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9. ABSTRACT
The Basic Village Education Project (BVE) was a carefully controlled experiment to study the effectiveness and relative costs of various communications media combinations used to reinforce and extend the efforts of extension agents and teachers in the Oriente region of Guatemala. The BVE Project's audience was the small, often illiterate, subsistence farmer. The program content gave information to help the farmer improve his production and profits from basic crops. The Project design included four communication media combinations as variables, with radio being a common element to three. These variables were: treatment R (radio), treatment RM (radio-monitor), treatment RMA (radio-monitor-agronomist), and treatment M (monitor only). Matched experimental and control areas were established in each of the two regions specified in the Implementation plan, the Oriente and the Occidente. This report summarizes three years of experimental educational programming and results of evaluation for the Oriente region where the experiment has been completed. The findings indicate that radio is a highly effective change medium when used in combination with a highly developed message preparation and feedback system. The findings have a number of implications for development projects throughout the world. The most significant findings are: radio can get new information to marginal populations; the use of a local person to lead study groups is effective; a technician is an important backup person in a non-formal education program; the message may be of more importance than the particular media used to transmit it; and evaluation should be included in the early planning stages.

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THE BASIC VILLAGE EDUCATION PROJECT

(Programa De Educacion Basica Rural)

GUATEMALA

ORIENTE REGION

COMBINED REPORT

1973 - 1976

This report has been prepared by the Academy for Educational Development under Contract No. AID/CM/la-C-73-19 for the Division of Education, Science and Technology, Office of Development Resources, Bureau for Latin America of the Agency for International Development, and by the University of South Florida under Subcontract with the Academy.

FOREWORD

The Oriente phase of the Basic Village Education Project has now been completed after nearly three years of experimental programming. This combined report summarizes field operations, evaluation activities and findings of the Project in that region. The Occidente phase is still in progress (experimental programming and data collection will be completed in late 1977) and will be reported later. The present report has been preceded by three annual interim reports, and numerous other reports prepared by field and evaluation staff.

The evaluation team participated with field staff in development of the Project design and Implementation Plan, and was closely associated with all subsequent developments which could affect the validity of their independent evaluation of the results. There was continuous interchange between evaluation and field staff in seeking to develop and maintain an educational program of high quality and to improve the confidence level of data obtained, in determining priorities for data analysis, and in interpretation of results.

Major credit for the success of the BVE experiment must be given to the Government of Guatemala for its continuing support of the Project, and to the rural people who responded so positively to the educational program and who subjected themselves willingly to the repeated interviews necessary for evaluation of results. The Ministry of Education which administered the Project provided essentially all operational personnel for the educational program as well as an increasing proportion of operating costs, and permitted the independence in operation necessary to achieve the objectives of the experiment. Other Ministries and agencies of Government also supported the Project at both national and local levels. The Ministry of Agriculture merits special acknowledgement for its close collaboration and support throughout the course of the experiment. Finally, but far from least, the dedication and continuing efforts of Project Director Mario Dardon and his staff resulted in an educational program that was worthy of evaluation.

The Basic Village Education Project was made possible by support received from the Agency for International Development. In addition to the financial contribution without which there would have been no Project, AID officials in both Washington and Guatemala supported the Contractor and the Government of Guatemala fully in its planning and execution, and provided the flexibility necessary to adjust for unanticipated developments.

The number of institutions and people, both Guatemalan and foreign, who contributed in some form to BVE is much too extensive to permit identifying them individually. However, the support, ideas and other contributions received from them are gratefully acknowledged.

CONTENTS

		PAGE
SUMMARY		x
	PART ONE. THE BASIC VILLAGE EDUCATION PROJECT (BVE)	
I.	BACKGROUND AND SETTING	3
II.	PROJECT DESCRIPTION	5
	PART TWO. BVE FIELD OPERATIONS IN THE ORIENTE	
III.	EDUCATIONAL PROGRAMMING SYSTEM	10
IV.	MESSAGE DEVELOPMENT	11
V.	PROGRAM MATERIALS PRODUCTION	13
	A. Production Planning	13
	B. Production of Audio Materials	16
	C. Production of Graphic Materials	18
VI.	MESSAGE DELIVERY TO THE TARGET AUDIENCE	19
	A. Treatment R	19
	B. Treatments RM and M	19
	C. Treatment RMA	25
	D. Crop Demonstrations	26
VII.	FORMATIVE EVALUATION	29
	A. Monitor and Agronomist Feedback Reports	29
	B. Program Materials Development and Testing	30
	C. Letters Received	34
	D. Radio Listenership Surveys	35
	E. Signal Penetration Tests	36
VIII.	SUMMATIVE EVALUATION - AN INTERACTIVE PROCESS	40
IX.	COST EFFECTIVENESS AND BENEFIT/COST	44

PAGE

X. HUMAN RESOURCES 49

A. Government of Guatemala 49
B. Technical Assistance 49
C. Staff Development 51

XI. INTERSECTORAL COORDINATION 56

A. Ministry of Agriculture 56
B. Ministry of Health 57
C. Ministry of Communications 57
D. Other Agencies and Programs 57

XII. FACTORS AFFECTING PERFORMANCE 60

A. Administrative 60
B. Operational 61
C. Agricultural/Climatic 63

XIII. PROJECT OUTREACH 65

XIV. THE FUTURE OF BVE 68

PART THREE. BVE PROJECT EVALUATION

XV. THE IMPACT OF BVE: A SUMMARY OF EVALUATION FINDINGS 71

A. Evaluation Design 71
B. Practice Change 72
C. Population Characteristics 73
D. Findings from Time Sample Surveys 75
E. Sources of Information 75
F. Discussion of Findings 77

XVI. EVALUATION DESIGN 84

A. Theoretical Basis of the Design 84
B. Characteristics of the Design Used for Measurement of the Results of the BVE Experimental Program 88
C. Choosing the Areas and the People for Interviewing 90
D. Preparation of the Questionnaires 92
E. Field Interviewing 94
F. Data Processing and Analysis 96
G. Personnel Training 96
H. Interpretation and Reporting of the Results 96

XVII. MEASURING CHANGES BY SELECTED PRACTICES 98

A. Development of the Practice Index 98
B. Comparison of Change from 1974-1976 by Total Practice Index 101

		PAGE
	C. Changes in Individual Practices	111
	D. The Impact of Change in Agricultural Practices on Crop Yield and Production	118
XVIII.	POPULATION CHARACTERISTICS AND THEIR RELATIONSHIP TO LEVEL OF PRACTICE AND LEVEL OF CHANGE	129
	A. High and Low Practice Farmers	130
	B. High and Low Change Farmers	134
XIX.	TRACKING THE PROCESS OF CHANGE: KNOWLEDGE AND ATTITUDES AS COMPARED TO PRACTICE	140
	A. Relationship of Responses on Time Sample Surveys and Annual Survey	140
	B. Representativeness of Farmers Selected for Time Sample Survey	141
	C. Relationship of Knowledge and Attitudes to Behavior	141
XX.	SOURCES OF INFORMATION FOR CHANGE	150
	A. Method of Measurement of Information Sources in Time Sample Surveys	150
	B. Sources of Information: Overall Impact	151
	C. Sources of Information: Differential Impact by Treatment Area	160
	D. Summary of Information Sources and BVE Treatments	164
XXI.	SIGNIFICANT QUESTIONS FOR FURTHER STUDY	167
	A. Non-Formal Education	167
	B. Major Area Topics Related to Agricultural Development	169
	C. Social and Cultural Items	169
	D. Methodology and Additional Analysis	172

TABLES

1. Summary chronology of the BVE Oriente experiment, 1971-77.

2. Summary of audio materials produced for BVE programming in the Oriente, January, 1974 - December, 1976.

3. Summary of graphic materials produced for BVE programming in the Oriente, January, 1974 - December, 1976.

4. Daily (Monday through Friday) broadcasting schedule of Radio Quezada Educativa, TGME, as of December, 1976.

5. Numbers of communities and rural families in each Oriente treatment area served by a BVE monitor.

6. Summary of farmer participation in BVE radio forum meetings in the Oriente during the life of the experiment, March, 1974 - December, 1976.

7. Summary of farmer participation in BVE radio forum meetings in the Oriente during the period July 1 - November 30, 1976.

8. Numbers of communities and rural families in each Oriente treatment area served by a BVE agronomist.

9. Summary of yields obtained under severe drought conditions from 1976 BVE crop demonstrations in Oriente treatment areas.

10. Comparisons of average yields and net returns from use of improved vs. traditional agricultural practices in two 1975 BVE crop demonstrations in Oriente treatment areas.

11. Summary of BVE crop demonstrations established in the Oriente during the life of the experiment, 1974 - 1976.

12. Summary of letters received by Radio Quezada Educativa, TGME, during the life of the experiment, March, 1974 - December, 1976.

13. Simulated economic costs for regional application of three message delivery system models utilized in the BVE experiment in the Oriente region of Guatemala.

14. Estimated direct costs of production of principal BVE educational programs in 1974 as compared to 1976.

15. Comparison of estimated production, gross income and net return per manzana (0.7 ha.) realized from traditional cropping systems with the potential from use of selected improved cropping systems in the Oriente region.

16. Items in the total practice score.

17. Summary of the total practice score distributions for 1974 and 1976.

18. Measurement of Total practice scores from 1974 to 1976 by number of individuals who changed.

19. Comparison of total practice scores, 1974 and 1976 by mean score: change within treatment condition across years.

20. Differential treatment effectiveness as measured by change from 1974 to 1976.

21. Differential treatment effectiveness when treatment areas are combined.

22. Correlations between total practice scores and crop yields: 1974, 1975, and 1976.

23. Correlations between total practice scores and crop production: 1974, 1975, and 1976.

24. Summary of the multiple regression results for corn: 1974, 1975, and 1976.

25. Summary of the multiple regression results for beans: 1974, 1975, and 1976.

26. Summary of the multiple regression results for sorghum: 1974, 1975, and 1976.

27. Number of high and low practice farmers by sub-area.

28. Sources of information reported by high practice and low practice farmers.

29. Number of high and low change farmers by sub-area.

30. Sources of information reported by high change and low change farmers.

31. Comparison of average attitude and usage levels.

32. Association between individual farmers' attitude and usage levels.

33. Agricultural practice improvement and sources of information reported on time sample surveys in Oriente during 1975 and 1976.

34. Sources of new information reported by farmers who improved their agricultural practices in 1975 or 1976 in the BVE experimental areas of Oriente.

35. Sources of new information reported by farmers who improved their agricultural practices in 1975 or 1976 in the BVE experimental areas of Oriente (Quezada and Yupi combined).

FIGURES

1. Basic Village Education Project experimental and control areas.

2. The BVE annual calendar of agricultural messages for 1976 Oriente programming.

3. A sample message strategy used in the BVE program materials production process.

4. Level of listenership by area to Radio Quezada Educativa, TGME, as indicated by four audience surveys conducted during the period April, 1975 - May, 1976. (Expressed as percent of respondents with access to radio who listen to TGME.)

5. Approximate boundaries of Radio Quezada Educativa coverage broadcasting at 500 and 1000 watts.

6. Graphic representation of research design used in BVE experimental program, 1973 - 1977.

7. Comparison of frequency distributions of usage and attitude levels for all five practices combined.

8. Average attitude and usage levels by practice.

9. Sources of new information for farmers who improved their agricultural practices.

10. Sources of new information for farmers adopting recommended practices.

11. Sources of new information for farmers using recommended practices.

12. Sources of new information for farmers having favorable attitudes toward the recommended practice.

PLATES

1. The rural people in BVE experimental and control communities in the Oriente region of Guatemala.

2. The impact of BVE depended in large part upon the quality and timeliness of its educational materials.

3. Media mixes under test in BVE included radio, monitor, radio plus monitor, and radio plus monitor plus agronomist.

4. Staff training and development were given high priority throughout the life of the BVE Project.

5. Nearly 8,000 individual interviews were conducted with Oriente farmers to obtain data for the BVE evaluation.

APPENDICES

A. Foreign technical assistance staff provided for the Basic Village Education Project by the Academy for Educational Development.

B. Staff report on Basic Village Education Project Conference/Seminar. Guatemala City, Guatemala, October 18-19, 1976.

C. Staff report on third annual review of the Basic Village Education Project. Washington, D.C., March 21-22, 1977.

D. Selected writings on field operations, Basic Village Education Project, Guatemala.

E. List of evaluation reports, working papers, and professional papers.

F. List of practices comprising the total practice score.

G. Tables related to the analysis of the 13 items in the total practice index.

H. Correlations between population characteristics and practice levels and change scores.

I. 1976 time sample/annual survey reliability.

J. Time sample representativeness.

SUMMARY

Present day information needs of rural people in developing countries are not being met adequately by traditional education and extension systems. The appropriate use of modern communications technology to reinforce and extend the efforts of extensionists and teachers would appear to offer at least a partial, low cost, solution to this dilemma. The Basic Village Education Project (BVE) has been a carefully controlled experiment to study the effectiveness and relative costs of various communications media combinations utilized in such a manner.

The BVE experiment was undertaken in Guatemala, a setting which has much in common with other countries in the developing world. The population is largely rural, land productivity is low, illiteracy is high, and the characteristics of Guatemalan peasant farmers are substantially representative of peasant societies throughout the world. Also, the diversity of its people, physiography and agriculture permitted the Project to conduct the experiment in two distinctive cultural environments. Thus, results from BVE are expected to have broad applicability.

The Oriente (southeastern) region with which this report deals is characterized by a Spanish-speaking Ladino population, typically broken terrain, distinct wet and dry seasons, and year-round warm weather. In the BVE target communities of this region, about two thirds of the adult heads of household are illiterate; and corn and beans are the basic crops produced on the small farms which are predominant in those communities.

The Basic Village Education Project was comprised of: a carefully controlled non-formal education program not requiring literacy; and a rigorous independent evaluation of that program's impact on knowledge, attitudes and agricultural practices among the target population. Its primary audience was the small, often illiterate, subsistence farmer; and its program content concentrated on information to help that farmer improve his production and profits from basic crops.

The Project design (as modified in 1975) included four communications media combinations as variables, with radio being a common element to three. Those variables, or treatments, were:

Treatment R (Radio). Educational messages were conveyed to the target population only through mass media, principally radio.

Treatment RM (Radio-Monitor) added interpersonal contact to mass media delivery, achieved through a local person (monitor) employed and trained by the Project to work directly with farmers in his own and three or four nearby communities.

Treatment RMA (Radio-Monitor-Agronomist), the most intensive treatment, included mass media and monitor as described above, and introduced a low level of technical agronomic assistance.

Treatment M (Monitor only), added in 1975 to ascertain the effect of the monitor apart from that of radio, utilized a monitor working in an area where the BVE radio signal was not received.

Matched experimental and control areas were established in each of the two regions specified in the Implementation Plan: the already described Oriente, and the Occidente (Indian Highlands). The present report summarizes three years of experimental educational programming and results of evaluation for the Oriente region in which the experiment has now been completed. (The Occidente phase is still in progress and will be reported later.)

The BVE Educational Program

Initiation of educational programming in the Oriente coincided with inauguration of the BVE radio station, Radio Quezada Educativa, in late March, 1974, following about ten months of intensive planning and preparation. Most operational personnel were provided by the Government of Guatemala, principally the Ministry of Education which administered the Project.

An integrated four-component educational programming system was instituted to facilitate the development of a quality program. Its components--message development, educational materials production, delivery to the target population, and formative evaluation--were by no means unique to BVE. The key to the Project's success in programming was the manner in which they were coordinated and integrated into a functional system.

Primary responsibility for agricultural message content was assigned to the BVE technical agriculture section which sought out, assessed and organized information from three kinds of sources: the people to whom the message would be directed; institutions which generate new technology and information; and institutions which provide farmers with needed goods and services. The Ministry of Agriculture was the Project's primary source of technical information on agriculture, and reviewed and approved all technical content prior to its use in the BVE program.

The Project produced both materials needed in the internal programming process, and audio and graphic materials for use in delivering its message to the target audience. The production output of BVE for the Oriente included a book of technical message content with accompanying scriptwriter's guide, annual message calendars and bi-weekly message strategies for nearly three years of educational programming, more than 94,000 copies of 933 different graphic materials, and 6,872 different audio programs of various types.

Radio Quezada Educativa broadcast a mix of pre-recorded and live programs (about 20 percent was educational programming related to agriculture) to Oriente families throughout the period of the experiment. The station was on the air Monday through Saturday on a split schedule (0500 to 0900 and 1600 to 2000 hours). It captured and maintained a large listening audience in the BVE experimental areas according to the results of periodic listener surveys.

Each BVE monitor was assigned to an area of four or five communities with 110 to 250 farm families per area depending upon community size, accessibility, and natural geographic or social limits. Near 1500 weekly

farmer meetings (radio forums) with a total attendance of 16,506 adults were held by Oriente monitors during the course of the experiment in addition to their contacts with individual farmers in their assigned communities.

Due to the relatively small size of the RMA treatment areas, the field agronomist worked only parttime in each. Expressed on a fulltime equivalence basis, he was responsible for an area having about 600 farm families. His principal functions in that area included monitor reinforcement, crop demonstrations and related activities, problem identification, and feedback. He also served as monitor trainer and supervisor, provided liaison with other agricultural programs in the region, supplied local farm news to Radio Quezada Educativa, and participated in the development of technical message content.

A viable information feedback system was indispensable to the program's continuing success. Various mechanisms, considered collectively as formative evaluation, were utilized: weekly feedback reports from monitors and field agronomist; testing of newly developed program materials; letters received by Radio Quezada Educativa (70,000 during the course of the experiment); listenership surveys; and radio signal penetration tests. In addition to helping the program respond to the ever-changing interests and needs of its audience, such feedback contributed to the interpretation of summative evaluation results.

A small unit was established in late 1975 to concentrate on the development and field evaluation of new program materials, particularly graphics. Its output (field tested in both the Oriente and Occidente regions) included four picture booklets with simple texts, two poster/handout combinations designed for mass distribution, eight special posters and handouts for use in radio forums, and seven posters and 16 flyers for distribution in the disaster zone following the 1976 earthquake.

