ 6. 500 000 francs et plus.

10. Quelle est votre langue de communication avec les vulgarisateurs?

_____ 1. Anglais	_____ 3. Les deux
_____ 2. Français	_____ 4. Dialecte local ou pidgin

11. Quelle est votre langue de communication avec les chercherus?

_____ 1. Anglais	_____ 3. Les deux
_____ 2. Français	_____ 4. Dialecte local ou pidgin

12. Avez-vous adopté une nouvelle variété de café Arabica ces deux derinières années?

_____ 1. Oui _____ 2. Non _____ 3. Ne m'en souviens plus.

13. Avez-vous adopté une nouvelle variété de maïs ces deux dernières années?

_____ 1. Oui _____ 2. Non _____ 3. Ne m'en souviens plus.

14. Vos Conaux de communication avec les vulgarisateurs

1. Individual	5. Individual et mass
2. Group	6. Group et mass
3. Mass	
4. Individual et group	

15. Vos canaux de communication avec les chercheurs?

1. Individual	5. Individual et mass
2. Group	6. Group et mass
3. Mass	
4. Individual et group	

2éme Partie

Instructions: Veuillez encercler un nombre de 1 à 5 sur l'échelle à droite de chaque point, indiquant le degré auquel vous vous sentez obligé de réaliser les tâches suivantes. Encercler également la lettre à droite du nombre, indiquant la fréquence de réalisation de la tâche sus-indiguée.

Degré auquel vous vous sentez obligé de réaliser les tâches suivants

1 = Absolument pas
2 = Non obligé
3 = Peut-être obligé ou non
4 = Obligé
5 = Absolument obligé

Fréquence de réalisation

S = Souvent
Q = Quelquefois
J = Jamais

B. Planifier et Implanter la dissémination des résultats de la recherche.

16. Passer aux agents de vulgarisation les problèmes observés dans votre exploitation	1 2 3 4 5	S Q J
17. Participer aux réunions organisées par les agents de vulgarisation.	1 2 3 4 5	S Q J
18. Faire appel à l'agent vulgarisateur chaque fois qu'un prblème naisse dans votre exploitation.	1 2 3 4 5	S Q J
19 Attendre que l'agent vulgarisateur vous communique les récentes innovations agricoles.	1 2 3 4 5	S Q J
20. Rendre régulièrement visite au poste agricole pour vous enquérir des nouvelles agronomiques.	1 2 3 4 5	S Q J
21. Aller à la recherche des suggestions des agents vulgaristeurs afin d'améliorer votre production.	1 2 3 4 5	S Q J
22. Utiliser les conseils des agents vulgarisateurs pour améliorer votre production.	1 2 3 4 5	S Q J
23. Requérir l'aide des agents vulgarisateurs pendant les ventes des produits agricoles.	1 2 3 4 5	S Q J
24. Demander l'aide des voisins si vous ne pouvez pas résoudre un problème observé dans votre exploitation.	1 2 3 4 5	S Q J

25. Assister vos voisin(es) au cas ou ils(elles) ont des problèmes dans leur(s) exploitation(s).	1 2 3 4 5	S Q J
26. Aller à la recherche des suggestions chez des voisins afin d'améliorer votre production agricole.	1 2 3 4 5	S Q J
27. Utiliser les conseils des voisins pour améliorer votre production agricole.	1 2 3 4 5	S Q J
28. Passer aux chercheurs les problèmes observés dans votre exploitation.	1 2 3 4 5	S Q J
29. Participer aux séances des démonstration des résultats organisées par les chercherurs.	1 2 3 4 5	S Q J
30. Participer aux séminaires ou récents résultats de la recherche sont démonstrés.	1 2 3 4 5	S Q J
31. Adapter les résultats de la recherche à vos conditions locales.	1 2 3 4 5	S Q J
32. Faire recours aux chercheurs chaque fois qu'un problème naisse dans votre unité de production.	1 2 3 4 5	S Q J
33. Faire recours aux suggestions des chercheurs pour améliorer votre production.	1 2 3 4 5	S Q J
34. Utiliser les conseils des chercheurs pour améliorer votre production.	1 2 3 4 5	S Q J

3ème Partie

La productivité du secteur agricole dépend généralement de plusieurs inputs. . . ., mais ces inputs à eux seuls ne peuvent pas donner à une nation telle que le Cameroun, une agriculture dont elle est fière, et dont ceux qui y sont engagés trouvent une certaine dignité. . . ., l'input supplémentaire, l'input cricial. . . . est l'intégration de la recherche agronomique, la formation/la vulgarisation rurales avec l'approvisionnement, la production et la commercialisation.

VEUILLEZ REPONDRE A TOUTES LES QUESTIONS. FOURNISSEZ DES COMMENTAIRES SUPPLEMENTAIRES EN DES ESPACES VIDES LAISSES A CE PROPOS.

Des liens et relations formels entre l'éducation rurale, la vulgarisation agricole, la recherche agronomique et le système de production ont fait de certaines nations importatrices de denrées alimentaires des puissances exportatrices des produits agricoles dans le monde.

En utilisant les catégories suivantes, encercler la réponse à chaque assertion qui traduit mieux votre opinion.