A number of in-course modifications and adjustments were required due to administrative, operational, and agricultural/climatic factors beyond the control of the Project. Delays in delivery and technical problems with equipment, budgetary delays and shortfalls on the part of the Government of Guatemala, drought, and a disastrous earthquake were among those most important. In general, however, Project operations adhered to the Implementation Plan throughout the course of the experiment.

Analyses of Project costs, cost effectiveness and benefit/cost relationships have not yet been completed. Early approximations indicate, however, that the costs in 1975 for operation of regional programs based on the Project's R, RM, and RMA treatments (expressed on a per farmer reached basis) would have been $4.34, $21.25 and $31.57, respectively.

Experimental programming in the Oriente region was terminated on schedule at the end of 1976. The Ministry of Education assumed complete responsibility for the BVE educational program in that region as of January, 1977, and it is continuing as an ongoing program of that Ministry.

The BVE Evaluation Findings

An accurate measure of the BVE impact was obtained through the continual evaluation which was a characteristic of the Project. It started with a baseline study, continued with monthly time sample studies, and ended each year with an annual survey. Evaluation activities were guided by a rigorous experimental design, but also took into account social and political realities.

Joint planning of the field program and the evaluation activities from the earliest stages of the Project was a necessary factor in assuring the accuracy of results obtained. This imposed some restrictions on both programming and evaluation but allowed for continuing coordination. The evaluation data provided valuable information for program initiators and feedback to keep activities on target. Thus, evaluation activities served two purposes, global impact measurement and interim program feedback.

The BVE educational program had a significant positive impact. The measurement of change through a total practice index consisting of 29 agricultural practices revealed evidence of an overall BVE effect when treatments were compared to control.

The radio was extremely effective in bringing about changes in knowledge, in attitudes, and in behavior. There were measurable changes in agricultural practices that were a part of the message content broadcast over BVE radio, even in the short period of time that the experimental program was in operation. When used in combination with other sources (i.e., monitor or monitor and agronomist) in the BVE treatment areas, radio continued to be the overwhelming medium for the transmission of knowledge, attitudes and practices.

The impact of radio diminished over time. In the early stages, radio appeared to be the most important medium by which new information entered the community. It is apparent that the local communication structure (e.g., friends and neighbors) became more important at the second stage of diffusion. Radio also showed a decrease over time when combined with other media such as monitor or visits of the agronomist which were reported as increasingly important sources.

Efforts at personalizing radio, a traditionally nonpersonal medium, were clearly among the most important factors in the success of BVE. The Project used a unique system of personalizing the radio message programming which involved a feedback system with letters and reports by the monitors and agronomists. This type of "open" system allowed the people themselves to develop a dialogue and assist in message development.

The monitor proved to have an important impact on change. In the area where the monitor served alone, there was evidence of rapid change in the second year of programming. When combined with radio, the monitor did not reach the level of radio as a source of new information. However, the monitor had a continued increase in impact whereas the radio declined after two years of programming.

Combining radio and monitor did not appear to increase total impact. Further investigation of community structure will be necessary before any definitive conclusions can be drawn regarding the lesser effect of the combination of radio and monitor in comparison to the monitor alone or radio alone.

The overall impact (in terms of change) was greatest in those areas in which the agronomist was used in combination with radio and monitor. The agronomist was seldom mentioned as a source of new information for change. However, examination of responses related to the question "Where do you receive good information for your agricultural operations?" revealed frequent mention of an agronomist, including the BVE agronomist. Since many of the agronomist's activities are backup rather than direct contact, it was not totally unexpected that the agronomist was not mentioned more often as a principal source of information for change.

Change observed in the control area is a clear indication that uncontrolled or uncontrollable factors existed in the field. Such factors had to be taken into account when measuring the differential impact of BVE in the treatment areas.

Differential treatment effectiveness was predicted but not found in the Project. Differences were found that substantiated a powerful BVE effect on the experimental areas when compared to natural change in a control area, but change between different experimental areas was not consistently in favor of any one treatment.

Initially, the design was seen as composed of four discrete treatments and a control, with the treatments designed to be independent tests of different media approaches. As the Project evolved, however, the assumption of independence became increasingly questionable. It seems clear that the creation of a powerful message development and feedback system resulted in the specific media delivery system being of less importance, and thereby not creating change independent of the message. The agronomist and monitor were necessary for message development and feedback used in all treatments, as well as for the interpersonal contact called for in treatments M, RM, and RMA.

In summary, BVE evaluation findings indicate that radio is a highly effective change medium when used in combination with a highly developed message preparation and feedback system. A message presentation system requires feedback from content specialists in regular contact with the target population depending on content, i.e., agronomist, health specialist. Radio may be a personalized medium under appropriate conditions of content preparation.

Implications of the BVE Findings

The BVE experience and its findings would appear to have a number of implications for development projects throughout the world. In the judgment of Project staff, the following are among those most significant:

1. It is evident that radio can be used successfully to get new

information to marginal populations such as peasant farmers.

2. The use of a local person to lead study groups seems to be an effective way to make new information available either by itself or in combination with a radio message or a technician who serves as a backup.

3. A technician is an important backup person in a non-formal education program. He should be seen as a link to the feedback system for keeping the message on target, for helping in the development of meaningful content, and for helping to interpret the message at the local level.

4. The local communication system between friends and neighbors should be considered as a fundamental part of any non-formal education project. Every effort should be made to increase the dialogue that takes place between local people, as well as the feedback from the local people back into the message development system.

5. The message may be of more importance than the particular media used to transmit it to the target audience.

6. Evaluation should be included at the early planning stages in the development of non-formal education projects--it should not be left as an afterthought.

PART ONE

THE BASIC VILLAGE EDUCATION PROJECT (BVE)

CHAPTER I

BACKGROUND AND SETTING

Rural people, who constitute the majority of the population in many developing countries, need a continuing flow of useful and relevant knowledge and information to help them achieve social and technological progress. Formal education systems and traditional extension education methods which rely primarily upon person-to-person contact have not proved adequate to satisfy that need, given the almost universal problem of resource constraints. More cost-effective ways must be developed and employed.

The appropriate use of modern communications technology to reinforce and extend the efforts of extensionists, teachers, and others engaged in development programs would appear to offer at least a partial solution to this dilemma. The Basic Village Education Project (BVE) was developed as a carefully controlled experiment to study the effectiveness and relative costs of various combinations of communications media used in such a manner.

The Project was originally conceived as a radio education program on the hypothesis that useful and relevant knowledge could be imparted at low unit cost, and in a manner that would not require literacy, to large segments of the rural population. Such an approach appeared to be a viable alternative for supplementing existing efforts in content areas such as education, health and agriculture.

A feasibility study was conducted in 1972 to determine the potential viability of the proposed program. Although that study did not result in definitive conclusions as to specific educational content or project design, it supported the feasibility of a pilot project, suggested various alternatives for further consideration, and included a series of general recommendations.

Follow-up discussions in late 1972 and early 1973 led to decisions to limit message content to agriculture, to continue experimental educational programming for a period of two to three years, and to conduct the experiment in two regions of widely contrasting cultural and socioeconomic characteristics. An agreement was signed with the Guatemalan Ministry of Education in February, 1973, to proceed with the Project, and a technical assistance team arrived in Guatemala in May of that year to work with the Ministry of Education in implementing it.

Basic Village Education Project origins, scope, design, and implementation are described in detail in the various documents and interim reports listed in Appendix D.

Results from BVE are expected to have broad applicability, as the Guatemalan setting and people have much in common with other countries in the developing world. Guatemala's population is largely rural, land productivity is low, illiteracy is high, population is increasing rapidly, and the characteristics of its peasant farmers are substantially represen-

tative of peasant societies throughout the world. In addition, the diversity of its people, physiography and agriculture has permitted the Project to conduct the experiment in two distinct cultural environments.

The present report deals with BVE operations and results in the Oriente region (southeastern Guatemala). The Occidente, or Indian Highlands, portion of the experiment is still in progress and will be reported later.

The Oriente region is characterized by sub-tropical lowlands with typically broken terrain, generally warm weather throughout the year, and distinct wet and dry seasons. Annual rainfall fluctuates from year to year, averaging about 1300 mm in the BVE experimental areas. Native varieties of corn and beans constitute the basic crops produced in the region. Sorghum, rice, and specialty crops such as tobacco, coffee, and vegetables are planted on a lesser scale. The main annual crop is seeded in May after the rains begin. Many farmers follow with a second crop planted in late July or August.

Small, subsistence level, farm units are predominant in BVE target communities of this region. The people are of Spanish-speaking Ladino heritage, and about two thirds of the adult heads of household are illiterate. According to results of the 1974 BVE baseline survey, among the farmers in the Yupiltepeque Valley (see Figure 1):

- half had less than two manzanas (1.4 ha.) of land available for planting;
- only about 11 percent had instituted changes in their farming practices recently;
- less than 10 percent regularly used fertilizers;
- more than 42 percent worked at other jobs away from home (generally migratory farm work);
- about 84 percent listened to radio regularly.

For a more complete general description of the Guatemalan setting and people, refer to references listed in Appendix D.

CHAPTER II

PROJECT DESCRIPTION

The Basic Village Education Project (BVE) is comprised of a carefully controlled non-formal education program not requiring literacy; and a rigorous independent evaluation of that program's impact on knowledge, attitudes and agricultural practices among the target population. Its primary audience is the small, often illiterate, subsistence farmer; and its program content concentrates on information to help that farmer improve his production and income from basic crops.

The specific objective of BVE, as defined in its Project Implementation Plan, is "to determine the effectiveness and relative costs of different mixes of communications media, used to supplement the work of extension agents (limited in number), in influencing change in agricultural practices and production among Ladinos and Indians of rural Guatemala." It is seeking, also, to develop a cadre of trained people in Guatemala capable of planning and implementing the integrated and effective use of modern communications technology in regional or national development programs.

The original Project design included as variables (treatments) three combinations of communications media, with radio being a common element to all. A fourth treatment, not including radio, was added in 1975. The same basic message was used for all treatments in a given region. Thus, the treatments differed only in the manner and number of ways in which that message was conveyed to the rural people.

Criteria used in the selection of media for each treatment included: 1) appropriateness with respect to the message, the target population, and Guatemala's development needs; 2) potential replicability in other sectors/settings; 3) practical limitations on the number and complexity of variables which could be included, taking into account constraints of time and resources allocated for the Project. Based on such criteria, the following treatments were selected:

Treatment R (Radio). Educational messages were conveyed to the target population only through mass media, principally radio. To implement this treatment, BVE installed two radio stations (Radio Quezada Educativa to serve the Oriente and Radio Momostenango Educativa for the Occidente).

Treatment RM (Radio-Monitor) added interpersonal contact to mass media delivery. That contact was achieved through a monitor, a local person employed and trained by the Project to work directly with farmers in his own and three or four nearby communities. The major "communications tool" of the monitor was a weekly meeting with farmers in each of his assigned communities at which he used audio and visual materials in presenting the agricultural message of the week.

Treatment RMA (Radio-Monitor-Agronomist), the most intensive treatment, included mass media and monitor as described above, and introduced a low level of technical agronomic assistance. In this treatment, a BVE field agronomist reinforced the monitor in his work, conducted crop demonstrations, and advised farmers.

Treatment M (Monitor only), added in 1975 to ascertain the effect of the monitor apart from that of radio, utilized a monitor working in an area where the BVE radio signal was not received.

Feedback received from the field through the monitors and agronomists was used regularly to modify, localize and personalize messages, and to make them more relevant to the interests and needs of the small farmers. Although the Project had no direct personal contact with farmers in communities under Treatment R, that treatment unquestionably benefited from such feedback. In that sense, the treatments were not completely independent variables.

The Project Plan called for experimentation in two contrasting cultural/agricultural environments: three years with a Spanish-speaking Ladino population of small farmers in the Oriente (southeastern Guatemala); and two years with a Quiche-speaking Indian population of small farmers in the Occidente (western Highlands). Matched experimental and control areas were established in each region as shown in Figure 1.

The Basic Village Education Project is jointly funded by the Government of Guatemala and the United States Agency for International Development in accordance with terms of an Agreement between the two governments. It is administered in Guatemala by the Ministry of Education in collaboration with the Ministries of Agriculture and Health. Foreign personnel and other technical assistance are provided by the Academy for Educational Development, under Contract No. AID/CM/1a-C-73-19 with the Agency for International Development. Responsibility for an independent evaluation of the Project rests with the University of South Florida through a subcontract with the Academy.

The present report summarizes field operations and evaluation results for the Oriente region in which experimental programming has now been completed. Major activities associated with that phase of the Project are indicated in Table 1. (Field operations and data collection for the Occidente are scheduled for completion in late 1977, and will be reported separately at a later date.)

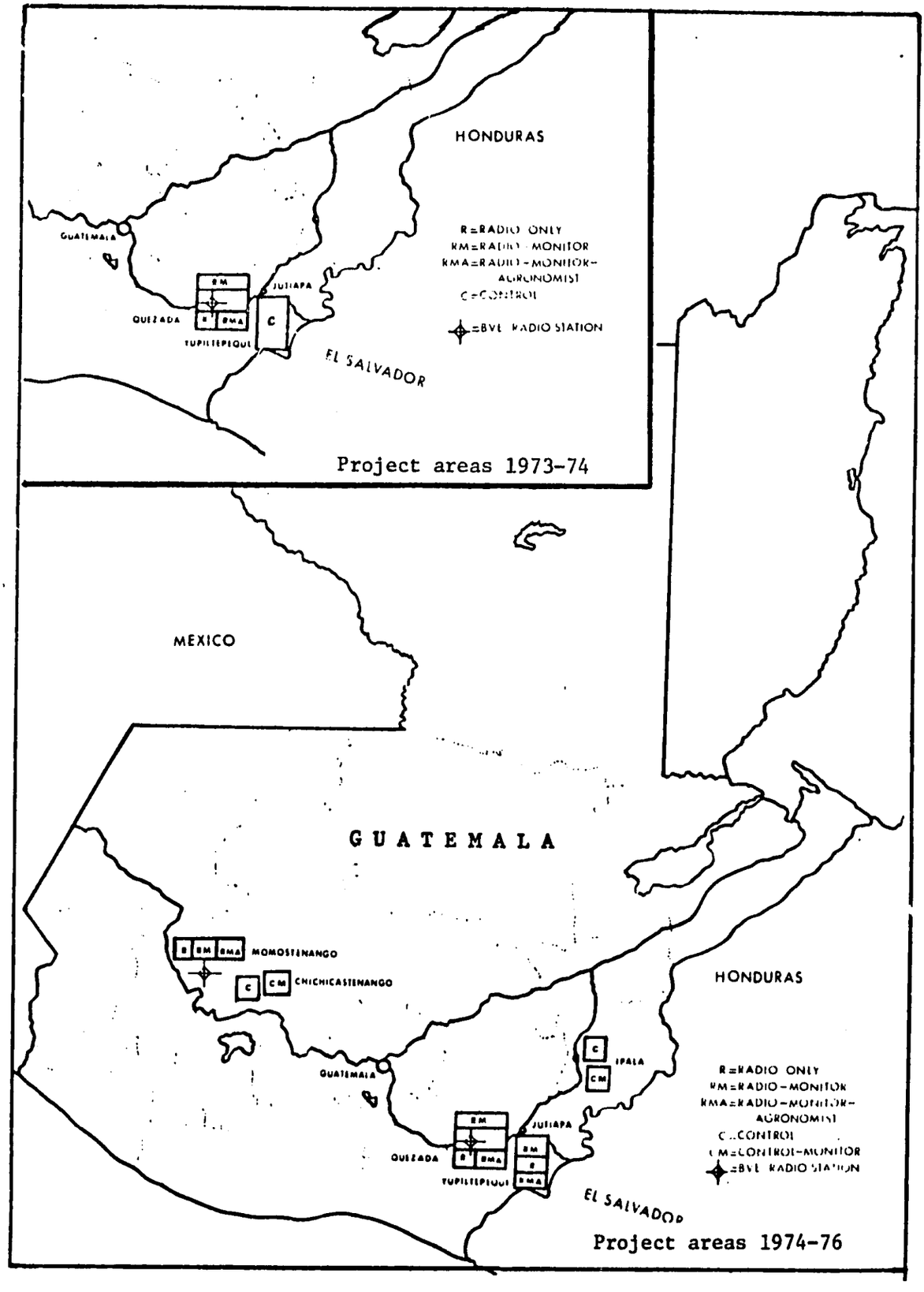


Figure 1. Basic Village Education Project experimental and control areas.

Table 1. Summary chronology of the BVE Oriente experiment, 1971-77.

Year	Event
1971	
-	Preliminary discussions: AID/GOG
1972	
-	AED feasibility study
-	Appointment of Guatemalan Director
1973	
-	U.S. technical assistance team arrived in Guatemala
-	Evaluation design prepared
-	Selection of areas
-	BVE/MinAg coordination committee established
-	First baseline survey conducted in Quezada, Yupiltepeque
-	Agricultural calendar prepared
-	Quezada monitors selected, trained
-	Central offices, production studios established
1974	
-	Radio Quezada Educativa, TGME, inaugurated
-	Time samples initiated
-	Ipala selected as 1975 control site
-	First annual follow-up survey
-	Completion of first year programming
1975	
-	Yupiltepeque changed from control to experimental area
-	Cost and benefit/cost studies started
-	BVE named autonomous directorate
-	Second annual follow-up survey
-	Materials testing unit established
-	Completion of second year programming
1976	
-	Earthquake - - suspension of normal program activities
-	Resumption of normal program activities one month later
-	Third annual follow-up survey
-	Termination of BVE experiment in Oriente
1977	
-	Continuation by Government of Guatemala of program in Oriente, while experiment continues in Occidente

PART TWO

BVE FIELD OPERATIONS IN THE ORIENTE

Initiation of experimental programming in the Oriente coincided with inauguration of BVE's Radio Quezada Educativa in late March, 1974, following about ten months of intensive planning and preparation. Although some in-course modifications and adjustments were required, Project operations in general followed the Implementation Plan closely throughout the course of the experiment.

December 31, 1976, marked the official termination, on schedule, of BVE experimental programming in the Oriente. Final data collection was completed 2 1/2 months later. As of January, 1977, the Guatemalan Ministry of Education assumed complete responsibility for BVE in that region with a firm commitment to maintain and expand the program.

CHAPTER III

EDUCATIONAL PROGRAMMING SYSTEM

The quality of the BVE educational program obviously was a major factor in determining its impact and, consequently, the validity of conclusions reached concerning effectiveness of the media mixes under test. At the same time, programming had to adhere to the Project's experimental design.

An integrated four-component system was established to facilitate the development of a quality educational program. The four components -- message development, educational materials production, delivery to the target population, and formative evaluation--were by no means unique to BVE. The key to success in programming was the manner in which they were coordinated and integrated. The system proved to be highly functional and, although modified and improved with experience, continued in use throughout the life of the program. Basically, it was designed to assure that:

- educational messages were localized, practical, and directed toward the interests, problems and potential opportunities of people in the rural areas;

- messages were developed and delivered in proper sequence at the right time through appropriate media; and

- comprehensive information was obtained systematically from the people and fed back into the system quickly to improve the program's quality and acceptability.

As indicated earlier, program content was primarily agricultural in nature, and the Project has been evaluated on the basis of its impact on change related to agriculture. However, the same programming system proved viable (although less fully utilized) for other areas, such as health, in which the Project also developed limited programming.

CHAPTER IV

MESSAGE DEVELOPMENT

The Ministry of Agriculture was critically important to BVE message development. That Ministry was the Project's primary source of technical information, and its various agencies were among the institutions providing goods and services to farmers. In addition, the Ministry of Agriculture reviewed and approved each technical content theme prior to its use in the Project.

Within BVE, primary responsibility for agricultural message content was assigned to the Project's technical agriculture section. The message development process involved seeking out, assessing, organizing, relating and collating information from three distinct sources: 1) the people to whom the message would be directed; 2) institutions which generate new technology and information; and 3) institutions which provide farmers with needed goods and services.

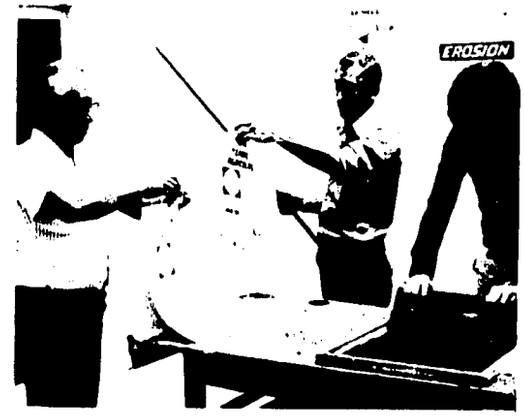
The first step was to obtain information from and about the people and their region so that messages could use existing practices and customs as points of departure for future improvement, and could be developed at a level consistent with farmers' knowledge and attitudes. Such information was obtained from baseline and other Project surveys, preliminary evaluation reports, feedback reports, and frequent visits to the region.

The agricultural section produced four basic documents for use in program production. Two (book of technical contents and scriptwriter's guide) comprised the basic package of technical agricultural resource information 1/. Both were first developed in 1973-74 and revised annually during the next two years. They will continue to form the foundation for educational programming provided by the Ministry of Education in each region through its "post-experiment" BVE program.

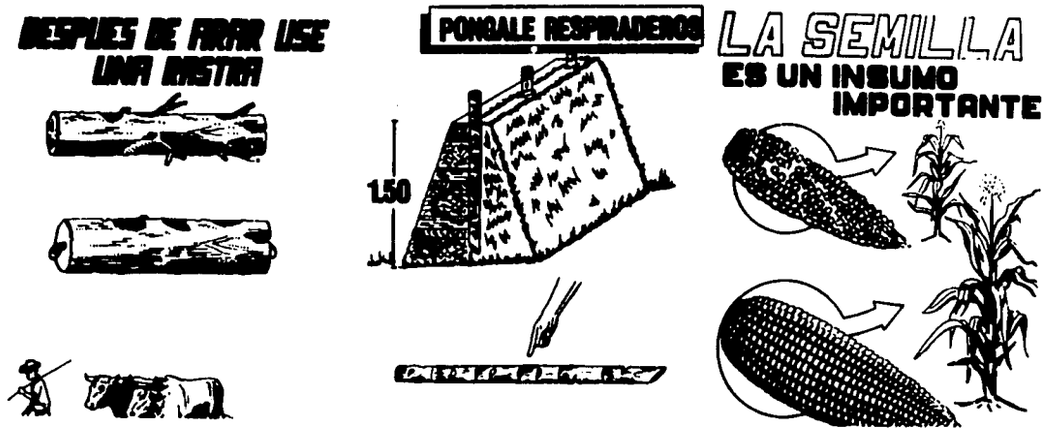
The book of technical contents was organized into sections corresponding to the twenty themes or major topics covered in BVE agricultural programming. Each section contained a complete package of information for one theme, relevant to the region for which it was developed. The scriptwriter's guide prepared for each theme identified the relevant behavioral objectives and the key points or ideas included in the technical contents text to which it related.

The development and continual review of these resource materials represented a major input into the program by both BVE and the Ministry of Agriculture throughout the experimental programming period. Similar, although less ambitious, efforts were exerted by Project and Ministry of Health staff in the preparation of health and nutrition resource materials.

1/ The other two documents prepared by the agronomists--annual message calendar and bi-weekly message strategy--are described in Chapter V-A.



Nearly 7000 different audio programs and 94,000 copies of 933 different graphic materials were created and produced by BVE for use in the Oriente region.



Oriente farmers liked these BVE graphics with clear messages and only essential detail. Field evaluation revealed that they readily captured the significance of the cross-section (center) and arrows (right).

Plate 2. The impact of BVE depended in large part upon the quality and timeliness of its educational materials.

CHAPTER V

PROGRAM MATERIALS PRODUCTION

Annual message calendars and bi-weekly message strategies for nearly three years of educational programming, more than 94,000 copies of 933 different graphic materials, and 6,872 different audio programs of various types represented the visible production output of the Project for the Oriente.

A. Production Planning

The first Oriente annual message calendar was developed in late 1973 by Project and Ministry of Agriculture agronomists to facilitate planning for 1974 educational programming. That calendar indicated the time at which each of the twenty basic themes should be promoted in order to coincide with corresponding farm activities in the area. (In time sequence, the 1974 annual message calendar preceded development of most themes in the technical contents book, and established time deadlines for their completion.)

Subsequent annual message calendars were developed through the same process. Although themes remained basically constant throughout the three years, some minor modifications were made on the basis of experience during the first year. The 1976 message calendar is shown in Figure 2.

The message strategy, an example of which is shown in Figure 3, was a detailed bi-weekly plan of educational messages developed from the annual calendar. It indicated specific agricultural content for each program through keyed references to the scriptwriter's guide, and was used by scriptwriters and artists in the development of day-by-day production schedules. Strategies were prepared and distributed to production staff two to three months in advance to insure proper integration of all themes and to allow adequate time for script review, recording and editing.

The agricultural section was given principal responsibility for message strategy development at the outset. During the later stages, key audio/visual production staff also collaborated actively in their preparation.

The final step in the formal production planning process was the weekly agronomist-scriptwriter-artist meeting instituted in mid-1974. These meetings were temporarily discontinued in mid-1975 due to internal problems, but were resumed in early 1976. This system became fully operative in mid-1976 when graphic arts staff, who had not been included earlier, began to participate regularly.

These weekly planning meetings served to orient production staff to specific objectives and content of upcoming educational programs, and provided an opportunity for making last minute adjustments to take into account the local situation of the moment. The dialogue established through such

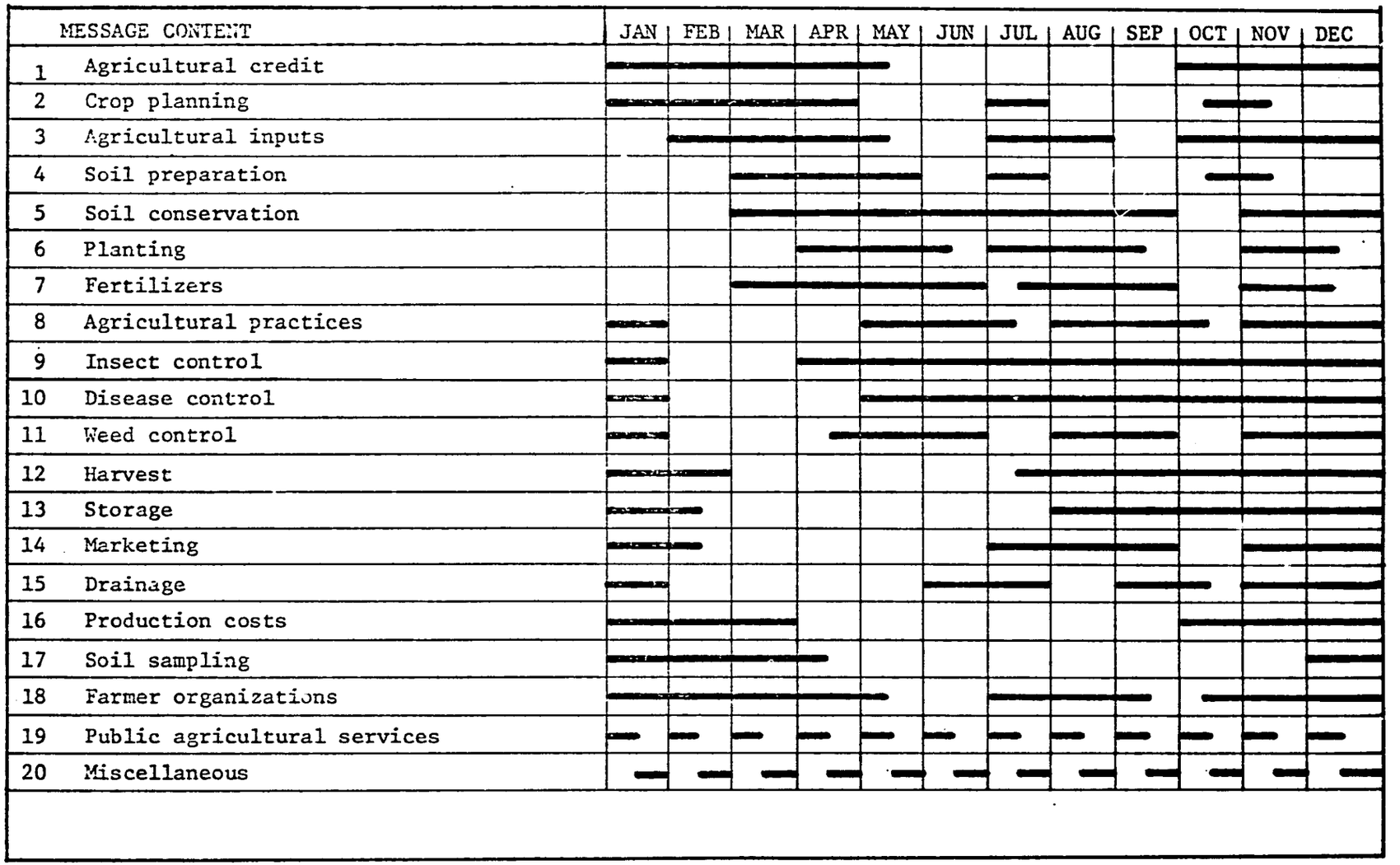


Figure 2. The BVE annual calendar of agricultural messages for 1976 Oriente programming.

ORIENTE — ESTRATEGIA DE LOS MENSAJES

del 16 DE AGOSTO al 29 DE AGOSTO 1976

TEMA	Fecha	No. Prog	PUNTOS Y OBJETIVOS	REVISTA AGRICOLA	CUÑAS	FORO TEX	VISUALES	C. CONS.
CONTROL DE PLAGAS	16	574	O - 9.3 P 91, 9.2, 9.3	9.1, 9.2, 9.3	9.1, 9.2, 9.3	No 23	No 23	No 93
	17	575	O 9.5 P 9.10, 9.11, 9.12	9.10, 9.11, 9.12	9.10, 9.11, 9.12	9.1, 9.2 9.3, 9.10 9.11, 9.12	1. 9.10 9.11	
INSUMOS	18	576	O 3.4 P 3.8, 3.10	3.8, 3.10	3.8, 3.10	3.8, 3.10	2. 3.8 3.10	
	19	577	O 3.5 P 3.4, 3.5	3.4, 3.5	3.4, 3.5	3.4, 3.5	3. 3.4 3.5	
FERTILIZACIÓN	20	578	O 7.3 P 7.13. 7.14. 7.18	7.13, 7.14, 7.18	7.13. 7.14. 7.18			
	21			FORO RADIO 23				
	22							
FERTILIZACIÓN	23	579	O 7.10 P. 7.24, 7.25, 7.27	7.24, 7.25, 7.27	7.24, 7.25, 7.27	No 24	No 24	No 94
CONTROL DE PLAGAS	24	580	O 9.3 P 9.7, 9.8, 9.12	9.7, 9.8, 9.12	9.7, 9.8, 9.12	7.14. 7.27	1- 7.14	
	25	581	O 9.5 P 9.15. 9.17	9.15, 9.17	9.15. 9.17	9.15, 9.17 1.2, 1.12 1.13, 1.23	2- 9.15 3- 9.17 4- 1.12 1.13	
CRÉDITOS	26	582	O 1.7 P 1.2, 1.12, 1.13	1.2, 1.12, 1.13	1.12, 1.2, 1.13	1.30 -	5- 1.23	
	[illegible]	[illegible]	O 1.8		1.25. 1.30			
				10 24				

Figure 3. A sample message strategy used in the BVE program materials production process.

sessions resulted in effective interaction and integration of technical and production staffs, a major goal in the development of the Project's educational programming system.

Scriptwriters and artists maintained a close association with field personnel, particularly during the latter stages, including several trips by production staff to the Oriente communities. This involvement with people in the experimental areas proved invaluable to the development of effective, relevant messages understandable to and usable by the target audience.

B. Production of Audio Materials

Audio materials produced by the Project for the Oriente (Table 2) included regularly scheduled radio programs and announcements, radio forums used by monitors in their weekly farmer meetings and later broadcast over the radio, and special programs. For those materials containing agricultural or health information, all scripts were checked for accuracy of technical content by an agronomist or the health advisor as appropriate prior to recording.

Although the basic format for agricultural audio programs was maintained throughout the experiment, feedback from the field and increasing experience of production staff permitted modification and improvement over time. Potential problems created by various changes in production staff assignments were minimized through the planning process described above, the teaming up of experienced and new writers during periods of transition, and minor reorganization of the production unit.

In keeping with the mandate to develop a low cost non-formal education program, BVE sought to establish a minimum-cost audio production capacity tailored to its specific needs. Compatibility with other components of the system and anticipated performance were among the factors considered in equipment selection. The objective was to utilize the least expensive equipment available that would be adequate for the work to be done.

Audio production facilities functioned well during the first year of operation, and the quality of programs produced was highly acceptable. Maintenance problems emerged during the second year of programming, however, and were serious during the final year. (It should be noted that the same facilities were used for both Oriente and Occidente program production, which approximately doubled the use of the facilities beginning in mid-1975).

A long term maintenance contract with the manufacturer's local representative did not, as had been expected, eliminate frequent breakdowns of tape recorders and copiers in daily use. A lack of locally available spare parts, excessive waiting periods for machine inspection and repair, and apparent lack of competent technicians all contributed to the problem. As a result, much of the repair and maintenance fell on BVE production staff, two of whom, fortunately, were qualified electronic technicians.

Although frustrating and of continuing concern, problems such as those cited above provided experience that may be helpful to other programs with similar production needs. The Basic Rural Education Project (see Chapter XI-D)

Table 2. Summary of audio materials produced for BVE programming in the Oriente, January, 1974 - December, 1976.

(All programs produced in Spanish)

Program	Description	Number produced 1/74-6/76	7/76-12/76	Total
Revista Agricola	Recorded radio program	606	134	740
Historias Verdaderas	Recorded radio program	315	134	449
Conversemos	Recorded radio program	250		250
Buenas Noticias	Recorded radio program	145		145
Hombre, Guitarra y Luciernaga	Recorded radio program	250		250
Musica	90 minute tapes	169		169
Radio forums	Cassette and radio program	114	22	136
Cunas Agricolas	Spot announcements	2,561	615	4,176
El Hogar que Sonamos	Recorded radio program	200	134	334
La Vida es Asi	Recorded radio program	105		105
La Magia de la Musica	Recorded radio program	38		38
Escuela del Aire	Recorded radio program	30		30
Programas Especiales	Recorded radio program	50		50

Table 3. Summary of graphic materials produced for BVE programming in the Oriente, January, 1974 - December, 1976.

Description	Number produced 1/74 - 6/76 orig.	copies	7/76 - 12/76 orig.	copies	Total orig.	copies
Radio Forum Materials:						
Flipcharts	381	1,205	111	1,724	492	2,929
Handouts	332	64,290	105	22,135	437	86,425
Stand-Alone Graphics:						
Posters	1	150	1	325	2	475
Handouts	1	2,200	1	2,200	2	4,400

is a case in point. The BVE production facility was studied while planning that Project's audio/visual production unit and provided guidelines for ordering and installing equipment for the new unit.

In spite of maintenance problems, the volume of audio materials produced in BVE was maintained at required levels; production quotas were met throughout the life of the program.

C. Production of Graphic Materials

Graphic materials were produced for use in the Oriente throughout the experiment (Table 3). Flipchart series accompanied all recorded radio forums used by monitors in their weekly meetings with farmers, and the same graphics were mimeographed in a smaller size to hand out to all who attended. Although the graphics were designed for use with a predominantly illiterate audience, simple words were included for the benefit of those who could read. As discussed in Chapter VII-B2, 1976 studies revealed that illiterates also preferred those with text.

Development and use of graphics progressed more slowly at the outset than was the case with audio materials due to startup pressures, a graphic arts staff inexperienced in creating materials for use with rural adults, and facilities limitations. Both the quality and volume of graphic materials produced in BVE increased significantly during the latter stages of the experiment, however.

All flipcharts and posters developed by staff artists were copied by hand until a photo silkscreen capability was installed in early 1976 which not only increased production capacity, but also provided greater flexibility. The silkscreen system permitted the artists to compose original art in a size most convenient for them, and eliminated all hand reproduction of posters and flipcharts. As a consequence, artists had more time to research their subjects and to develop preliminary sketches. Also, the demands of this type of printing obligated the artists to simplify their product and to present it in a clearer, less cluttered style than that previously employed in hand-produced materials.