SD = Totalement en désaccord
D = En désaccord
U = Sans Opinion
A = Accord
SA = Totalement en accord

35. Participer aux démonstrations des résultats organisées par les chercheurs et agents de vulgarisation accroîtront vos compétences pratiques.	SD D U A SA
36. Les séminaires, les activités de démonstration organisés par les agents de vulgarisation sont meilleurs que ceux quis sont organisés par les chercheurs.	SD D U A SA
37. Une colaboration croissante entre les services de recherche et de vulgarisation vous donnerait d'énormes bénéfices.	SD D U A SA
38. La collaboration entre planteurs pourrait entraîner une amélioration de la profession.	SD D U A SA
39. La collaboration entre chercheurs (Institut de Recherche Agronomique) et les enseignants en agronomie (Collèges Régionaux d'Agriculture, Centre Universitaire de Dschang) est nécessaire pour le développement agricole.	SD D U A SA
40. La collaboration entre chercheurs et planteurs est absolument nécessaire pour le développement agricole.	SD D U A SA
41. La collaboration entre chercheurs, agents de vulgarisation et planteurs est absolument nécessaire pour le développement agricole.	SD D U A SA
42. Une attribution des responsabilités d'enseignement, de recherche et de vulgarisation à un individu est mutuellement bénéfique à l'Institut de Recherche Agronomique, le service de vulgarisation, l'enseignement agricole et les planteurs.	SD D U A SA

43. Intégrer la recherche agronomique, la vulgarisation et l'enseignement agricoles au sein d'une unité administrative apporterait un souffle noveau au développement agricole.	SD D U A SA
44. Intégrer la recherche agronomique, la vulgarisation et l'enseignement agricoles au sein d'une unité administrative n'ecessiterait d'énormes ressources (financières et humaines).	SD D U A SA
45. Intégrer la recherche agronomique, la vulgarisation et l'enseignement agricoles au sein d'une unité administrative conduirait nécessairement à une meilleure utilisation des ressources (financières et humaines).	SD D U A SA
46. Intégrer la recherche agronomique, la vulgarisation et l'enseignement agricoles au sein d'une unité administrative conduirait nécessairement à une amélioration des services rendus par chaque composante.	SD D U A SA
47. Intégrer la recherche agronomique, la vulgarisation et l'enseignement agricoles au sein d'une unité administrative détériorerait plutôt les services actuellement rendus par chaque composante.	SD D U A SA

Nous vous remercions de partager votre opinion sur les liens et relations entre organismes chargés de développer et de vulgariser les innovations agricoles au Cameroun.

48. Veuillez utiliser l'espace vide ci-dessous pour exprimer vos commentaires et suggestions supplémentaires, relatif à cette étude.

Si jamais vous désirez obtenir une copie du résumé de cette étude, nous ne serions que très heureux de vous inscrire sur notre liste. Pour nous faciliter la tâche et maintenir la confidentialité, veuillez écrire votre nom et adresse sur une feuille de papier séparée que vous nous retournerez en même temps que le questionnaire. Vous êtes prié de ne pas marquer votre nom sur le questionnaire.

Nous vous remercions vivement.

PERCEPTION DES LINES ENTRE ORGANISMES CHARGES DE DEVELOPPER ET DE DIFFUSER LES INNOVATIONS AGRICOLES AU CAMEROUN PAR LES PLANTEURS, AGENTS DE VULGARISATION ET CHERCHEURS.

ENQUETE NATIONALE DES AGENTS DE VULGARISATION

Département de Vulgarisation et Education Rurales
Université d'Etat de Michigan
410 Agriculture Hall
East-Lansing, MI 48824
U.S.A.

Département d'Education Rurale
Centre Universitaire de Dschang
B.P. 110
Dschang
Cameroun

Questionnaire

Ce questionnaire est élaboré en vue d'estimer les perceptions des agents de vulgarisation sur les liens et relations entre organismes chargés de développer et de diffuser les innovations agricoles au Cameroun. Les informations obtenues au cours de cette étude pourront aider à améliorer les liens et relations existant entre l'Institut de Recherche Agronomique, les Services de Vulgarisation et le système paysan. Toute information est strictement confidentielle. Elle ne sera utilisée qu'à des fins professionnelles. Votre coopération est nécessaire et sera grandement appréciée.

1ère Partie

A. Information Générale (Prière cocher une seule réponse par question)

1. Quel est votre titre/position?
   _____ 1. Chef Service de Vulgarisation agricole
   _____ 2. Délégué Provincial de l'Agriculture
   _____ 3. Chef de Service Provincial de l'Agriculture
   _____ 4. Délégué Départemental de l'Agriculture
   _____ 5. Chef de Service Départemental de l'Agriculture
   _____ 6. Délégué d'Agriculture d'Arrondissement
   _____ 7. Chef de Poste Agricole
   _____ 8. Moniteur Agricole
   _____ 9. Autre (Spécifier)_____

2. Sexe
   _____ 1. Masculin _____ 2. Féminin

3. Age
   _____ 1. 25 ans et moins _____ 5. 40 - 44
   _____ 2. 26 - 29 _____ 6. 45 - 49
   _____ 3. 30 - 34 _____ 7. 50 - 54
   _____ 4. 35 - 39 _____ 8. 55 et plus.

4. Niveau d'éducation le plus élevé et diplôme obtenu.
   _____ 1. Certificat d'Etudes Primaires Elémentaires et moins/Equivalent
   _____ 2. Conducteur Agricole/Equivalent
   _____ 3. Agent Technique d'Agriculture/Equivalent
   _____ 4. Technicien d'Agriculture/Equivalent
   _____ 5. Technicien Supérieur d'Agriculture/Equivalent
   _____ 6. Ingénieur des Travaux Agricoles/Equivalent
   _____ 7. Ingénieur Agronome/Equivalent
   _____ 8. Docteur Ingénieur/Equivalent
   _____ 9. Docteur d'Etat/Equivalent
   _____ 10. Autre (Spécifier)_____

5. Depuis combien d'années êtes-vous chercheur?
   _____ 1. Moins d'un an _____ 4. 10 - 14

_____ 2. 1 - 6
_____ 3. 5 - 9
_____ 5. 15 - 19
_____ 6. 20 et plus

6. Nombre de planteurs que vous encadrez.

_____ 1. 99 et moins
_____ 2. 100 - 199
_____ 3. 200 - 299
_____ 4. 300 - 399
_____ 5. 400 - 499
_____ 6. 500 - 599
_____ 7. 600 - 699
_____ 8. 700 - 799
_____ 9. 800 - 899
_____10. 900 - 999
_____11. 1000 et plus

7. Quelle est votre langue de communication avec les planteurs?

_____ 1. Français
_____ 2. Anglais
_____ 3. Les deux
_____ 4. Dialecte local ou pidgin
_____ 5. Autre (Spécifier)_____

8. Quelle est votre principale langue de communication avec les chercheurs?

_____ 1. Français
_____ 2. Anglais
_____ 3. Les daux
_____ 4. Dialect local au pidgin
_____ 5. Autre (Spécifier)_____

9. Quels sont vos canaux de communication avec les planteurs?

1. Individual
2. Group
3. Mass
4. Individual et group
5. Individual et mass
6. Group et mass

10. Quels sont vos canaux de communication avec les agents de les chercheurs

1. Individual
2. Group
3. Mass
4. Individual et group
5. Individual et mass
6. Group et mass

11. Avez-vous vulgarisé une nouvelle variété de café ces deux dernières années?

_____ 1. Oui _____ 2. Non _____ 3. Ne m'en souvien plus

12. Avez-vous vulgarisé une nouvelle variété de maïs ces deux dernières années?

_____ 1. Oui _____ 2. Non _____ 3. Ne m'en souvien plus

2ème Partie

Instructions: Prière encercler un nombre de 1 à 5 sur l'échelle à droite de chaque point, indiquant le degré auquel vous vous sentez obligé de réaliser les tâches suivantes. Encercler également la lettre à droite du nombre, indiquant la fréquence de réalisation de la tâche sus-indiguée.

Degré auquel vous vous sentez obligé de réaliser les tâches suivantes

1 = Absolument pas
2 = Non obligé
3 = Peut-être obligé ou non
4 = Obligé
5 = Absolument obligé

Fréquence de réalisation

S = Souvent
Q = Quelquefois
J = Jamais

B. Planifier et Implanter les programmes de vulgarisation.

13. Transférer aux planteurs les récentes découvertes scientifiques.	1 2 3 4 5	S Q J
14. Interpréter aux planteurs les récentes découvertes scientifiques.	1 2 3 4 5	S Q J
15. Passer aux chercheurs des questions émanant des planteurs.	1 2 3 4 5	S Q J
16. Assister les chercheurs à obtenir la coopération des planteurs lors des tests de démonstration.	1 2 3 4 5	S Q J
17. Organiser des séminaires auxquels les chercheurs présentent aux planteurs les récentes découvertes scientifiques	1 2 3 4 5	S Q J
18. Adapter les résultats de la recherche aux conditions locales.	1 2 3 4 5	S Q J
19. Adresser les problèmes ignorés par les chercheurs.	1 2 3 4 5	S Q J
20. Distribuer aux planteurs des inputs agricoles.	1 2 3 4 5	S Q J
21. Aider les planteurs à remplir les demandes de crédit FONADER.	1 2 3 4 5	S Q J

22. Collecter les donnés statistiques.	1 2 3 4 5	S Q J
23. Assister les planteurs lors de la vente des produits agricoles.	1 2 3 4 5	S Q J
24. Fair recours aux collègues si jamais vous ne pouvez résoudre un problème.	1 2 3 4 5	S Q J
25. Préparer les tournées des superviseurs.	1 2 3 4 5	S Q J
C. Conseiller divers groupes organisationnels		
26. Encourager les planteurs à adhérer aux coopératives de l'U.C.C.A.O.	1 2 3 4 5	S Q J
27. Encourager les planteurs à former des Groupes d'Agriculteurs Modernes (G.A.M.).	1 2 3 4 5	S Q J
28. Encourager les jeunes locaux à adhérer au programme des "Jeunes Agriculteurs."	1 2 3 4 5	S Q J
29. Requérir le support des officiels aux activités des "Jeunes Agriculteurs."	1 2 3 4 5	S Q J
30. Développer les qualités de leader chez les adhérents des coopératives ou des G.A.M.	1 2 3 4 5	S Q J
D. Travailler comme un leader éducationnel dans la communauté		
31. Représenter le Ministre de l'Agriculture dans la communauté.	1 2 3 4 5	S Q J
32. Déterminer les besoins agricoles de la communauté.	1 2 3 4 5	S Q J
E. Travailler en tant que membre d'une profession.		
33. Participer régulièrement aux réunions de travail avec les autres members de la profession.	1 2 3 4 5	S Q J
34. Coordonner vos activités avec d'autres activités de la communauté.	1 2 3 4 5	S Q J
35. Rechercher les suggestions des collègues pour améliorer vos programmes.	1 2 3 4 5	S Q J
36. Interpréter les politiques agricoles aux membres de la communauté.	1 2 3 4 5	S Q J

37. Utiliser les conseils des supérieurs pour améliorer vos programmes.	1 2 3 4 5	S Q J
38. Utiliser les conseils des chercheurs pour améliorer vos programmes.	1 2 3 4 5	S Q J
39. Rechercher les conseils des planteurs pour améliorer vos programmes.	1 2 3 4 5	S Q J
40. Assister autres agents d'encadrement dans l'amélioration de la qualité de leurs programmes.	1 2 3 4 5	S Q J
41. Prendre les cours (par correspondance) pour améliorer vos compétences professionnelles.	1 2 3 4 5	S Q J
42. Participer aux séminaires destinés à améliorer vos compétences techniques.	1 2 3 4 5	S Q J
43. Assister les collèques à résoudre leurs probrèmes de vulgarisation.	1 2 3 4 5	S Q J
44. Participer aux initiatives nationales de la promotion de la profession de vulgarisateur et des services de vulgarisation.	1 2 3 4 5	S Q J

<u>3ème Partie</u>

La productivité du secteur agricole dépend généralement de plusieurs inputs. . . ., mais ces inputs à eux seuls ne peuvent pas donner à une nation telle que le Cameroun, une agriculture dont elle est fière, et dont ceux qui y sont engagés trouvent une certaine dignité. . . ., l'input supplémentaire, l'input cricial. . . . est l'intégration de la recherche agronomique, la formation/la vulgarisation rurales avec l'approvisionnement, la production et la commercialisation.