Several other measures taken in late 1975 and early 1976 contributed to the significantly improved graphic arts output during the final year of Oriente programming. Results of the materials testing program (see Chapter VII-B) provided guidelines for the artists. A portfolio of model drawings prepared by the Project's graphic arts specialist permitted staff artists to copy human and animal poses to obtain more realistic figures. Also important were the stimulation, guidance, instruction and direct assistance provided by foreign graphic arts technicians available to the Project from October, 1975, through 1976.

As the result of all the above, the Project was able to produce "stand-alone" posters and handouts, several historietas, posters and flyers to respond to postearthquake needs, and various other materials for special purposes during the final year of programming -- in addition to continuing with flipcharts and handouts for the radio forums

CHAPTER VI

MESSAGE DELIVERY TO THE TARGET AUDIENCE

The media combinations described briefly in Chapter II were used to transmit educational programs to rural families in the Oriente experimental areas during the period March 25,1974 to December 31, 1976. The only major interruption (approximately one month in duration) occurred in February, 1976, as the result of a disastrous earthquake.

A. Treatment R (Radio)

In this treacment, educational information was disseminated to Oriente farmers primarily through Radio Quezada Educativa (TGME), a 1000-watt radio transmitter installed and operated by the Project on a frequency of 1320 kHz. The station was operated below capacity to exclude the control areas from its area of acceptable reception. Following a trial period to establish coverage, TGME broadcast at approximately 125 watts through 1974. Its output was boosted to 500 watts in early 1975 to obtain acceptable reception in Yupiltepeque, the new experimental area (Figure 1).

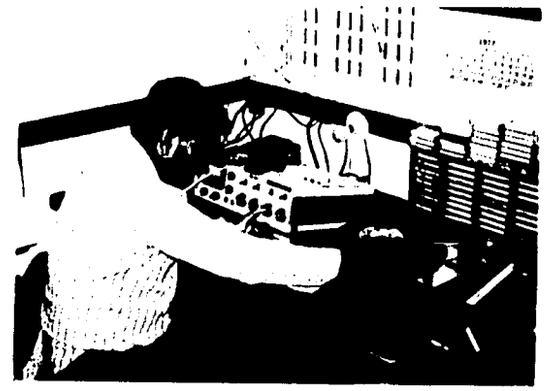
Radio Quezada Educativa was on the air Monday through Saturday on a split schedule (0500 to 0900 and 1600 to 2000 hours) during the entire experimental period. The station carried educational programs throughout the year except on holidays and during the Christmas season (mid-December to mid-January). Special programming appropriate to the season was prepared for those occasions. The regular weekday broadcasting schedule of TGME as of December, 1976, is shown in Table 4. Saturday transmission consisted of the weekly radio forum broadcast in morning and afternoon plus live programs of local interest. The station was off the air on Sundays.

To attract and maintain its listening audience, Radio Quezada Educativa provided a mix of pre-recorded and live programming of which about 20 percent was related to agriculture. Educational programs on agriculture, health, special music, and national culture were recorded in Project studios (see Chapter V-B). Of the various formats used, the radio novel or "soap opera" proved to be the most popular.

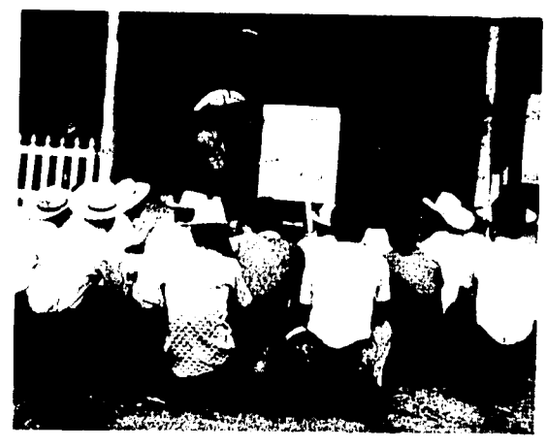
Live programs of community interest -- musical variety shows, news of local events, response to letters received, etc. -- helped to provide a link between the local people and the disembodied, often impersonal, voice of the radio. This link was without question a significant factor in maintaining TGME's large listening audience during its three years of operations (see Chapter VII-D).

B. Treatments RM and M (Radio-Monitor and Monitor Only)

Monitor functions were identical in treatments RM and M. The essential



Mass media contact with Oriente farmers was achieved by BVE through Radio Quezada Educativa, TGME, broadcasting at Ktlz.



The BVE monitors received weekly orientation from the agronomist (left) before presenting radio forums in their assigned communities.

The BVE field agronomist provided technical assistance to farmers, trained and reinforced the monitors, and identified field problems.

Plate 3. Media mixes under test in BVE included radio, monitor, radio plus monitor, and radio plus monitor plus agronomist.

Table 4. Daily (Monday through Friday) broadcasting schedule of Radio Quezada Educative, TGME, as of December, 1976.

Hora (Hour)	Programa (Program)
Manana (a.m.)	
0500 - 0600	Mananitas Radio Quezada (Rancheras)
0600 - 0630	Revista Agricola
0630 - 0645	Viaje Musical Latinoamericano
0645 - 0700	Para Servir a Usted
0700 - 0730	El Hogar que Sonamos
0730 - 0800	La Musica que Usted Pide
0800 - 0830	Mayalandia
0830 - 0900	Historias Verdaderas
0900	Cierre de la Estacion
Tarde (p.m.)	
1600 - 1700	Variedades de la Tarde (Musica)
1700 - 1715	Para Servir a Usted
1715 - 1730	Viaje Musical Latinoamericano
1730 - 1800	Revista Agricola
1800 - 1830	El Hogar que Sonamos
1830 - 1900	La Musica que Usted Pide
1900 - 1930	Mayalandia
1930 - 2000	Historias Verdaderas
2000	Cierre de la Estacion

difference between the two was the inclusion of radio in RM, but not in M.

The monitor was a local person employed by the Project to work directly with farmers in his own and three or four nearby communities as a motivator and two-way channel of information between the farmers and the Project. Although agriculturally oriented, the monitors were not technicians. Nevertheless, through continued training and experience, they were approaching a para-professional level by the time experimental programming was completed.

To meet the requirements of the experiment in the Oriente, two monitors were employed from early 1974 to the end of 1976 to serve the RM and RMA treatment areas in Quezada. Beginning in 1975, two additional monitors were employed to function in the RM and RMA treatment areas of Yupiltepeque and the M area of Ipala. (The monitor for the Yupiltepeque RM treatment also served as monitor for the Ipala M area.)

The area and number of farm families served by each monitor varied with community size and accessibility, and with natural geographic or social limits. The original Project design envisioned a farm family: monitor ratio of 300-400 to one. In practice, that proved to be overly ambitious. The numbers of communities and families in the area assigned to each monitor are presented in Table 5 below.

Equipment provided to each monitor included a portable tape recorder and microphone, extra batteries (rechargeable batteries were used in 1976), a waterproof container for carrying visual materials, and a lantern. Late each week, he received a pre-recorded cassette, flipcharts and handouts for use in presenting the radio forum message during the following week.

Table 5. Numbers of communities and rural families in each Oriente treatment area served by a BVE monitor.

Area	Treatment	Period of operation	No. of communities	Approx. No. of families
Quezada	RM	1974 - 76	5	150
Quezada	RMA	1974 - 76	5	240
Yupiltepeque	RM	1975 - 76	4	160
Yupiltepeque	RMA	1975 - 76	4	250
Ipala 1/	M	1975 - 76	1	110

1/ The Yupiltepeque RM monitor also functioned in Ipala M.

The monitor visited each of his assigned communities weekly. During the day, he visited with farmers about their agricultural activities, and invited them to attend the radio forum meeting in the late afternoon at a pre-arranged time and place. When farmers had assembled for the meeting, the monitor presented the agricultural message of the week through playing the cassette and displaying flipcharts at the appropriate times. Both during and after the presentation he encouraged discussion and questions. Those questions which he could not answer were noted, later referred to the field agronomist, and the answer given the following week. At the close of the meeting each participant was given a set of handouts to take with him.

Radio forum meetings were suspended each year during the months of December, January and February to provide time for monitor vacations, the annual monitor in-service training course, and various other preparatory activities. That period coincided with the holiday season and time of minimum agricultural activity.

A summary of radio forum meetings and attendance in the Oriente region during the experimental period is given in Table 6. Average attendance had stabilized by mid-1976 at about 10-11 participants, and continued at that level during the final months of programming as shown in Table 7. Although the number of farmers at a given meeting represented a relatively low percentage of total potential audience, intra-community diffusion appeared to be an important factor in spreading the information presented at the weekly meetings.

Strong emphasis was placed throughout the experiment on the monitor's feedback function described in Chapter VII-A. As the monitors had not been accustomed to preparing reports, and, in some cases, had had only rudimentary formal education, a combination of mechanisms was employed to obtain feedback from them. Simple weekly written reports provided basic information such as attendance at radio forums, questions received, weather conditions, and ongoing agricultural activities. Those reports were supplemented with commentaries recorded on cassettes by the monitor, recordings of discussions at meetings, and weekly oral reports to the field agronomist.

The BVE monitor training program is described in Chapter X-C. Particular mention should be made at this point of the weekly monitor orientation sessions conducted by the field agronomist. The first part of each such session was devoted to discussion of that week's activities and feedback from the people in the communities. Then, the monitors received instruction and practical assistance for the radio forums of the following week. Special attention was given to improving feedback and maintaining contacts in the communities.

The portable cassette recorders supplied to the monitors were inexpensive, and were expected at the outset to have a useful life of perhaps six to twelve months under the hard usage to which they would be subjected. In practice, their performance far exceeded original expectations. Nevertheless, maintenance became an increasingly serious problem during 1976. In spite of a monthly schedule of inspection and repair instituted in mid-1976, it was necessary to keep a stock of six or seven reserve machines with the field agronomist during the final months in order to avoid

Table 6. Summary of farmer participation in BVE radio forum meetings in the Oriente during the life of the experiment, March, 1974 - December, 1976.

Treatment sub-area	No. of communities	No. of meetings	Total adult participation	Average attendance per meeting
QRM 1/	5	426	6,108	14.3
QRMA 1/	5	508	4,796	9.4
YRM 2/	4	243	2,011	8.3
YRMA 2/	4	255	2,547	10.0
CM 2/	1	61	1,044	17.1
TOTAL		1,493	16,506	11.1

1/ Radio forums initiated March 25, 1974.
2/ Radio forums initiated March 1, 1975.

Table 7. Summary of farmer participation in BVE radio forum meetings in the Oriente during the period July 1 - November 30, 1976.

Treatment sub-area	No. of communities	No. of meetings	Total adult participation	Average attendance per meeting
QRM	5	74	1,004	13.6
QRMA	5	88	616	7.0
YRM	4	44	417	9.5
YRMA	4	50	578	11.6
CM	1	15	192	12.8
TOTAL		271	2,807	10.4

cancellations of radio forum meetings due to recorder malfunction. Thus, Project experience would indicate that two years is about the maximum service life of such recorders under these extreme conditions.

Oriente monitors have continued to function in their communities under the auspices of the Ministry of Education since the termination of the experiment in that region. That Ministry plans to expand the BVE program in the Oriente soon as described in Chapter XIV.

C. Treatment RMA (Radio-Monitor-Agronomist)

Communities in the RMA treatment area had opportunity to receive educational information through the radio or/and monitor as described above, plus technical assistance from an extension-type agronomist. Early in the program, a farm family:agronomist ratio of 900-1000 to one was projected. In practice, the ratio was about 600:1 (see Table 8) expressed on a fulltime equivalence basis. (Due to the relatively small size of the RMA treatment areas, the field agronomist worked only part-time in each. The remainder of his time was devoted to other Project activities.)

Table 8. Numbers of communities and rural families in each Oriente treatment area served by a BVE agronomist.

Area	Treatment	No. of communities	No. of families	Days in area per week	No. of families for full-time equivalence
Quezada	RMA	5	240	2	600
Yupiltepeque	RMA	4	250	2	625

Principal functions of the field agronomist included monitor reinforcement, crop demonstrations and related activities, problem identification, and feedback. In addition, he maintained close liaison and contact with public agricultural sector programs in the region.

With respect to monitors, the BVE agronomist served as an instructor in the intensive pre-service and in-service training courses, and conducted the weekly monitor orientation sessions (see preceding section). In the RMA communities, he attended radio forum meetings periodically to observe the monitor in action and to provide additional technical information. He involved the monitors in work associated with the crop demonstrations, and accompanied them on farm visits to observe the crops and identify potential problems. He worked with monitors throughout the year to improve the quality of their feedback information, as well as functioning as a feedback agent himself.

The field agronomist served as the Project's principal contact with

other agricultural programs in the region, provided local farm news to Radio Quezada Educativa, participated in development of the annual message calendar and, as time permitted, wrote texts for selected themes included in the book of technical contents (see Chapter IV).

D. Crop Demonstrations

Crop demonstrations were instituted in 1974 to achieve two broad objectives: 1) serve as an educational tool in the transmission of information to farmers; and 2) verify the effects of improved agricultural practices on production of corn, beans and sorghum in the region. Demonstrations were conducted in both the RMA and RM regions.

The Project field agronomist was responsible for planning and conducting demonstrations in the RMA areas in collaboration with the monitor, and for training the RM monitor (who worked alone) to conduct simple demonstrations in his own area. All demonstrations were established on fields of farmer cooperators who were supplied with the necessary seed, fertilizer, insecticide, etc. The farmer performed all field operations, with critical stages being supervised by the agronomist or monitor. The farmer kept the production from the plot in return for his cooperation.

The agronomist and/or monitor held periodic meetings with local farmers at the demonstration plot sites during the cropping season. On those occasions, the farmers received instruction in improved farming techniques included in the BVE agricultural information package, and participated in practical activities related thereto. Field reports indicate that over 1000 farmers participated in and received instruction from the Project's crop demonstrations during the 1974 - 1976 period. In 1976 alone, nearly 100 separate meetings were held at the demonstration sites.

Results from 1976 crop demonstrations were inconclusive due to the crippling effects of a severe drought from mid-July to the end of the year which resulted in near total loss of both first and second plantings of major crops. Ministry of Agriculture personnel in the region estimated losses at greater than 80 percent for corn and 85 percent for beans. As shown in Table 9 below, Project demonstration plots suffered equally heavy losses. Crop production in the Oriente was also depressed by drought in 1974, although to a lesser degree.

The 1975 agricultural season was considered a "normal" year. Comparisons of results from improved and traditional practices used in two 1975 corn and bean demonstration plots, summarized in Table 10, are in sharp contrast to those of 1976.

Demonstration plot designs and agricultural practices utilized were modified as the program progressed. The Project supplied all inputs to the farmer cooperators during the first year. In subsequent years, ICTA (the research arm of the Ministry of Agriculture) and private distributors donated seed and other inputs in return for receiving information concerning results. A summary of BVE crop demonstrations conducted in the Oriente during the course of the experiment is included as Table 11.

Table 9. Summary of yields obtained under severe drought conditions from 1976 BVE crop demonstrations in Oriente treatment areas.

Area	Sub-area	Crops	Calculated yield		
			Corn	Beans	Sorghum
			kg/ha	kg/ha	kg/ha
Quezada	RM	Corn, beans, sorghum	-	47	-
	RM	Beans, corn	-	85	
Quezada	RMA	Corn, beans	-	-	
	RMA	Corn, beans, sorghum	-	507	620
	RMA	Beans, corn, sorghum	-	418	571
Yupiltepeque	RM	Corn	380		
	RM	Corn	-		
Yupiltepeque	RMA	Beans, corn	-	-	
	RMA	Beans, corn	-	317	
	RMA	Corn	792		

Table 10. Comparisons of average yields and net returns from use of improved vs. traditional agricultural practices in two 1975 BVE crop demonstrations in Oriente treatment areas.

Crop	Average yield		Average net income 1/	
	Improved practices	Traditional practices	Improved practices	Traditional practices
	kg/ha	kg/ha	$/ha	$/ha
Corn	3,440	1,000	285	125
Beans	565	500		

1/ Based on 1975 market prices.

Table 11. Summary of BVE crop demonstrations established in the Oriente during the life of the experiment, 1974 - 1976.

Year	Area	Sub-area	Crops	No. of plots
1974	Quezada	RM	Corn, beans	2
			Beans	5
			Corn, beans, sorghum	2
	Quezada	RMA	Corn	3
			Beans	3
			Sorghum	3
			Corn, beans	3
			Sorghum, beans	2
1975	Quezada	RM	Corn	2
			Corn, sorghum	1
			Beans, sorghum	1
	Quezada	RMA	Corn	3
			Corn, beans	2
			Sorghum	1
			Beans, sorghum	1
			Corn, beans, sorghum	1
	Yupiltepeque	RM	Corn	1
	Yupiltepeque	RMA	Corn	2
			Corn, beans	2
			Sorghum	1
			Corn, beans, sorghum	1
1976	Quezada	RM	Beans, corn	1
			Corn, beans, sorghum	1
	Quezada	RMA	Corn, beans	1
			Corn, beans, sorghum	1
			Beans, corn, sorghum	1
	Yupiltepeque	RM	Corn	2
	Yupiltepeque	RMA	Corn, beans	2
		Total number of plots		52

CHAPTER VII

FORMATIVE EVALUATION

To remain effective, an educational program has to be flexible and responsive to the ever-changing needs of its target audience. Quality of program content and delivery must be measured in terms of relevance and acceptability as perceived by that audience. Therefore, development and full utilization of a viable information feedback system is indispensable to the program's continuing success. The various mechanisms (considered collectively as formative evaluation) which comprised the BVE feedback system are discussed below.

A. Monitor and Agronomist Feedback Reports

Principal responsibilities of the monitor, as discussed elsewhere in this report, focused primarily on continuing contact with farmers through weekly radio forums, periodic farm visits and daily involvement in community activities. Information generated by these contacts was reported back to the field agronomist and Project offices through the monitor's weekly feedback report. These reports included information on:

- radio forum attendance and statistics;
- questions and problems of local farmers;
- acceptance of educational programming in the area;
- crop and climatic conditions.