PRIERE REPONDRE A TOUTES LES QUESTIONS, FOURNISSEZ DES COMMENTAIRES SUPPLEMENTAIRES EN DES ESPACES VIDES LAISSES A CE PROPOS.

Des liens et relations formels entre l'éducation rurale, la vulgarisation agricole, la recherche agronomique et le système de production ont fait de certaines nations importatrices de denrées alimentaires, des puissances exportatrices des produits agricoles dans le monde.

En utilisant les catégories suivantes, encercler la réponse à chaque assertion qui traduit mieux votre opinion.

SD = Totalement en désaccord
D = En désaccord
U = Sans Opinion
A = Accord
SA = Totalement en accord

45. Rentrer sur les bancs de l'école améliorerait vos connaissances.	SD D U A SA
46. Rentrer sur les bancs de l'école améliorerait vos compétences professionnelles.	SD D U A SA
47. Une formation supplémentaire serait bénéfique aussi bien à vous-même qu'à votre organisation professionneles (le Service de Vulgarisation).	SD D U A SA
48. La collaboration entre les agents d'encadrement agricole pourrait conduire à l'amélioration des services de la vulgarisation et de la profession	SD D U A SA
49. La collaboration entre les chercheurs (I.R.A.) et les agents d'encadrement est absolument nécessaire pour le développement agricole.	SD D U A SA
50. La collaboration entre les chercheurs (I.R.A.) et les formateurs est nécessaire pour le développement agricole.	SD D U A SA
51. La collaboration entre formateurs et agents d'encadrement est nécessaire pour le développement agricole.	SD D U A SA
52. La collaboration entre chercheurs, agents d'encadrement et planteurs est nécessaire pour le développement agricole.	SD D U A SA
53. L'attribution des responsabilités dénseignement, de recherche et de vulgarisation à un individu est mutuellement bénéfique à l'Institut de Recherche Agronomique, le Service de Vulgarisation et l'Enseigrement Agricole.	SD D U A SA
54. Intégrer la recherche agronomique, la vulgarisation et l'enseignement agricoles dans une unité administrative pourrait faire prospérer l'agriculture camerounaise.	SD D U A SA
55. Intégrer la recherche agronomique, la vulgarisation et l'enseignement agricoles dans une unité administrative exigerait d'énormes ressources.	SD D U A SA
56. Intégrer la recherche agronomique, la vulgarisation et l'enseignement agricoles dans	

une unité administrative entraînerait une meilleure utilisation des ressources humaines et financières.	SD D U A SA
57. Intégrer la recherche agronomique, la vulgarisation et l'enseignement agricoles dans une unité administrative entraînerait une amélioration des services rendus par chaque composante.	SD D U A SA
58. Intégrer la recherche agronomique, la vulgarisation et l'enseignement agricoles dans une unité administrative détériorerait plutôt les services rendus actuellement par chaque composante.	SD D U A SA

Nous vous remercions de partager votre opinion sur les liens et relations entre organismes chargés de développer et de vulgariser les innovations agricoles au Cameroun.

59. Veuillez utiliser l'espace vide ci-dessous pour exprimer vos commentaires et suggestions supplémentaires, relatif à cette étude.

N.B.: Si jamais vous désirez obtenir une copie du résumé de cette étude, nous ne serions que très heureux de vous inscrire sur notre liste.

Pour nous faciliter la tâche et maintenir la confidentialité, veuillez écrire votre nom et adresse sur une feuille de papier séparée que vous nous retournerez en même temps que le questionnaire.

Vous êtes prié de ne pas marquer votre nom sur le questionnaire.

Nous vous remercions vivement.

PERCEPTION DES LINES ENTRE ORGANISMES CHARGES DE DEVELOPPER ET DE DIFFUSER LES INNOVATIONS AGRICOLES AU CAMEROUN PAR LES PLANTEURS, AGENTS DE VULGARISATION ET CHERCHEURS.

ENQUETE NATIONALE DES CHERCHEURS

Département de Vulgarisation et Education Rurales
Université d'Etat de Michigan
410 Agriculture Hall
East-Lansing, MI 48824
U.S.A.

Département d'Education Rurale
Centre Universitaire de Dschang
B.P. 110
Dschang
Cameroun

Questionnaire

Ce questionnaire est élaboré en vue d'estimer les perceptions des chercheurs sur les liens et relations entre organismes chargés de développer et de diffuser les innovations agricoles au Cameroun. Les informations obtenues au cours de cette étude pourront aider à améliorer les liens et relations existant entre l'Institut de Recherche Agronomique, les Services de Vulgarisation et le système paysan. Toute information est strictement confidentielle. Elle ne sera utilisée qu'à des fins professionnelles. Votre coopération est absolument nécessaire et sera grandement appréciée.

1ère Partie

A. Information générale (Prière cocher une réponse par question)

1. Quel est votre titre/position?
   _____ 1. Chef de Centre de Recherche
   _____ 2. Chef de Station de Recherche
   _____ 3. Chef d'Antenne de Recherche
   _____ 4. Technicien de Recherche
   _____ 5. Attaché de Recherche
   _____ 6. Chargé de Recherche
   _____ 7. Autre (Spécifier)_____

2. Sexe
   _____ 1. Masculin _____ 2. Féminin

3. Age
   _____ 1. Moins de 25 ans _____ 5. 40 - 44
   _____ 2. 26 - 29 _____ 6. 45 - 49
   _____ 3. 30 - 34 _____ 7. 50 - 54
   _____ 4. 35 - 39 _____ 8. 55 et plus.

4. Nationalité
   _____ 1. Camerounaise _____ 2. Autre (Spécifier)_____

5. Diplôme le plus élevé obtenu.
   _____ 1. Moins que la Licence ou le diplôme d'Ingénieur des Travaux/Equivalent
   _____ 2. Licence/Ingénieur des Travaux/Equivalent
   _____ 3. Ingénieur Agronome/Equivalent
   _____ 4. Matrise/Equivalent
   _____ 5. D.E.A. (Diplôme d'Edudes Approfondies)/Equivalent
   _____ 6. Doctorat de 3e Cycle/Equivalent
   _____ 7. Doctorat d'Etat/Equivalent
   _____ 8. Autre (Spécifier)_____

6. a - Depuis combien d'années êtes-vous chercheur?
   _____ 1. Moins de 4 ans _____ 4. 15 - 19
   _____ 2. 5 - 9 _____ 5. 20 ans at plus
   _____ 3. 10 - 14

b. Vos responsabilités de recherche couvrent les programmes suivants:

_____ 1. Café Arabica _____ 3. Les deux
_____ 2. Maïs _____ 4. Autre (Spécifier)_____

7. En quelle(s) langue(s) reportez-vous les résultats de la recherche

_____ 1. Français _____ 3. Autre (Spécifier)_____
_____ 2. Anglais

8. Quelle est votre principale langue de communication avec les planteurs?
_____ 1. Français _____ 3. Les daux
_____ 2. Anglais _____ 4. Autre (Spécifier)_____

9. Quelle est votre principale langue de communication avec les agents de vulgarisation?
_____ 1. Français _____ 3. Les daux
_____ 2. Anglais _____ 4. Autre (Spécifier)_____

10. Quels sont vos canaux de communication avec les planteurs?

1. Individual
2. Group
3. Mass
4. Individual et group
5. Individual et mass
6. Group et mass
7. Autre (Spécifier)_____

11. Quels sont vos canaux de communication avec les agents de vulgarisation?

1. Individual
2. Group
3. Mass
4. Individual et group
5. Individual et mass
6. Group et mass
7. Autre (Spécifier)_____

12. Quelle est votre spécialité?

_____ 1. Génetique
_____ 2. Sélection et Amélioration des Plantes
_____ 3. Agronomie Générale
_____ 4. Statistique
_____ 5. Biométrie
_____ 6. Autre (Spécifier)_____

13. Quand avez-vous débuté la diffusion de la plus récente variété de maïs?
_____ 1. Moins d'un an _____ 5. 7 - 8
_____ 2. 1 - 2 _____ 6. 9 - 10
_____ 3. 3 - 4 _____ 7. 11 et plus
_____ 4. 5 - 6 _____ 8. Ne s'applique pas à votre cas.

14. Quand avez-voux débuté la diffusion de la plus récente variété de café Arabica?

_____ 1. Moins d'un an	_____ 5. 7 - 8
_____ 2. 1 - 2	_____ 6. 9 - 10
_____ 3. 3 - 4	_____ 7. 11 et plus
_____ 4. 5 - 6	_____ 8. Ne s'applique pas à votre cas.

2éme Partie

Instructions: Veuillez encercler un nombre de 1 à 5 sur l'échelle à droite de chaque point, indiquant le degré auquel vous vous sentez obligé de réaliser les tâches suivantes. Encercler également la(les) lettre(s) à droite du nombre, indiquant la fréquence de réalisation de la tâche sus-indiguée.

Degré auquel vous vous sentez obligé de réaliser les tâches suivants

1 = Absolument pas
2 = Non obligé
3 = Peut-être obligé ou non
4 = Obligé
5 = Absolument obligé

Fréquence de réalisation

S = Souvent
Q = Quelquefois
J = Jamais

B. Planifier et Implanter la dissémination des résultats de la recherche.

15. Transférer aux planteurs les récents résultats de la recherche.	1 2 3 4 5	S Q J
16. Transférer aux agents de vulgarisation les récents résultats de la recherche.	1 2 3 4 5	S Q J
17. Interpréter aux planteurs les récents résultats de la recherche.	1 2 3 4 5	S Q J
18. Interpréter aux agents de vulgarisation les récents résultats de la recherche.	1 2 3 4 5	S Q J
19. Organiser des séminaires et réunions au cours desquels les récents résultats de la recherche sont démonstrés aux planteurs	1 2 3 4 5	S Q J
20. Organiser des séminaires et réunions au cours desquels les récents résultats de la recherche sont démonstrés aux agents de vulgarisation.	1 2 3 4 5	S Q J
21. Organiser des séances de démonstration dans les parcelles des paysans.	1 2 3 4 5	S Q J
22. Organiser des séances de démonstration dans les parcelles de la Station.	1 2 3 4 5	S Q J

23. Adapter les résultats de la recherche aux besoins locaux.	1 2 3 4 5	S Q J
24. Faire recours aux collègues, si vous ne pouvez pas résoudre un problème de la recherche.	1 2 3 4 5	S Q J
25. Faire recours aux agents de vulgarisation si vous ne pouvez pas résoudre un problème de la recherche.	1 2 3 4 5	S Q J
26. Fair recours aux planteurs, si vous ne pouvez pas résoudre un problème de la recherche.	1 2 3 4 5	S Q J
C. <u>Travailler en tant que membre d'une profession</u>		
27. Participer régulièrement aux réunions des cadres.	1 2 3 4 5	S Q J
28. Tenir compte des suggestions des collègues pour améliorer votre programme.	1 2 3 4 5	S Q J
29. Utiliser les conseils des supérieurs pour améliorer votre programme.	1 2 3 4 5	S Q J
30. Utiliser les conseils des agents de vulgarisation pour améliorer votre programme.	1 2 3 4 5	S Q J
31. Utiliser les conseils des planteurs pour améliorer votre programme.	1 2 3 4 5	S Q J
32. Assister les collègues à améliorer la qualité de leurs programmes.	1 2 3 4 5	S Q J
D. <u>Travailler comme un member d'une profession</u>		
33. Pendre les cours (par correspondance) pour améliorer vos compétences professionnelle.	1 2 3 4 5	S Q J
34. Participer aux séminaires destinés à améliorer vos compétences professionnelles	1 2 3 4 5	S Q J
35. Assister les collègues ayant des problèmes de recherche.	1 2 3 4 5	S Q J
36. Participer aux initiatives nationales de la promotion de la profession de chercheur et des services de la recherche agronomique.	1 2 3 4 5	S Q J