The field agronomist also submitted weekly reports to the Project which encompassed:

- weather and crop conditions, and specific problems observed in the area;
- crop demonstration progress and statistics;
- coordination activities with other agencies in the region;
- Ministry of Agriculture programs and activities;
- the weekly monitor orientation session;
- analysis of the radio forum for the week;
- plan for the next monitor orientation session; and
- current agricultural input and basic grain prices in local markets.

Both monitor and agronomist reports were received in Project offices at the beginning of each week. By mid-week they had been summarized and reproduced for distribution to Project staff to permit their immediate use in programming activities.

Feedback reports were instituted soon after field operations began in early 1974, and continued throughout the experiment. However, reporting formats underwent numerous modifications over the years in the interest of making them simple, concise, and to the point, yet probing enough to reflect the immediate agricultural conditions of the region.

Although BVE programs were mapped out on a yearly basis (see Chapter V-A), frequent changes in specific themes occurred during that year in response to feedback reports from the field. Some were in response to serious immediate needs of the farmers while others had longer range implications.

Examples of the former would include special programs produced by the Project in response to a severe infestation of bean-attacking beetles (Diabrotica) in mid-1975. Although normal programming would have covered this subject later in the year (when these beetles normally emerge), unusual climatic conditions caused premature attacks on the region's bean crops. As a result of monitor and agronomist feedback reports to this effect, the programming schedule was changed and special programs produced to provide farmers with specific information on how to combat those particular insects.

As an example of feedback having longer range implications, an early 1976 radio forum on soil conservation generated a great deal of interest. One of the flipcharts used with that forum illustrated home-made levels that could be used for laying out contour lines. Numerous requests were received from farmers for instruction the next year on how to construct and use such levels.

Not all feedback came from the village level. In early 1975, BVE radio programs on farm credit generated such widespread interest on the part of farmers to obtain credit for their crops, that the Ministry of Agriculture's local credit promotors were overloaded with loan requests. Feedback from the regional director of DIGESA through the Project agronomist indicated that no more requests could be processed that year and BVE programs were altered accordingly.

B. Program Materials Development and Testing

The development and field evaluation of new and innovative program materials was a major objective of the BVE Project during its three years of operation in the Oriente.

Although some steps were taken at the start of the Project to pre-test audio and visual materials in the field, early progress was disappointing. Pre-testing of programs with a small panel of farmers outside the experimental zone in early 1974 proved instructive but was soon discontinued due to personnel constraints. Production staff were consequently forced to

rely on post-delivery feedback in order to judge the quality of materials produced and to modify them accordingly. Such feedback took the form of monitor and agronomist reports, letters to the radio station, ongoing personal contacts with farmers, and conversations held with staff of local agencies and institutions.

During the first year of Project operations, testing activities focused mainly on the evaluation and improvement of audio materials. Scriptwriters, editors and actors had been newly trained in their tasks and still lacked necessary experience for producing consistently interesting, relevant programs. In addition, systems for agricultural content and audio message development were still in the fledgling stage, requiring constant feedback and modification.

In the case of graphic materials, posters and mimeographed handouts for use at radio forums were produced by two trained artists. Although they lacked experience in producing materials for a rural, often illiterate, audience and needed to improve the relevance of their visuals, the product was reasonably acceptable at that stage.

1. Consumer cassette pilot study

In mid-1974, an experimental study dealing with communication using cassette tape recorders was conducted in the Oriente. This study, termed the "Consumer Cassette Study," evaluated the effectiveness of pre-recorded messages delivered by a community volunteer to rural, subsistence families. Unlike the overall BVE Project, whose target audience consisted of head of household farmers, this study was aimed at the entire rural family, including women and children.

Messages were divided into four categories: agriculture, health and nutrition, household hints, and entertaining fables taken from area folklore. Two systems of delivery were evaluated: that in which the volunteer visited different families each night and played the programs himself; and that in which a second tape recorder was passed on from family to family independent of the volunteer. In each system, the taped program was retrieved by the volunteer and replaced with the next tape before starting its rounds again.

A total of four different tapes, one per week, were produced and delivered over a one month period. Four separate Oriente communities participated in the study, all of which were outside the BVE experimental areas, but still representative of the region.

Results of the study were encouraging with respect to rural communication through cassette recorders. In summary, the study showed that:

- although not all families in the community received the tape recorder in their homes, practically everyone heard the messages at least once and, in many cases, more than five times;

- each taped program was played on an average of 80-90 times during its one week stay in the community;

- credibility and relevance were high, stimulating action on the part of the listeners (one agricultural message promoted planting of sorghum as a second crop. Over 800 lbs. of sorghum seed were subsequently bought by farmers in these four communities even though it had not previously constituted a major crop for them);

- although portable battery-operated tape recorders were unfamiliar to the villagers, they soon learned to operate and care for the machines; and all recorders were returned to the Project in perfect working condition at the end of the study;

- the two systems of delivery were equally effective in bringing the message to the target audience.

2. Materials development and testing unit

The Project created a new unit in late 1975 to provide greater capability for development and field evaluation of new program materials, especially graphics. That unit, designed to develop and test materials for both the Oriente and Occidente regions, was staffed with newly-provided personnel: a senior A/V specialist (U.S. hire) to serve as unit director; a graphic arts specialist (U.S. hire) to train Project artists and develop new materials; a Guatemalan evaluation specialist; three Guatemalan interviewers; and, later, a Guatemalan artist.

Shortly after the materials testing unit got under way, the disastrous earthquake of February 4, 1976, caused a suspension of normal program operations for approximately one month. The unit gained invaluable experience during that period, however, through responding to the request of the National Emergency Committee to participate in relief activities. Specifically, they developed and produced a series of posters and handouts related to emergency activities. In addition, they conducted field evaluations of comprehension and acceptance of selected materials.

Upon resumption of regular project activities in March, 1976, the unit proceeded with scheduled development and evaluation of agriculturally oriented graphics. In summary, new materials developed and tested by the unit for both the Oriente and Occidente regions included:

- Four picture booklets with simple texts (historietas) covering the subjects of farm credit, fertilizers, insecticides and agricultural cooperatives. (One of these booklets was also produced in a photographic version.) Such booklets were designed for multiple uses. In addition to periodic use in radio forums and community meetings, they were also intended

for eventual mass distribution throughout the region, in essence forming the beginning of a simple farm reference library.

- Two poster/handout combinations on the subjects of corn fertilization and insect control. These posters and handouts were designed for mass distribution in target communities, delivering a simple message without additional materials.

- Eight special posters and handouts for use in radio forums. These materials were added to normal forum materials to test the acceptance and comprehension of various visual devices conventionally used in modern graphics.

- Seven posters and sixteen flyers for distribution in the disaster zone by the National Emergency Committee in the immediate post-earthquake period.

Field evaluation procedures varied with the type of material to be tested. In general terms, however, two basic approaches were used: continuing panels of farmers who met with evaluators bi-weekly for a period of several months to a year; and individual interviews of a stratified sample.

Among the significant findings of the materials development and testing unit, which terminated its activities in late 1976, were:

- Humorous representations (persons, insects, crops, situations), although usually understood by audiences in both regions, were not liked. As an example, the cartoon style of illustration was consistently rejected, while a more realistic and serious style of presentation of the same message was accepted and liked.

- Silhouettes were rejected even though the audience had little difficulty interpreting them correctly. The same drawing was accepted and liked when presented in a more conventional and realistic manner.

- With respect to the historietas, people kept them and wanted more on other subjects. Although a few of the comic book devices were not understood, the stories and ideas were generally interpreted correctly provided the drawings were appropriate and well done.

- Those who could not read asked someone else to read the historieta text to them. Indeed, they preferred some text to accompany the pictures.

(Results of the 1976 annual survey indicated that more than 80 percent of Oriente families have at least one literate person in the household, as contrasted to less than 40 percent literacy among adult farmers. These data, coupled with the reaction received to historietas with text, indicate that family literacy may be an important factor in determination of the most appropriate media mixes for use in non-formal education programs.)

- Abstract drawings and some visual devices were not understood. Arrows and circles were usually interpreted correctly; but simple terrain maps, flow diagrams and thought ballons gave the majority of the viewers trouble.

- Drawings had to be kept large and simple. Attempts to add depth or dimension by texture or shadows were often misinterpreted by the viewers.

- Viewers were able to interpret correctly "partial drawings," such as part of a shovel, a hand, a man showing only one of his arms, or a leaf segment.

- Accuracy and realism are important factors in the success of any drawing. Farmers were critical of details such as color (pink background with black ink was preferred), size, type and stage of development of the various crops. They often picked up errors or inconsistencies between visual and audio materials.

C. Letters Received

More than 70,000 letters were received by Radio Quezada Educativa during the experimental period between March, 1974 and December, 1976, as shown in Table 12.

Obviously, such letters did not constitute a representative sample of the target audience as less than half of the farmers within range of the station are literate. Nevertheless, the letters provided important feedback information which served three functions. It was used in programming; it provided specific questions related to agriculture to which the program could respond; and it helped define the approximate geographic distribution of the listening audience. As a result, it was possible to localize and personalize programming to the extent that radio in a very real sense became a part of the life of the community.

Table 12. Summary of letters received by Radio Quezada Educativa, TGME, during the life of the experiment, March, 1974 - December, 1976.

Period	No. of letters received
March 25, 1974 - June 15, 1974	2,697
July 1, 1974 - June 30, 1975	30,407
July 1, 1975 - June 30, 1976	21,867 1/
July 1, 1976 - December 31, 1976	15,101
Total	70,072

1/ Reflects sharp decrease in letters received by TGME during the immediate post earthquake period in February - March, 1976.

Feedback reports in early 1976 indicated that people in Yupiltepeque did not consider Radio Quezada Educativa to be "their" station. Most of the farmers lived too far from the station to deliver letters personally, and postage rates were too high for them to use the public post.

To alleviate that feeling of isolation, six Radio Quezada letter drops were installed at strategic places in the Yupiltepeque Valley. Arrangements were made to have letters picked up at least once a week and delivered immediately to the Radio for acknowledgement over the air. Reports from the area indicated that the venture was highly successful and encouraged many farmers to write letters with personal messages and agricultural questions.

D. Radio Listenership Surveys

Seven audience surveys were conducted during the three years of Oriente operations to determine levels of listenership to TGME and audience acceptance of BVE's radio programming.

Throughout the course of the Project, listenership in the experimental area of the Quezada Valley was maintained at more than 90 percent of those who listened to any radio. Relevant agricultural advice, good music, and frequent personal messages were consistently cited by listeners as the principal reasons for tuning into TGME.

The Yupiltepeque Valley was a program-free control area through 1974, the first year of field operations. Some listenership was reported from there during that period, however. Even after the output of TGME had been reduced to only 125 watts, and in spite of strong interference from neighboring radio stations, some Yupiltepeque farmers

continued to listen to TGME programs whenever reception allowed. The reported level of listenership (less than 25 percent) was not considered to compromise the experimental design significantly since most farmers were able to receive only sporadic broadcasts due to the interference factor.

When the Yupiltepeque Valley was changed from a control to a full experimental area in January, 1975, TGME increased its broadcasting power to 500 watts to cover the region with an acceptable signal. Interference continued to be a problem during some hours, particularly in the late afternoon and early evening. Even so, 1975 audience surveys indicated that listenership to TGME in Yupiltepeque soon increased to 46 percent.

Following a local promotion campaign consisting of handouts, posters and community meetings, listenership had risen dramatically by mid-1975 to over 91 percent. Although tapering off slightly after the novelty effect wore off, listenership in Yupiltepeque remained at relatively high levels (70-80 percent) through 1976.

Listenership in the Ipala area (established as a control area in early 1975) remained at less than 17 percent during the course of the experiment. Of those in Ipala who listened to TGME at all, most indicated that they did so only occasionally, as interference was quite strong throughout most of the day.

In short, Project studies indicate that better than acceptable audience levels were consistently maintained in the experimental areas while listenership in the control areas, though detectable, was low enough not to seriously jeopardize the experimental design.

A summary of four BVE audience surveys covering the period from April, 1975 (soon after full field operations were begun in the expanded Yupiltepeque experimental and Ipala control areas), to May, 1976, is presented in Figure 4.

E. Signal Penetration Tests

As indicated earlier, Radio Quezada Educativa, TGME, broadcast at 125 watts through 1974 and at 500 watts during the remainder of the experiment. Output was again increased, to 1000 watts, at the end of 1976 as the experiment was terminated and the station turned over completely to the Ministry of Education. Four measurements of the strength of the TGME signal were made during the course of the experiment to determine boundaries and quality of reception.

From the standpoint of the BVE experiment, these tests revealed the degree to which experimental design requirements for acceptable reception in experimental treatment areas and exclusion from control and "monitor only" areas were being met. In summary, results were as follows:

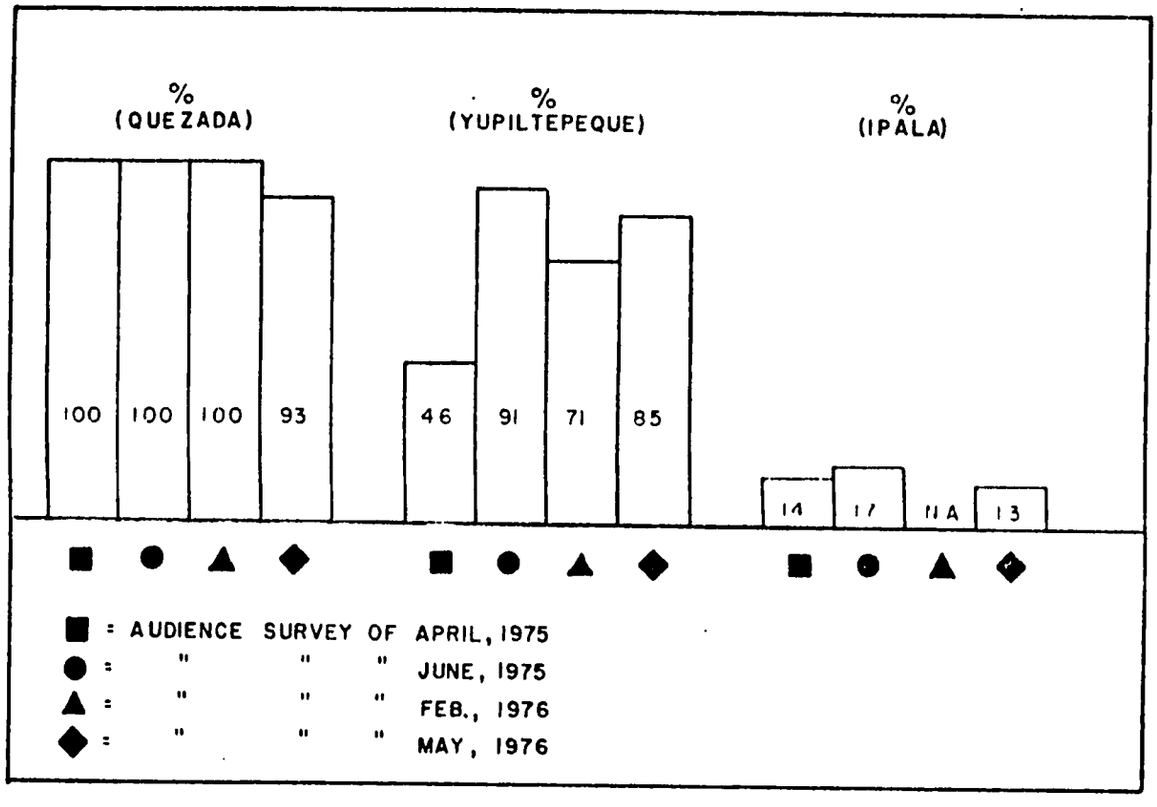


Figure 4. Level of listenership by area to Radio Quezada Educativa, TGME, as indicated by four audience surveys conducted during the period April, 1975 - May, 1976. (Expressed as percent of respondents with access to radio who listen to TGME.)

- At 125 watts (1974): reception was excellent in the Quezada experimental areas, but poor in Yupiltepeque (then the control area) due to both morning and afternoon interference. Thus, Project design requirements were essentially met.

- At 500 watts (1975 - 76): reception in Quezada continued to be excellent. Although interference was still a problem at certain hours in Yupiltepeque (now converted into an experimental area), reception was generally good. With minor programming adjustments and other measures, an adequate Yupiltepeque audience was developed and maintained. Reception in the Ipala region was weak with strong interference from neighboring commercial stations, and the Ipala listening audience was minimal. Thus, Project design requirements were still essentially satisfied.

The total area reached by the TGME signal was also determined to estimate the size and geographic extension of its potential audience. Reception always extended beyond the borders of areas designated by Project design to receive radio. Educational programming, althouugh directed primarily to the experimental areas, also had to take cognizance of the total listening audience. Further, such information was required for use in the cost and benefit/cost studies discussed in Chapter IX.

Approximately three southeastern Guatemala departments with a total rural population approaching 550,000 were within the reception radius of TGME when broadcasting at 500 watts, according to estimates derived from a 1976 test. The final signal penetration test, conducted in March, 1977, after power had been boosted to 1000 watts, indicated that total coverage remained essentially the same as at 500 watts due to natural barriers in the region. The area of strong reception was, however, nearly doubled. Areas of strong, moderate and weak reception at 500 watts, and of strong reception at 1000 watts, are shown in Figure 5.