3ème Partie

La productivité du secteur agricole dépend généralement de plusieurs inputs. . . ., mais ces inputs à eux seuls ne peuvent pas donner à une nation telle que le Cameroun, une agriculture dont elle est fière, et dont ceux qui y sont engagés trouvent une certaine dignité. . . ., l'input supplémentaire, l'input cricial. . . . est l'intégration de la recherche agronomique, la formation/la vulgarisation rurales avec l'approvisionnement, la production et la commercialisation.

PRIERE REPONDRE A TOUTES LES QUESTIONS, FOURNISSEZ DES COMMENTAIRES SUPPLEMENTAIRES EN DES ESPACES VIDES LAISSES A CE PROPOS.

Des liens et relations formels entre l'éducation rurale, la vulgarisation agricole, la recherche agronomique et le système de production ont fait de certaines nations importatrices de denrées alimentaires, des puissances exportatrices des produits agricoles dans le monde.

En utilisant les catégories suivantes, encercler la réponse à chaque assertion qui traduit mieux votre opinion.

SD = Totalement en désaccord
D = En désaccord
U = Sans Opinion
A = Accord
SA = Totalement en accord

37. La collaboration entre chercheurs peut mener à l'amélioration de la recherche et de la profession.	**SD D U A SA**
38. La collaboration entre chercheurs (Institut de la Recherche Agronomique), enseignants en agriculture (Collèges Régionaux d'Agriculture, le Centre Universitaire de Dschang) est impératif pour le développement agricole.	**SD D U A SA**
39. La collaboration entre chercheurs et planteurs est une conditon préalable au développment agricole.	**SD D U A SA**
40. La collaboration entre chercheurs, agents de vulgarisation et planteurs est une condition préalable au développement agricole.	**SD D U A SA**
41. Collaboration entre chercheurs et vulgarisations est benefique aux planteurs.	**SD D U A SA**

42. Une attribution des responsabilités d'enseignement, de recherche et de vulgarisation à un individu est mutuellement bénéfique à l'Institut de Recherche Agronomique, le Service de Vulgarisation l'Enseignement Agricole et les planteurs.	SD D U A SA
43. Intégrer la recherche agronomique, la vulgarisation et l'enseignement agricoles au sein d'une unité administrative apporterait un souffle nouveau au développement agricole.	SD D U A SA
44. Intégrer la recherche agronomique, la vulgarisation et l'enseignement agricoles au sein d'une unité administrative nécessiterait d'énormes ressources (financières et humaines).	SD D U A SA
45. Intégrer la recherche agronomique, la vulgarisation et l'enseignement agricoles au sein d'une unité administrative conduirait nécessairement à une melleure utilisation des ressources (financières et humaines).	SD D U A SA
46. Intégrer la recherche agronomique, la vulgarisation et l'enseignement agricoles au sein d'une unité administrative améliorerait les services rendus par chaque composante.	SD D U A SA
47. Intégrer la recherche agronomique, la vulgarisation et l'enseignement agricoles au sein d'une unité administrative détériorerait plutôt les services actuallement rendus par chaque composante.	SD D U A SA

Nous vous remercions de partager votre opinion sur les liens et relations entre organismes chargés de développer et de vulgariser les innovations agricoles au Cameroun.

48. Veuillez utiliser l'espace vide ci-dessous pour exprimer vos commentaires et suggestions supplémentaires, relatif à cette étude.

Si jamais vous désirez obtenir une copie du résumé de cette étude, nous ne serions que très heureux de vous inscrire sur notre liste. Pour nous faciliter la tâche et maintenir la confidentialité, veuillez écrire votre nom et adresse sur une feuille de papier séparée que vous nous retournerez en même temps que le questionnaire.

Vous êtes prié de ne pas marquer votre nom sur le questionnaire.

Nous vous remercions vivement.

APPENDIX D

WRITTEN COMMENTS FROM QUESTIONNAIRE

69. Vouillez utiliser l'espace vide ci-dessous pour exprimer vos commentaires et suggestions supplémentaires relatifs à cette étude.

Ces deux dernières années, j'ai vulgarisé la nouvelle variété de café arabica, le java et la nouvelle variété de maïs Z 290 issues des stations PDRPO respectives de Bamendjou pour le café et Bafoli pour le maïs.

En observation, je constate que ces deux nouvelles variétés sont des types hauts producteurs, mais le java est très sensible à l'anthracnose et le maïs se conserve difficilement à cause des charançons.

Je souhaiterais que les nouvelles variétés soient aussi plus étudiées quant à la résistance aux maladies et aux parasites.

N.B. : Si jamais vous désirez obtenir une copie du résumé des résultats de cette étude, nous ne serions que très heureux de vous inscrire sur notre liste.

Pour nous faciliter la tâche et maintenir la confidentialité prière écrire votre nom et adresse sur une feuille de papier séparée que vous nous retournerez en même temps que le questionnaire.

Vous êtes prié de ne pas marquer votre nom sur le questionnaire.

Nous vous remercions vivement.

Veuillez utiliser l'espace vide ci-dessous pour exprimer vos commentaires et suggestions supplémentaires relatifs à cette étude.

Pour donner un coup de fouet à l'agriculture camerounaise, on devrait :

1/- Organiser chaque année ou chaque semestre si possible les cours de recyclage pour tous les responsables d'encadrement à tous les niveaux.

2/- Chaque encadreur de Base éduquera 50 à 100 planteurs au maximum afin que son action soit efficace car un agent qui encadre 1000 à 5000 planteurs n'a pas une tâche facile.

3/- Mettre à la disposition de chaque siège du PA, DAA, DDA, DPAO, 3 à 4 ouvriers permanents en qualité des jardiniers pour établir les collections des vergers, des cultures maraîchères et des cultures vivrières de consommation courante au Cameroun et provoquer des visites commentées de la part des paysans car ils aiment voir et imiter sans discours fatiguant.

4/- Créer des Centres de Formation Rurale au niveau de chaque Arrondissement où les jeunes agriculteurs de deux sexes seront éduqués sérieusement en pratiques agricoles diverses.

5/- Créer des Centres de Recherche Agronomique dans chaque Département pour éviter les parcours excessifs.

6/- Enseigner la technique de commandement à tous les responsables de l'encadrement des planteurs afin d'éviter le comportement barbare et bizare de certains envers les collaborateurs et les paysans.

7/- Créer des Fermes de Multiplication de Matériel Végétal au niveau de chaque Arrondissement et même de chaque poste agricole.

8/- Établir les Vergers communautaires avec les plants sélectionnés des arbres fruitiers existants au Cameroun. Enfin et en conclusion, ces q.q. suggestions pourront changer l'aspect de l'Agriculture si elles seront appliquées.

N.B. : Si jamais vous désirez obtenir une copie du résumé des résultats de cette étude, nous ne serions que très heureux de vous inscrire sur notre liste.

Pour nous faciliter la tâche et maintenir la confidentialité prière écrire votre nom et adresse sur une feuille de papier séparée que vous nous retournerez en même temps que le questionnaire.

Vous êtes prié de ne pas marquer votre nom sur le questionnaire.

Nous vous remercions vivement.

9. Veuillez utiliser l'espace vide ci-dessous pour exprimer vos commentaires et suggestions supplémentaires relatifs à cette étude.

En guise de commentaire et de suggestion, je ne manquerai pas de vous évoquer le grand mal qui ruine notre action en milieu rural;

- le manque de cohérence qui devait exister entre le cadre traditionnel de l'Agriculture et celui de la société de développement rural d'une part et celui de la recherche d'autre part.

En milieu rural proprement dit on déplore :

- le retard dû au moment de la distribution des intrants agricoles,
- la non distribution régulière et équitable des crédits agricoles à tous les niveaux par le FONADER
- le bafouillement de certaines normes techniques par les sociétés de Développement (écartement entre les plants lors de leur mise en terre définitive) café.

En outre, la cohabitation entre la recherche, l'enseignement agricole et la vulgarisation serait la bienvenue à plus d'un titre. Elle permettra aux responsables de ces services de se concerter rapidement pour trouver une solution nécessaire à un problème naissant.

N.B. : Si jamais vous désirez obtenir une copie du résumé des résultats de cette étude, nous ne serions que très heureux de vous inscrire sur notre liste.

Pour nous faciliter la tâche et maintenir la confidentialité prière écrire votre nom et adresse sur une feuille de papier séparée que vous nous retournerez en même temps que le questionnaire.

Vous êtes prié de ne pas marquer votre nom sur le questionnaire!

Nous vous remercions vivement.

69. Veuillez utiliser l'espace vide ci-dessous pour exprimer vos commentaires et suggestions supplémentaires relatifs à cette étude.

Pratiquement les chercheurs (IRA) devraient travailler constamment en étroite collaboration avec les encadreurs de la localité où ils prétendent faire des essais d'une variété quelconque. Mais, nous, vulgarisateurs sommes surpris quelquefois du passage des chercheurs opérant sous silence dans notre zone.

Les planteurs eux-mêmes se demandent s'il existe en dehors des encadreurs (vulgarisateurs) qui leur sont familiés d'autres personnes appelées Chercheurs Quel peut être leur rôle sur le terrain.

Il serait souhaitable qu'il ait une correlation pratique et permanente sur le terrain entre les chercheurs (IRA), les agents d'encadrement, les formateurs et les planteurs, ceci pour se stimuler les uns, les autres afin de mener à bien le développement agricole dans notre pays.

Les chercheurs devraient d'abord étudier les milieux avant d'y introduire les differents produits correspondants (fongicide, fertilizants, variété de maïs, de café etc...) savoir élaborer et analyser les suggestions des planteurs à ce propos.

N.B. : Si jamais vous désirez obtenir une copie du résumé des résultats de cette étude, nous ne serions que très heureux de vous inscrire sur notre liste.

Pour nous faciliter la tâche et maintenir la confidentialité prière écrire votre nom et adresse sur une feuille de papier séparée que vous nous retournerez en même temps que le questionnaire.

Vous êtes prié de ne pas marquer votre nom sur le questionnaire.

Nous vous remercions vivement.

Nous vous remercions de bien vouloir partager votre opinion sur les liens entre organisations chargées de développer et de vulgariser les innovations agricoles au Cameroun.

55. Veuillez utiliser l'espace vide ci-dessus pour exprimer vos commentaires et suggestions supplémentaires relatifs à cette étude.

Si jamais, vous désirez obtenir une copie du résumé des résultats de cette étude, nous ne serions que très heureux de vous inscrire sur notre liste. Pour nous faciliter la tâche et maintenir la confidentialité, veuillez écrire votre nom et adresse sur une feuille de papier séparée que vous nous retournerez en même temps que le questionnaire. Vous êtes prié de ne pas marquer votre nom sur le questionnaire.

Nous vous remercions vivement.