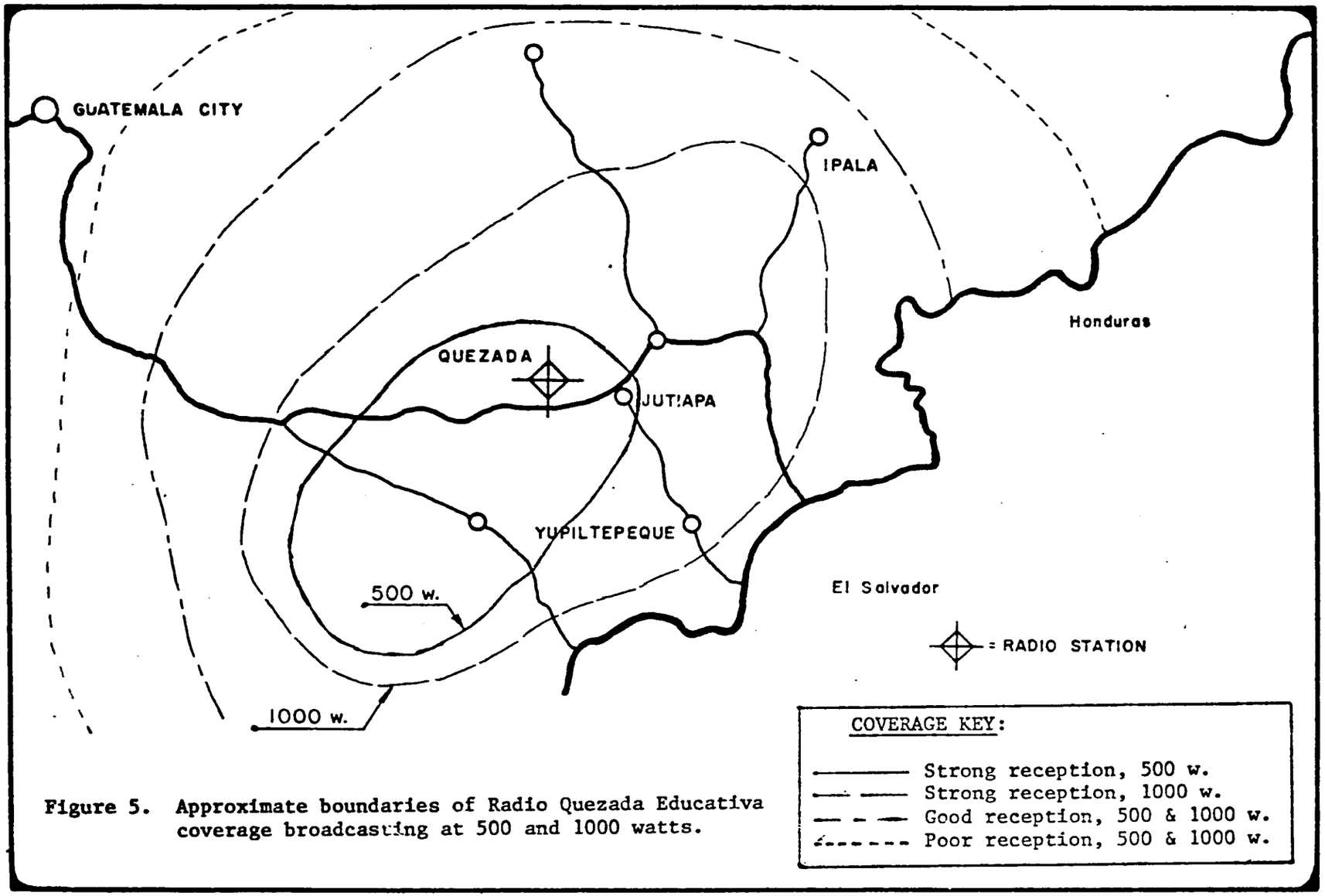


Figure 5. Approximate boundaries of Radio Quezada Educativa coverage broadcasting at 500 and 1000 watts.

CHAPTER VIII

SUMMATIVE EVALUATION - AN INTERACTIVE PROCESS

As stated in Chapter II, the BVE experiment was comprised of: 1) a non-formal education program, and 2) a rigorous independent evaluation of that program's impact. The educational program, described in Chapters III to VII, was operated by the Guatemalan Ministry of Education supported with technical assistance provided through the Contractor. Its results were evaluated, as reported in Chapters XV to XXI, by a University of South Florida team under terms of a subcontract with the Contractor.

Although independent in concept and functional responsibility, the two components of the Project were highly interdependent in terms of achieving their respective objectives. On the one hand, strict adherence to the experimental design in carrying out the educational program was a prerequisite for evaluation. On the other, information obtained from baseline studies was required for development of an educational program adapted to the needs and interests of the target population, and in-depth feedback obtained through the evaluation process permitted in-course corrections and improvements in that program.

The Project obviously did not function in a controlled laboratory setting. On the contrary, it was forced to deal continually with exogenous forces and developments which affected program operations, evaluation, or both. Any deviation from the original design caused problems in evaluation. Failure to be sensitive and respond appropriately to such factors could conceivably result in loss of the entire experiment. Consequently, compromises between what was called for in the design and what was practical from the standpoint of program operations were at times necessary. In other cases, it was possible to maintain the program as planned, but results were influenced in ways not originally anticipated.

Thus, a series of constraints were placed upon both program and evaluation--beginning with development of the basic design and continuing throughout the life of the experiment. To deal with them adequately required close coordination, collaboration and interaction between program and evaluation personnel. The interactive process through which the integrity of the BVE experiment was maintained while carrying out its educational program and evaluation can perhaps best be described through a brief account of how it functioned in practice.

In May, 1973, the first major task of the newly formed Project team was to develop a design that would: a) conform to the BVE Project Agreement; b) provide for an educational program adapted to the setting and directed toward the interests and needs of the target population; and c) permit collection of reliable data in the forms and quantities required for a rigorous evaluation of results. The technical assistance field team, the Project evaluation team, the Guatemalan Project director, and the USAID/Guatemala education officer collaborated in the development

of that design. A short term communications consultant was utilized for final determination of the media mixes to be included as experimental variables.

Initial Oriente experimental and control areas were selected in June and July. The above-cited group first established general selection criteria, and then used map studies and extensive reconnaissance trips in making a preliminary selection of general areas which appeared to meet those criteria. Project staff assisted in tabulation and summarization of censes and other data, and agronomists made more detailed reconnaissance-type studies of each community within those general areas. Final selection of communities to be included in each treatment area and in the control was made jointly by BVE program and evaluation leaders.

Development of the questionnaire to be used in the first baseline study was a major Project activity during July and August. Although a responsibility of the evaluation team, assistance from program staff was needed--particularly with respect to agricultural questions to be asked of the farmers. Program staff helped to identify the critical questions, and to develop ranges of responses to be expected.

August was a month of intensive preparation. The evaluation team prepared the list of farmers to be interviewed. The Guatemalan Project director helped to identify interviewer candidates, and several members of his staff served as interviewers for that first survey, thereby gaining knowledge and understanding of the people in the region that were invaluable to the program as it moved into the operational phase. The co-director of evaluation and the field supervisor, assisted by the Project agronomist, conducted an intensive interviewer training course. As part of that training, practice interviews were conducted in the field and the questionnaire was pretested. Then, the interviewers were consulted in making final questionnaire revisions before launching the actual survey.

The first phase of the Oriente baseline survey was conducted in September. Field interviewing, questionnaire checking, and preliminary data tabulation were carried out by Project field staff according to the plan developed by the evaluation team, and the data sent to the University of South Florida for processing and analysis. Prior to the survey, however, the Guatemalan Project director established contact with the local authorities in the region to obtain permission and support for the study.

The pattern of interaction, collaboration, and mutual reinforcement described above was followed throughout the experiment in collecting data according to the plan and under the general direction of the evaluation team.

Development of agricultural content for the educational program started in September. Ministry of Agriculture soil test summaries and limited data from field trials indicated that crops in the region should respond well to proper fertilizer use. Conversations with progressive farmers and experienced extension workers, and results of a Project study of Quezada Valley soils, corroborated that conclusion. It appeared that

Oriente farmers could benefit from the use of fertilizers on their crops, and that theme-actually a complex of practices--was tentatively selected as an important component of the BVE message.

Preliminary results of the baseline study, which included crop fertilization among its critical questions, were available by mid-October. They revealed that approximately half of the farmers interviewed had reported using fertilizers on their crops that year. Nevertheless, crop yields tended to be low. Although the number of farmers already using fertilizer indicated widespread knowledge about its value, existing crop production levels suggested that many of them were not gaining maximum benefit from their fertilizer investments. With this confirmation from baseline study results, the proper use of fertilizer was included as a major BVE theme and, consequently, became one of the important indicators used for measuring Project impact.

The fertilizer message had to be modified before the educational program even got underway, however (see Chapter XII-C). The combination of scarce supplies and high prices for fertilizers in early 1974 made it unlikely that farmers would, or should, increase their fertilizer consumption that year. Consequently, the 1974 educational program focused on "how to do the job better with or without fertilizer" rather than on "use fertilizer to increase your production and profits". At that point, it appeared that fertilizer use per se could not be used after all as a reliable indicator of BVE impact due to external factors completely beyond the control of the experiment.

Time sample surveys (discussed in Chapter XIX) asked questions about the most important practices (as judged by the Project agronomists) included in BVE programs of the previous month. The agronomists also provided a series of possible responses to each question ranging from the most desirable to unacceptable based upon information used in the educational message. Responses obtained in each such survey were processed rapidly. Results were made available to program staff immediately in computer printout form and, periodically, in evaluation reports. Project agronomists soon learned how to read the printouts and referred to them directly as they developed BVE message content and strategy.

The time samples provided a check on whether an educational message was getting across, and its immediate impact. In the case of the above-mentioned 1974 fertilizer situation, for example, Time Sample No. 3 indicated that fewer farmers were using fertilizers than in 1973. Many of those same farmers had received new information about crop fertilization, however--some of which they reported as coming from the BVE program. (The decrease in farmers in the Quezada Valley who used fertilizer in 1974 as compared to 1973 was further verified in the 1974 survey.)

Three additional examples, again related to the fertilizer message, may serve to illustrate the manner in which evaluation results contributed to the educational program throughout the experiment. Survey results indicated that initial projections of yield increases that could be expected from intermediate levels of fertilizer use were consistent with actual increases reported by farmers. Therefore, the program proceeded with greater confidence and more positive messages in that regard from 1975

onward. Both time sample and annual surveys confirmed field observations that the majority of farmers knew about fertilizer, but needed help in its best use; therefore, the fertilizer message became more comprehensive and in-depth as the program progressed. Contrary to original expectations, evaluation results indicated radio to be an effective medium for inducing changes in agricultural practices. Consequently, more of the total fertilizer message was delivered by radio and less by radio forum after the first year. Such a shift permitted the radio forums to include a broader spectrum of key practices during the course of a year's programming.

Among the new educational materials tested by program staff were several picture booklets with simple texts, one of which was on the subject of fertilization (see Chapter VII-B2). An unexpected result of that testing was the preference expressed by illiterates for some text to accompany the pictures. A question on family literacy was subsequently added to the annual survey questionnaire and it was found that a high percentage of Oriente rural families have at least one literate member in the household. Individual literacy vs. family literacy is one of the significant questions suggested in Chapter XXI for further study.

During the period of educational programming in the Oriente (April, 1974 - December, 1976), fertilization or the related topic of soil analysis was the subject of eighty-one 30-minute radio programs and 19 weekly radio forums. Spot announcements concerning one of these topics were broadcast over Radio Quezada Educativa on 83 different days, and fertilizers were included as one of the improved practices in the majority of 52 crop demonstrations conducted by BVE in the region. In addition, some aspects of the fertilizer message were included in programs on crop planning, agricultural inputs and other themes.

Evaluation results relating to fertilizer use were reported in at least a dozen short evaluation reports as well as in working papers and the annual interim reports. In spite of the unfavorable fertilizer price/supply situation (which improved somewhat after 1974), rainfall deficiencies and other problems they encountered, a significant number of farmers did change as a result of the BVE program, and fertilizer use (particularly at flowering) proved to be the most reliable predictor of yield and production.

Crop fertilization has been used in the foregoing account to illustrate the interaction and mutual reinforcement between the educational program and evaluation components of BVE in operation. That pattern, established during the Project design stage and continued through completion of the experiment, served to strengthen both components.

CHAPTER IX

COST EFFECTIVENESS AND BENEFIT/COST

Analyses of Project costs, cost effectiveness and benefit/cost relationships were undertaken as projected in the Implementation Plan. A general methodology was established in 1974, and a computer program was designed in 1975 to facilitate the work. Two preliminary cost papers have been produced to date, and a more comprehensive report is in progress as of this writing.

Economies of scale were not uniform for the various media utilized in the BVE experiment. To obtain comparable audiences for the purpose of comparing costs, it was necessary to construct an independent model for each of the BVE message delivery systems. The following characteristics were common to all models: 1) a region-wide program for a population of 500,000 people, six members per family, living on small farms (1.4 ha.) that are not functionally isolated (they have reasonable access to transportation facilities); 2) three-fourths of the population in the region listen to the radio an average of three hours daily. These are characteristics representative of the section of Guatemala in which the BVE Oriente experiment was conducted.

The methodology employed to compute costs followed that of Jamison and Klees. 1/ Cost categories were modified, however, to conform to the BVE Project design; and costs were calculated in terms of cost per farmer exposed to the system rather than on a per student per hour basis.

Actual Project costs were used as the basis for calculation of simulated economic costs associated with implementation and operation of the three message delivery system models included in the study. At this stage in the analysis, reported costs (summarized in Table 13) include all external assistance and evaluation costs incurred in the experiment as well as host government and farmer costs.

In addition to the overall analysis described above, partial analyses of production costs for specific programs were made periodically to determine the relative amounts of input required for the different components described in Chapters IV and V. Cost items utilized for that purpose included only manpower, materials, supplies, transportation, and miscellaneous costs specifically attributable to production of educational programs on agriculture.

As shown in Table 14, the estimated cost of producing an audio or audio/visual program decreased sharply from 1974 to 1976, due principally to lower costs for information development and script preparation. In the case of information development, the basic body of technical agricultural information (see Chapter IV) had been developed in 1973-74 and sub-

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1/ Jamison, Dean, and Steven Klees. 1973. The cost of instructional radio and television for developing countries. Academy for Educational Development.

Table 13. Simulated economic costs 1/ for regional application 2/ of three message delivery system models utilized in the BVE experiment in the Oriente region of Guatemala. 3/

Delivery System	Cumulative through first year of operation 4/		Second year of operation 5/	
	Total	per farmer	Total	per farmer
	$	$	$	$
Radio alone	710,212	11.36	271,353	4.34
Radio/monitor	1,766,846	28.27	1,327,903	21.25
Radio/monitor/agronomist	2,411,856	38.59	1,972,903	31.57

1/ Includes overhead charge to reflect Ministry opportunity costs, and spreads expenditures for capital items over the useful life of the item.

2/ Based on projection of 62,500 farmers to be exposed to the complete system in each instance. In practice, it would be reasonable to expect that a larger number of farmers would be exposed to the radio component of a delivery system than to either the monitor or agronomist component.

3/ Preliminary; subject to revision in the final analyses.

4/ Includes simulated economic costs for startup plus first year of operation.

5/ Includes simulated economic cost for second complete year of operation.

Table 14. Estimated direct costs 1/ of production per program for principal BVE educational programs in 1974 as compared to 1976.

	Revista Agricola 2/		Radio Foro 3/	
	1974	1976	1974	1976
	$	$	$	$
Information development	26.90	0.60	107.55	0.60
Strategy development	1.75	2.35	7.05	2.35
Script preparation	25.20	13.90	36.50	17.75
Audio production	12.20	11.50	9.05	16.95
Graphics production	-	-	68.10	82.85
Transportation		0.50		0.75
Miscellaneous		3.00		3.00
TOTAL	66.05	31.85	228.25	124.25

1/ Based on materials costs and Guatemalan wage scales (for all manpower inputs) for early 1974 and early 1976, respectively. Does not include equipment operation or depreciation, or administrative overhead. Estimates subject to modification in final Project cost analysis.

2/ A daily 30-minute radio program. Five were produced weekly.

3/ The weekly radio forum. One forum was produced each week; a complete set of the audio and graphic materials comprising the program was made available to each monitor. The audio portion of the forum was broadcast twice on Saturday over Radio Quezada Educativa.

stantially revised in 1975. By 1976, that material required only updating and minor revision. (In a continuing program, the cost for information development would be expected to fluctuate from year to year depending upon the amount and complexity of new technology available, and the rapidity of change among the farmers in the target population.)

Decreased costs for script preparation were largely a reflection of the more experienced staff who could produce a quality script in less time.

Both audio and graphic production costs increased somewhat for the radio forum due to expansion of the program in 1975. It should be noted, however, that these components increased only 87 and 22 percent, respectively, even though the number of monitors was doubled and the quality of graphic materials was upgraded significantly.

A preliminary study was completed in 1976 of potential income changes which could be expected by farmers if they should shift from traditional to improved agricultural practices. Results indicated that the use of practices included in BVE educational programming may sharply increase a small farmer's yield and profits, depending upon such exogenous factors as weather, input availability and topography. The potential magnitude of such increases under favorable conditions is illustrated in Table 15. Such data (in conjunction with practice adoption, yield and production data discussed in Part Three) will be used in benefit/cost analyses.

Table 15. Comparison of estimated production, gross income and net return per manzana (0.70 ha.) realized from traditional cropping systems with the potential from use of selected improved cropping systems in the Oriente region.

Cropping system	Production (cwt./mz.)			Gross income 1/	Production costs	Net return
	Corn	Beans	Sorghum			
				$	$	$
Traditional						
Corn/beans/sorghum 2/	15.0	8.0	20.0	334	198	136
Corn/beans 2/	15.0	8.0	-	234	147	87
Improved						
Corn/beans/sorghum 3/	40.0	15.0	30.0	660	310	350
Corn/beans 4/	50.0	16.0	-	588	261	327

1/ Calculated at the following prices ($/cwt.): corn - 6.00; beans - 18.00; sorghum - 6.00.

2/ Mixed cultivation (interplanted).

3/ Corn/beans interplanted followed by a second crop of early maturing sorghum.

4/ First crop, corn, followed by a second crop, beans.

CHAPTER X

HUMAN RESOURCES

Operating personnel for the BVE Project were, for the most part, provided by the Government of Guatemala, principally the Ministry of Education. Technical assistance personnel were provided by the Academy for Educational Development under the terms of its contract with the Agency for International Development.

A. Government of Guatemala

The Ministry of Education supplied more than fifty personnel to the Project during its period of full operation in both regions. Of these, the Project director, administrative staff and service personnel served the entire Project. Staffs of scriptwriters, artists, radio announcers and actors, sound technicians, radio station operating personnel, translators (Occidente only) and monitors were assigned to produce and deliver educational programs for each of the two regions -- Oriente and Occidente.

The Ministry of Agriculture, although not a signatory to the Agreement under which the Project functioned, supplied several key people to BVE. A Ministry of Agriculture agronomist served with the Project at headquarters for more than two years, during which time he assisted BVE in development of a technical program resources package in addition to performing his major functions of ongoing liaison between his Ministry and the Project. The Ministry of Agriculture also made two of their agronomists available to the Project to serve as BVE field agronomists, one each in Oriente and Occidente, during 1975 and 1976 (see Chapter VI for a description of field agronomist responsibilities).

Although likewise not a party to the BVE Project Agreement, the Ministry of Health assigned a physician to work with the Project on a parttime basis beginning in mid-1974. He served as a technical consultant in the development of health and nutrition radio programs.

B. Technical Assistance

Technical assistance was directed primarily toward Project planning, development and implementation of systems required for the program, development of message content, improvement of educational materials, and Project evaluation. Technicians sought to function throughout in a manner that would facilitate the development of an effective Guatemalan staff capable of continuing the program without outside assistance after termination of the BVE experiment.

1. Foreign technicians

Continuity in technical assistance to BVE was maintained through a small long term team headquartered in Guatemala, which was backstopped in Washington by the Academy for Educational Development Project Coordinator and his staff. That team, which arrived in Guatemala in May, 1973, had been preceded by a Project feasibility study team, and was supplemented during the course of the experiment by short and long term specialists in various fields. As indicated earlier (Chapter II), Project evaluation was carried out through a subcontract with the University of South Florida. All foreign technicians provided to the Project under the contract, together with their areas of responsibility, are listed in Appendix A.

2. Local hire

The BVE agricultural section was staffed primarily through the contract in accordance with the Project Agreement. Agronomic assistance during the preparatory period in late 1973 was obtained through a subcontract with a local consulting firm. From early 1974 onward, contract-provided agronomists were employed on a direct local hire basis. Agronomic assistance from the Ministry of Agriculture, described earlier in this chapter, decreased requirements which had to be met under the contract.

Agronomists provided under the contract included: agricultural section coordinator (1974-76), Oriente field agronomist (1974), and regional agronomist for the Oriente (1975-76). A regional agronomist for the Occidente was also provided when that part of the Project was implemented.

The materials development and testing unit is discussed in Chapter VII-B. With the exception of the artist and one interviewer, local hire staff contracted for that unit had had previous experience in the Project and were able to get that work underway with minimal orientation.

With the exception of Oriente time sample interviewers from mid-1975 through 1976, essentially all personnel utilized in Project evaluation activities were provided by the contract (see Part Three). More than forty interviewers were employed at varying times for the baseline, annual follow-up, and time sample surveys in the Oriente and Occidente. The same personnel were also utilized for checking questionnaires and related activities. Although there was some overlap in personnel utilized for the two regions, manpower requirements for the Oriente were roughly twice that of the Occidente due to the larger sample size in the former region.

Some operating positions, principally for operation of Radio Quezada Educativa, were funded by the contract during the first year of operation as had been projected in the Implementation Plan. Temporary unanticipated employment under the contract of a few technical personnel was also necessary due to a series of delays and budget constraints encountered by the Ministry of Education early in the Project (see Chapter XII-A).

The Contractor also maintained a small local hire support staff in Guatemala consisting of a bi-lingual secretary and (from late 1975 onward) an administrative assistant.

C. Staff Development

Development of a national staff posessing both the technical and organizational capabilities required for a multi-faceted program such as BVE received major attention from the Project's inception. The foreign advisory staff sought to contribute to staff development through working side by side with Guatemalan colleagues to develop needed systems, procedures and skills as well as by serving as formal trainers when the need arose. Results achieved were gratifying to both Guatemalan and technical assistance staff.

Training was tailored, insofar as possible, to the individual and to the job to be done. In general terms, the approach was to give relatively short, intensive, initial training with strong emphasis on the practical. It included orientation into the Project in its entirety as well as the individual's specific role. Initial training was followed with a continuing program of reinforcement and development -- in-service training and orientation, constructive supervision, and staff interaction.

After the Project was in operation, new staff members were customarily assigned to work temporarily with an experienced staff member in a "learn by doing" situation before receiving their permanent assignments. Solicitation by the Project Director of suggestions from his staff for improvement of educational programs and of Project operations, and a number of promotions within the Project, served as strong incentives for self-improvement.

Progress achieved in staff development is indicated by the fact that, with the exception of summative evaluation and special materials testing activities, national staff operated the Oriente phase of the Project virtually unassisted during 1976. Such progress obviously had positive implications with respect to the potential replicability in other countries of BVE-type non-formal education programs.

Clockwise (from upper left):

Interviewer training
Monitor training
Scriptwriter training
Artist training
Weekly orientation

Plate 4. Staff training and development were given high priority throughout the life of the BVE Project.

1. Project administration and management

The technical assistance team brought knowledge and experience from elsewhere which, when coupled with their Guatemalan counterparts' understanding of the country and its culture, contributed to the development of a technically sound Project well-adapted to Guatemala. Development and implementation of operational systems, organizational structure and administrative procedures were evolutionary processes. Leadership was provided by the Guatemalan Project Director and senior U.S. technicians, but all professional staff (both Guatemalan and foreign) were involved as well.

In recognition of the Project's development in this area, the Guatemalan Project Director and senior members of his staff were called upon repeatedly during the course of the experiment to serve on official committees and commissions dealing with non-formal education.

2. Audio/visual production

Nearly all personnel assigned to the Project at the outset by the Ministry of Education had been selected prior to determination of the specific skills which would be required. Exceptions included sound technicians, artists, a photographer, and some actors who had had previous training and experience in their technical fields. However, all were highly motivated, possessed basic skills such as the ability to write, and were eager to learn new skills and techniques.

Local resource people were utilized as trainers in an initial training course in late 1976 in which all production staff participated. That course was followed by "learn by doing" type training under the leadership of technical assistance staff. By the time educational programming was initiated in late March, 1974, the staff had progressed to the point where they could produce audio and graphic materials of a quality acceptable for that stage of the Project.

Staff turnover was relatively low, and the quality of audio materials improved rapidly. Subsequently, as new staff joined the Project, or assignments were changed, on-the-job training was provided. In the case of graphic materials production, early difficulties and later measures taken to improve the quality of output are discussed in Chapter V-C.

Production of audio materials for the Oriente had become essentially an all-Guatemalan operation by the second year. Graphic materials production, which progressed more slowly at the outset, continued to receive some assistance from foreign technicians through most of 1976.

In short, at the termination of the Oriente experiment in December, 1976, the audio/visual production staff was capable of producing, on time and in quantities needed, the various types of audio and graphic materials required for continuation of the program as described in Chapter XIV.

3. Monitors

The four men employed by BVE to serve as monitors in the Oriente region came to the Project with little or no formal schooling and hardly more than traditional knowledge of basic agriculture. However, they were known and respected in their communities, came from agricultural backgrounds, and were capable of learning new ideas and practices concerning the production of basic crops.

Initial (pre-service) training focused primarily on the role of the monitor in the community, his responsibilities to the Project, and simple skills concerning the use of portable tape recorders. It also included information, at a rather superficial level, on basic agricultural topics such as fertilizers and insecticides.

Weekly orientation sessions (see Chapter VI-B) and annual in-service training courses were used to instruct the monitors in greater depth with respect to improved agricultural technology. The weekly orientation sessions were particularly effective in this regard as the instruction was related specifically to agricultural activities of the moment. Communications and feedback skills were also stressed in both the weekly sessions and the annual courses.

During the life of the Project, Oriente monitors successfully conducted almost 1,500 radio forums, maintained continual contact with farmer in their areas, and accurately reported regional agricultural conditions and problems in their weekly reports. By the close of Project operations in that region, monitors were answering many of the farmers' questions and advising them on common agricultural practices.

4. Evaluation

As indicated earlier in this chapter, more than 40 short term interviewers and data tabulators for baseline and annual follow-up surveys were employed by the Contractor during the course of the experiment. All potential interviewers went through an intensive pre-service training course (described in Reference I-2 listed in Appendix D) which also served as a final personnel screening device. While in the field, and during the subsequent questionnaire checking and tabulation stages, they worked under the close supervision of the field supervisors. Insofar as possible, the best interviewers were re-employed for subsequent surveys.

Through the above process, a group of individuals was developed who were capable of conducting detailed interviews with rural people, checking the validity of responses, and transferring data from field questionnaires to forms needed for use with a computer. Several of the

interviewers were subsequently employed fulltime in the Project -- four interviewers used in the Oriente later became time sample and/or program materials testing interviewers. (Among the Occidente interviewers, four were also later employed on a longer term basis. One became the local administrative assistant for the Contractor, one was selected as a program materials field evaluator, and two were time sample interviewers.)

Upon termination of the experiment in the Oriente, two of the abovementioned time sample interviewers were retained by the Ministry of Education for qualitative activities related to the expansion of BVE in that region.

CHAPTER XI

INTERSECTORAL COORDINATION

The BVE program of education and information neither generated technical information nor provided services other than education. Close collaboration with technical agencies was therefore essential to development of the educational program. Also, effective coordination had to be maintained with public and private sector service and supply agencies in order that rural people might take fullest advantage of new knowledge and information received through that program. Consequently, strong efforts were made from the inception of the Project to develop and maintain close, effective working relationships and coordination with cooperating ministries and agencies.

A. Ministry of Agriculture

Although BVE was a communications experiment in the Ministry of Education, its educational program focused on agriculture and the subsistence level farmer. The Project relied primarily upon Agriculture for its message content and to provide farmers in the region with needed credit and other services. Superficially, the BVE educational program resembled in some respects the ongoing Ministry of Agriculture extension program. However, although it was involved at the feasibility study stage, the Ministry of Agriculture was not a signatory to the Project Agreements that created and supported BVE. As a result, the Ministry of Agriculture initially had reservations about the Project.

A joint BVE - Agriculture coordinating committee, established at the national level in mid-1973, proved to be a key element in alleviating such reservations and in achieving the needed coordination and collaboration. Although undergoing some changes in membership from time to time, that Committee continued to function effectively throughout the experiment. Similar, although somewhat less formal, linkages were developed in the field between BVE and regional Ministry of Agriculture staff.

The already established collaboration between BVE and the Ministry of Agriculture was semi-institutionalized in May, 1975, with the signing of a letter of understanding.

In addition to continuing interaction and informal collaboration with BVE at both national and regional levels, the Ministry of Agriculture:

- provided technical information on production and marketing of basic crops;

- reviewed, corrected and approved technical resource materials developed by the Project;

- assigned agronomists to the Project as discussed in Chapter X-A;

- strengthened, to the extent permitted by its limited resources, its services to farmers in the BVE experimental and control areas.

The Project, in return, regularly made announcements over the radio and through its monitors about Ministry of Agriculture activities, made selected educational materials available to Agriculture for use outside BVE experimental and control areas, and participated in various farmer and staff training courses organized by that Ministry. When drought-induced crop losses curtailed crop production in 1974, BVE participated in the Agriculture Ministry's program for promoting second crop plantings in the Oriente. Relevant feedback information was passed on to Agriculture, and results obtained from the BVE evaluation were shared with that Ministry as they became available.

B. Ministry of Health

In early 1974, BVE solicited the collaboration of the Ministry of Health in developing radio programs related to health and nutrition. That Ministry not only provided technical information, but also assigned a parttime technical advisor to the Project as reported in Chapter X-A. The inclusion of such programs improved the radio programming mix and helped to maintain a broader listening audience. Participation, through radio programs and announcements, of BVE in Ministry of Health vaccination campaigns was a notable example of effective coordination between the two institutions.

C. Ministry of Communications

The establishment and maintenance of a radio transmitter in Guatemala falls under the jurisdiction of the Ministry of Communications. Contact was made with this agency in mid-1973 in the form of applications for assignment of radio frequency and call letters. Both were received late in the same year but, due to duplication with a commercial station, had to be changed just prior to the inauguration of Radio Quezada in March, 1974. From that date onward, the Project radio station operated at 1320 kHz with the call letters of TGME.

D. Other Agencies and Programs

The Project had contact in varying degrees with numerous other governmental agencies and programs both within and outside the Ministry of Education. A few examples are cited below.

1. Directorate of Census and Statistics

The census constituted a major source of information used in the selection of areas and the sample of farmers to be interviewed in baseline and follow-up surveys. Although they had not yet been published, the Directorate of Census and Statistics made data from the April, 1973, census available to the Project for that purpose.

2. PEMEP

The Proyecto de Extension y Mejoramiento de la Educacion Primaria (PEMEP), an AID-supported experimental program in elementary education, collaborated closely with BVE from the outset. The transmitter and tower for BVE's Radio Quezada Educativa were installed on the grounds of the PEMEP pilot school near Quezada, and two PEMEP technicians (one Guatemalan and one U.S.) were made available to assist in BVE preparatory activities. Both technicians were later transferred to BVE. Elementary school teachers in the Quezada Valley participated in promotional activities prior to the inauguration of Radio Quezada Educativa, and continued to serve as channels of information concerning forthcoming events throughout the course of the experiment.

In 1974, BVE collaborated with PEMEP on an experimental program of primary school extension in the Quezada Valley. That program, "Escuela del Aire," was broadcast three days a week from June to October over Radio Quezada Educativa. A number of outlying schools were supplied with portable radios and lesson sheets on the two units -- growing tomatoes and collecting stories about the Quezada Valley -- included in the series of programs. All materials were written and produced by PEMEP staff while BVE provided recording, mounting and reproduction facilities as well as air time over TGME. A postprogram evaluation by PEMEP indicated that the "Escuela del Aire" had had significant impact. Of the PEMEP staff responsible for this program, one was later associated with BVE as the evaluator in the materials development and testing unit (see Chapter VII-B), and another later became head of the investigation/evaluation unit of the Basic Rural Education Project described below.

3. Postearthquake emergency programs

The BVE response to the National Emergency Committee request for production of posters and handouts during the immediate postearthquake period has already been cited (see Chapter VII-B). In addition, the Project produced several series of short radio announcements and programs in three languages (Quiche, Cakchiquel, and Spanish) for use over the national radio netowrk to which all stations in the country were linked. Also, BVE conducted several radio forum-type meetings for people in earthquake-affected areas to demonstrate that approach to local authorities. Health and sanitation were the major topics covered in the above activities. In agriculture, BVE agronomists conducted a study of potential effects of the earthquake on 1976 agricultural activity and production in selected areas of the Occidente. That study was planned in conjunction with the Ministry of Agriculture and the results were reported back to them.

In addition to activities such as those described above, senior Project staff served on various commissions, committees and work groups. For example, the Project Director and Program Leader served on a commission established by the Ministry of Education to plan effective audio/visual support to an emergency plan for formal education.

4. The Basic Rural Education Project (BRE)

The current Guatemalan Five Year Development Plan for education includes a major new non-formal education (NFE) component designed to coordinate all NFE activities of the various ministries and to establish a regional NFE "module" in the Highlands of Guatemala. The Plan envisions that coordination will be achieved through inter-ministerial bodies at the national level and that the module will utilize monitors, radio and other delivery systems in carrying non-formal education to the rural people of the Highlands region. This new program is receiving support from the Agency for International Development through the Basic Rural Education Project, and from UNESCO and UNICEF.

In addition to its continuing responsibility to the BVE Project, the Academy for Educational Development assumed the further responsibility (under a separate contract with the Agency for International Development) to provide technical services to the Basic Rural Education Project, effective November 24, 1975. As of December 1, 1975, the Contractor's Field Program Leader for the Basic Village Education Project became Field Program Leader for the two projects.

Project staff had frequent substantive contact and interaction with the National Economic Planning Council, international agencies, and (after its formation) the NFE Coordination Secretariat during the planning and early implementation stages of this new NFE program. In addition to technician inputs, BVE made educational materials available to the new program, and helped to train selected BRE personnel.

In short, BVE experience and results contributed significantly to the planning and implementation of the new non-formal education program.

CHAPTER XII

FACTORS AFFECTING PERFORMANCE

The BVE experiment in the Oriente adhered to the 1973 Project Implementation Plan in nearly all significant aspects. A number of in-course modifications were required, however, to adjust for unanticipated factors beyond the control of Project personnel. Those factors which were most critical in terms of affecting performance have been reported earlier in the Project's interim reports, and are summarized briefly below.

A. Administrative Factors

The GOG national budget for CY1974 (their fiscal year) had been submitted to the Guatemalan Congress before the BVE Project Agreement for 1974 operations was signed in October, 1973. Thus, the GOG contribution was not specifically identified in that budget. Instead, BVE was funded through transfers from the Adult Literacy Department of the Ministry of Education, and the Project continued to operate under that department until mid-1975.

Partially as a consequence of the above, GOG support remained at lower than anticipated levels, and the Guatemalan Project Director had difficulty both in filling all projected positions on time and in securing adequate funds for project operations. In order to adhere to the Project Implementation Plan during that period, the Contractor had to incur unanticipated expenditures for personnel, supplies, and other operating costs.

The situation improved somewhat in mid-1975 when BVE was assigned an independent budget within the Ministry of Education. The GOG contribution was increased from that time onward, although it was still not completely adequate due (at least in part) to inflation and staff salary increases.

The earthquake of February, 1976 (discussed below) resulted in serious budget problems in addition to disrupting the program in other ways. Although personnel and some other line items in the Ministry of Education's budget for the Project remained intact, most non-personnel service and supply categories were frozen as a result of the emergency. Subsequently, authorization to spend previously programmed funds was restored gradually, and the GOG was contributing increasingly to operating expenses by mid-1976. In the meantime, the Contractor again had to incur unanticipated expenditures--to permit collaboration with the National Emergency Committee during the immediate postearthquake period, and to avoid interruption of normal programming.

A reassessment of personnel and other resource requirements, made in late 1974 after the Project had been in operation in the Oriente for a number of months, revealed the need for minor reallocations of resources and a few additional positions on the part of both the GOG and the Contractor.

Those changes were reflected in a revised PROP and in subsequent Project Agreements.