Nous vous remercions de bien vouloir partager votre opinion sur les liens entre organisations chargées de développer et de vulgariser les innovations agricoles au Cameroun.

55. Veuillez utiliser l'espace vide ci-dessus pour exprimer vos commentaires et suggestions supplémentaires relatifs à cette étude.

Lorsque nous parlez des chercheurs nous les paysans nous ne les connaissons pas. Sauf les Agents Vulgarisateurs que nous trouvons régulièrement dans nos champs.

Si jamais, vous désirez obtenir une copie du résumé des résultats de cette étude, nous ne serions que très heureux de vous inscrire sur notre liste. Pour nous faciliter la tâche et maintenir la confidentialité, veuillez écrire votre nom et adresse sur une feuille de papier séparée que vous nous retournerez en même temps que le questionnaire. Vous êtes prié de ne pas marquer votre nom sur le questionnaire.

Nous vous remercions vivement.

Nous vous remercions de bien vouloir partager votre opinion sur les liens entre organisations chargées de développer et de vulgariser les innovations agricoles au Cameroun.

5. Veuillez utiliser l'espace vide ci-dessus pour exprimer vos commentaires et suggestions supplémentaires relatifs à cette étude.

La culture du café arabica est très pénible mais son prix d'achat est très bas. nous prions le gouvernement de bien vouloir augmenter très sensiblement le prix de kg (environ 2.500 F) compte tenu de tous les ~~pênes~~ peines des planteurs.

J'ai fait plus de 60 ans dans la culture du café, mais étant vieux ce que je veillis en même temps que ma plantation, et dès que je serais mort ma plantation sera également morte. Les enfants abandonneront la culture caféière parce qu'ils tiennent leur compte de gestion qui est toujours supérieur au revenu de la plantation. certains grands planteurs ont déjà fait l'expérience → plantation abandonnée

Si jamais, vous désirez obtenir une copie du résumé des résultats de cette étude, nous ne serions que très heureux de vous inscrire sur notre liste. Pour nous faciliter la tâche et maintenir la confidentialité, veuillez écrire votre nom et adresse sur une feuille de papier séparée que vous nous retournerez en même temps que le questionnaire. Vous êtes prié de ne pas marquer votre nom sur le questionnaire.

Nous vous remercions vivement.

Nous vous remercions de bien vouloir partager votre opinion sur les liens entre organisations chargées de développer et de vulgariser les innovations agricoles au Cameroun.

55. Veuillez utiliser l'espace vide ci-dessus pour exprimer vos commentaires et suggestions supplémentaires relatifs à cette étude.

Je suis très ravi d'avoir répondu aux questions. Mais je ne sais pas si tout ce que vous avez demandé n'est peut pas avoir lié au travail. Je serai très content de voir un jour les chercheurs dans le village.

Si jamais, vous désirez obtenir une copie du résumé des résultats de cette étude, nous ne serions que très heureux de vous inscrire sur notre liste. Pour nous faciliter la tâche et maintenir la confidentialité, veuillez écrire votre nom et adresse sur une feuille de papier séparée que vous nous retournerez en même temps que le questionnaire. Vous êtes prié de ne pas marquer votre nom sur le questionnaire.

Nous vous remercions vivement.

Nous vous remercions de bien vouloir partager votre opinion sur les liens entre organisations chargées de développer et de vulgariser les innovations agricoles au Cameroun.

55. Veuillez utiliser l'espace vide ci-dessous pour exprimer vos commentaires et suggestions supplémentaires relatifs à cette étude.

Nous déplorons l'insuffisance des traitements phytosanitaires, le ravitaillement avec retard. Les fertilisants coûtent trop cher. Même que le diphulpeur. Nous demandons la subvention des herbicides. Insuffisance des encadreurs de base. Problèmes sur l'évacuation des produits vivriers vers les centres urbains. Le Poste Agricole n'est pas construit, d'où difficultés de stockage des produits

Si jamais, vous désirez obtenir une copie du résumé des résultats de cette étude, nous ne serions que très heureux de vous inscrire sur notre liste. Pour nous faciliter la tâche et maintenir la confidentialité, veuillez écrire votre nom et adresse sur une feuille de papier séparé, que vous nous retournerez en même temps que le questionnaire. Vous êtes prié de ne pas marquer votre nom sur le questionnaire.

Nous vous remercions vivement.

Nous vous remercions de bien vouloir partager votre opinion sur les liens entre organisations chargées de développer et de vulgariser les innovations agricoles au Cameroun.

55. Veuillez utiliser l'espace vide ci-dessus pour exprimer vos commentaires et suggestions supplémentaires relatifs à cette étude.

Suite à votre enquette, j'ai bien compris mais il serait souhaitable de nous demander que faisant déjà plus de 20 ans dans ma carrière de planteur quel est mon profit dans ce métier.

Dans les 20 ans de culture de café arabica, je n'ai rien vu comme profit, je suis devenu très vieux et jusqu'à le moment je pratique cette culture par quoi faire.

Je n'ai pas une case d'habitation et j'ai plus de 30 personnes à mon dos. Si le caféier était important à l'homme planteur a qu'on devrait l'accordé un crédit important (construct° rurale, amélioration de la plantation etc ---). Le revenu de la plantation ne fait qu'entretenir la famille (ration, habillement, cas de maladie). A présent je suis âgé et les autres enfants ne veulent plus aller aux champs avec, ils ont vu la pénitence et surtout que ça ne rapporte rien comme revenue.

Si jamais, vous désirez obtenir une copie du résumé des résultats de cette étude, nous ne serions que très heureux de vous inscrire sur notre liste. Pour nous faciliter la tâche et maintenir la confidentialité, veuillez écrire votre nom et adresse sur une feuille de papier séparée que vous nous retournerez en même temps que le questionnaire. Vous êtes prié de ne pas marquer votre nom sur le questionnaire.

Nous vous remercions vivement.