Agreement was reached in mid-1976 with the BVE Project Director and BRE Coordination Secretary (see Chapter XI-D4) to combine the audio/visual production units of the two programs into a single unit for a period of one year. The objectives were: 1) to facilitate collaboration; 2) to provide an immediate production capacity for BRE during the period in which its own facilities were being installed; and 3) to strengthen the capability of BVE to develop and test new program materials that would have eventual applicability to both programs. Unfortunately, although preliminary commitments were met by the Contractor, that agreement could not be implemented. As a result, the materials development and testing described in Chapter VII-B was less extensive in scope than had been expected.

Both long and short term technical assistance commitments were met by the Contractor approximately as programmed with one notable exception. Difficulty was encountered in recruiting a qualified communications specialist with necessary fluency in Spanish to replace the audio/visual specialist who terminated in August, 1974. The position remained vacant for more than a year during which time planned upgrading and diversification of the graphic arts component of the BVE educational materials package were seriously delayed. That situation was alleviated in late 1975 and early 1976 with the arrival of senior graphic arts and A/V specialists (see Chapter VII-B).

B. Operational Factors

1. Delays in equipment deliveries

Educational programming in the Oriente was scheduled to begin in January, 1974, to coincide with farmers' planning and preparation for the crop planting season. It was impossible to meet that schedule, however, due to delays in delivery to Guatemala of the radio transmitter, tower, and A/V equipment. Radio Quezada Educativa was finally inaugurated in late March and educational programming according to the experimental design was initiated immediately thereafter.

This delay had three major adverse implications for the first year of operation. People in the Quezada area were very much aware of initial field preparations and had rising expectations with respect to the program. With the extended delay, they began to lose their initial enthusiasm. A similar situation developed with Project staff whose morale was seriously taxed as schedules and strategies were repeatedly adjusted. From the standpoint of the experiment, the most serious consequence was the loss of opportunity for impact on major decisions which should be made by farmers early in the year with respect to crop planning, credit use, preliminary land preparation, etc. In short, the 1974 BVE educational program did not represent a complete agricultural year.

2. Technical problems with radio transmitter

The output of Radio Quezada Educativa was scheduled for an increase to 500 watts at the end of 1974 (see Chapter VI-A). When station personnel adjusted the transmitter to increase the power, however, output dropped instead. After two months of checking the transmitter and tower installations, the problem was identified as a factory defect and was rectified by the Project's consulting engineer. Power was then boosted to 500 watts, and was maintained at that level without further difficulty through the remainder of the experiment.

As a result of the above, the radio promotion campaign in Yupiltepeque had to be delayed, and listenership in that area was relatively low in the early months of 1975 (see Chapter VII-D, Figure 4).

3. Earthquake

On February 4, 1976, Guatemala suffered a disastrous earthquake which seriously affected the entire nation during most of that year. Although the part of the Oriente region in which the Project operated was not affected by the otherwise widespread destruction, normal Project activities were essentially suspended during the month-long emergency period immediately following the disaster.

The direct BVE response to the national emergency included:

- immediate link-up of Radio Quezada Educativa with the national emergency broadcasting network and suspension of all scheduled Project radio programming during a 22-day period (this also applied to the BVE station in the Occidente);
- suspension of normal program production and diversion of production resources to the development of special programs and materials requested by the National Emergency Committee;
- purchase of food, tents and other relief materials for affected Project personnel;
- diversion of Project personnel and vehicles for emergency relief work with CARE and other institutions in affected disaster areas.

From the standpoint of the experiment, the disaster occurred at a time when agricultural activities were at a minimum. Through rescheduling and modification of programs to adjust to the changed situation, it was possible to include essentially all major educational messages planned for the year. The development and testing of new materials (Chapter VII-B2) received a serious setback, however. Also, strains on resources and staff resulting from the disaster prevented the scheduled incorporation of the consumer cas-

C. Agricultural/Climatic Factors

Although the major thrust of the BVE educational program was directed toward agriculture, the Project obviously could neither generate new agricultural technology nor control such things as weather and prices. Yet such factors had a direct bearing on both the content of that program and the interpretation of evaluation results.

1. Agricultural information base

Early indications were that the agricultural information base was reasonably adequate, and that there would be little difficulty in obtaining sufficient relevant message material to feed the educational program. Later investigation, after the arrival of the field team, revealed that the earlier assessment had been too optimistic. As a result, the input required to develop appropriate localized resource material was significantly greater then had been anticipated.

2. Weather conditions

In 1973, the baseline year, the Oriente region of Guatemala received about 350 mm. more than the normal 1300 mm. of rainfall, and crop yields were reported to be quite good. In contrast, rainfall for the three subsequent years--the years of BVE educational programming--were significantly below normal; and reported corn yields for the region were also down. In 1976, particularly, effects of low total rainfall were exacerbated by heavy rains early in the season followed by serious drought in the critical months of July through September.

In brief, corn yields regionwide (as reported by the Ministry of Agriculture) were above normal in 1973, somewhat depressed in 1975, and seriously depressed in 1974 and 1976. In terms of Project impact, this meant that the farmers' potential for increasing production was affected similarly.

3. Input availability and input/product price relationships

The first year of BVE educational programming in the Oriente, 1974, was also the year of the energy crisis. Fertilizer prices skyrocketed to more than three times those of the previous year, and fertilizers were in short supply. The supply situation improved in subsequent years. Although prices dropped slightly in 1975 and more in 1976, they remained high relative to 1973.

The Project had planned to stress the need for fertilizers in its 1974 educational program. The above-cited increase in input prices was not accompanied by a corresponding increase in agricultural product prices,

however, and an early assessment revealed that returns that year from fertilizer use would probably be little more than marginal for many farmers. Therefore, the strategy was shifted to emphasize how to get maximum returns from fertilizer if it was to be used, and viable, lower cost, alternatives for increasing production where the farmer was unable to use it. That strategy was re-examined at least annually, and modified in accordance with the projected situation for the year.

CHAPTER XIII

PROJECT OUTREACH

Operational experience gained in developing, implementing and sustaining the BVE educational program attracted wide attention both within and outside Guatemala from the outset. Representatives of numerous national and international organizations and institutions visited BVE. Project staff briefed visitors from numerous Latin America countries, West Germany and the United States. They participated in a number of conferences outside Guatemala, and responded to several requests for consulting assistance elsewhere in Central America. Such activities are still in progress.

A few examples may serve to illustrate the wide range of project contacts:

> "A preliminary report presented by the Guatemalan Project Director, the Evaluation Director and the U.S. Program Leader at an international conference on non-formal education (Michigan State University April 24-25, 1974) represented the first extensive public exposure of BVE. Reaction to the Project was strongly positive at that conference, and numerous questions were received." (BVE Project - First Interim Report - Part I).

> "Two Central American countries, Nicaragua and Honduras, had indicated intention to initiate programs incorporating BVE concepts and approaches. As a result of Honduran interest, a senior BVE staff member (the U.S. Administrative Officer) made two preliminary trips to that country to advise the AID Mission on possibilities for such a program. He then returned to Honduras in the last half of June, 1974, as leader of a team to work with AID and Honduran officials in development of a specific proposal." (BVE Project - First Interim Report - Part I).

> "As an example of expectations of other Guatemalan institutions, the director of the Direccion de Ensenanza y Capacitacion Agricolas of the Ministry of Agriculture has stated on various occasions that his institution is looking towards the results obtained from the BVE to provide guidance as it seeks to improve its own programs in the future." (The BVE Project - Third Interim Report, Field Operations, June, 1975 - June 1976).

> "In the immediate post earthquake period following the disastrous earthquake of February 4, 1976, the project was called upon to help plan effective audio/visual support to an emergency plan for formal education being planned by the

Ministry of Education." (The Basic Village Education Project - Third Interim Report, Field Operations, June, 1975 - June, 1976).

"Representatives from INCAP (Instituto de Nutricion de Centro America y Panama) requested assistance in developing a consumer cassette type of program on nutrition." (The Basic Village Education Project - Third Interim Report, Field Operations, June 1975 - June 1976).

"The Government of Honduras, with support from AID, was about to embark on an ambitious NFE program. At AID's request the BVE Program Leader presented a seminar on BVE to senior Ministry of Education staff in Tegucigalpa, and consulted with AID on plans for the program." (The Basic Village Education Project - Third Interim Report, Field Operations, June 1975 - June 1976).

"When asked to review some key Latin American AID-supported projects at the Mission Directors' Meeting in Hong Kong, the USAID/Nicaragua Mission Director selected the BVE Project as one of his examples." (The Basic Village Education Project - Third Interim Report, Field Operations, June 1975 - June 1976).

The BVE Agricultural Section Coordinator and the Co-Director of Evaluation participated in an international conference/workshop on "Non-Formal Education and the Rural Poor" organized by Michigan State University in late 1976. The BVE Project reports were well received and stimulated much productive discussion.

In late 1976, three representatives of a Honduran non-formal education program were with BVE in Guatemala for an intensive two-month training course in program production and evaluation conducted by Project personnel.

From its beginning, the Project was cognizant of the need for interaction and sharing information with other agencies and programs in non-formal education and related areas. Early efforts in this regard were directed principally toward design and operational aspects of BVE, while later outreach activities were weighted more heavily toward results obtained. Complete documentation of the Project was given major importance throughout the experiment.

Project field and evaluation staff participated jointly in several sessions organized specifically for the purpose of reviewing BVE progress and results. Included among such events were:

- A presentation by the Field Program Leader and Evaluation Director to AID/Washington staff in April, 1974, on Project design and implementation.

- A comprehensive review of the Project organized by AID in Washington in June, 1975.

- An intensive review of Project status and plans for its completion held in Guatemala with representatives of BVE, USAID/Guatemala and AID/Washington in early February, 1976. The possibility of a one-year extension of the Occidente phase of the experiment, and plans for upgrading the quality and use of graphic materials, were among the issues discussed.

- A two-day conference held in Guatemala in October, 1976, to present preliminary results from Project evaluation. More than 80 representatives of 18 national and international institutions and U.S. universities were in attendance. A report of the conference is included as Appendix B.

- A review of the Project in Washington in March, 1977, requested by AID/Washington (a report of the conference is attached as Appendix C). Project technical assistance and evaluation staff presented data and discussion materials relating to progress, preliminary findings and policy implications for future non-formal education projects. Materials produced by field staff for distribution to participants in the review are listed in Appendix D as references J-13, J-14, and J-15.

Nearly 70 reports (see Appendix D), not including the evaluation reports discussed in Part Three, have already been generated by the Project. Many are preliminary in nature and for very limited distribution. A series of more definitive reports are planned or under preparation in the interest of sharing both operational experience and results as broadly as possible.

A 16 mm color film was produced early in the Project which describes the BVE setting, objectives, design and early operations in southeastern Guatemala. A 35 mm slide set with accompanying narration was developed in 1974 to describe BVE concepts and operations, and has since been updated periodically. A segment on the BVE Project in the Highlands was included in a 16 mm color movie on world-wide use of communications technology filmed by NASA and AID, for transmission via satellite to countries from Asia to Latin America.

In addition to the types of operational and outreach materials described above, copies of all written, graphic and audio materials produced since the inception of the Project are on file in the BVE office. The Project also maintains a photographic library of color transparencies, black and white prints, and negatives of all artwork done for silkscreen reproduction.

CHAPTER XIV

THE FUTURE OF BVE

Although outside support for BVE operations in the Oriente terminated at the end of 1976, the program is being continued in that region by the Ministry of Education. As of this writing, its form remains essentially the same as during the experimental phase. The BVE program is in a state of transition, however, with plans currently being made to modify and expand it in the near future. The eventual relationship between the post experiment BVE and the new interministerial NFE program described briefly in Chapter XI-D is still not clear, although present indications are that BVE will continue to function within the Ministry of Education.

The Ministry of Education has recently been reorganized, and it is anticipated that BVE will form the core of a new division of research and production within the Ministry's non-formal education directorate. With respect to BVE, current proposals (still to be approved and funded) call for:

- broadening the scope of educational programs produced to include (in addition to agriculture and health) rural family education, Spanish language instruction and basic literacy;
- increasing the number of monitors in the field;
- additional sound and recording studios;
- a complete graphic arts printing shop with offset, silkscreen and photoengraving capabilities.

Thus, while BVE is still in its final year of experimentation in the Occidente, its transition to a permanent Ministry of Education institution with an even larger role in non-formal education is already in progress.

PART THREE

BVE PROJECT EVALUATION

CHAPTER XV

THE IMPACT OF BVE: A SUMMARY OF EVALUATION FINDINGS

This chapter presents an overview of findings based on the more detailed information provided in the chapters that follow. By making this material available early, with an interpretation and synthesis of some of the major results, the following chapters should be viewed as providing separate but related analyses of the project.

Chapter XVI presents a review of the methodology and discusses some of the problems encountered in field research. In Chapter XVII, change introduced by the project as measured by a total practice index is considered. Some of the major population characteristics are presented in relation to the level of practice and change in Chapter XVIII. The use of the time sampling procedure follows in Chapter XIX, with an analysis of sources of information presented in Chapter XX. The last section, Chapter XXI, deals with questions and issues that are projected for future analysis.

A. Evaluation Design

1. The experimental design was an effective means of measuring the results of the BVE project. Although difficult to use outside of the laboratory, it was possible to make the necessary adaptations so that precise measurements of the results of the BVE experimental project could be obtained.

2. Joint planning of the field program and the evaluation activities from the earliest stages of the project was a necessary factor in assuring accurate measurement of the results. This imposed some restrictions on both programming and evaluation but allowed for continuing coordination.

3. Continual evaluation was a characteristic of the BVE project. Starting with a baseline study, continuing with monthly time sample surveys and ending each year with an annual survey, an accurate measure of the BVE impact was obtained.

4. The evaluation data provided valuable information for program initiators and feedback to keep activities on target. In this way, evaluation activities can serve two purposes, global impact measurement and interim program feedback.

5. The BVE evaluation activities were guided by a rigorous experimental design but also took into account social and political realities. Although some experimental modifications were made in order to maintain contact with the farmers, the essential elements for accurate measurement of results remained intact.

6. All evaluation personnel had an understanding of the cultural setting in which the programming and measurement took place. All personnel, either through direct contact or prepared materials were introduced to the cultural setting of the areas being studied.

7. Foreign evaluation personnel did not enter experimental areas unless absolutely necessary to avoid contamination of the results. During reconnaissance surveys and questionnaire preparation, limited visits were made by outside personnel. Help was available daily, but there was no noticeable presence at any time.

8. The interviewers were selected from the same background as the people to be interviewed. It was possible to train project staff in evaluation techniques, but it would have been difficult to train for rapport with peasant farmers.

9. The questionnaires that were used were adjusted to the unique cultural setting as well as to the interviewers who used them. The final two revisions in the questionnaire (there were eleven in all) were made with the help of the interviewers after having field experience.

10. Frequent meetings were held with field program personnel and administrators to acquaint them with the evaluation activities and results. Evaluation is often threatening to both program personnel and administrators but harmony must be maintained if a project is to be completed.

B. Practice Change

A total practice index, consisting of 29 practices, provided a functional instrument for the measurement of change. Using the total practice index, the following results were observed:

1. Significant positive change over time and within treatment areas was observed in all treatment areas* and control.

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* R - Radio alone
RM - Radio plus monitor
M - Monitor alone
RMA - Radio plus monitor and agronomist

2. All treatment conditions except YRM (Yupiltepeque RM) showed a significantly greater rate of change over time than control.

3. Differential treatment effectiveness was found but not in the predicted directions. RMA produced a significantly greater rate of change than RM. However, RMA, IM (Impala M) and R did differ significantly from one another in rate of change.

4. Practice levels showed a consistent positive relationship with both yield and production, thus confirming the hypothesis that it is advantageous for farmers to adopt new practices.

5. Selected packages of practices were identified which were highly predictive of yield and production.

C. Population Characteristics

The following is a summary of the findings with respect to population characteristics and their relationship to level of practice and level of change:

1. When high practice farmers were compared with low practice farmers, the following differences emerged:

   a. High practice farmers travel more frequently to the municipio or departmental capital and to Guatemala City than low practice farmers;

   b. are more likely to belong to organized groups than low practice farmers;

   c. tend to make fewer decisions alone than low practice farmers;

   d. own more and rent less land than low practice farmers;

   e. are more likely to own horses and oxen than low practice farmers;

   f. sell more corn and beans than low practice farmers;

   g. perceive less risk in using improved crop seed than low practice farmers;

   h. report receiving more new information than low practice farmers, and typically receive this information from either the radio or the monitor;

i. regard the radio as an important source of information significantly more often than low practice farmers, and tend to consider visits from the agronomist as less important than low practice farmers. They also have their own radios more often than low practice farmers and listen more hours per day;

j. believe that an individual can advance in life as a farmer, and express higher hopes for the education of their children than low practice farmers;

k. are more likely to be literate than low practice farmers, and they have attended more years of school than low practice farmers.

2. When high change farmers were compared with low change farmers, the following differences emerged:

a. High change farmers tend to travel more than low change farmers to the municipio or departmental capital and to Guatemala City;

b. are more likely to belong to organized groups than low change farmers;

c. own more land than low change farmers;

d. are more likely to own horses and oxen than low change farmers;

e. sell more corn and beans than low change farmers;

f. rely less on friends and neighbors as a source of information than low change farmers;

g. are in more frequent contact with argricultural technicians than low change farmers;

h. have higher aspirations for their children's education than low change farmers;

i. listen to the radio more often, and are more likely to have their own radio than low change farmers; show a greater interest in educational programming;

j. tend to be slightly more literate than low change farmers.

D. Findings from Time Sample Surveys

1. The information that has been gathered in the BVE Project is reliable. There have been systematic cross-checks for consistency in farmers' responses to questions on both time samples and annual surveys.

2. The time sample surveys provided immediate feedback for programming. Questions were program-specific and early tabulation helped in providing feedback for program activities.

3. The surveys of representative sub-samples gave accurate information. The time sample surveys were conducted with a representative sub-sample of the total group that was interviewed in the annual surveys.

4. Knowledge and attitudes were measured as well as practices. The time sample surveys were designed to measure changes in knowledge and attitude realizing that practice changes would come more slowly.

5. Attitude levels are found to be higher than the level of actual use of recommended practice. The number of farmers who actually use the highest level of a practice is not as great as the number of farmers who feel that this level is the best. At the same time, in those areas where the knowledge and attitude levels are the highest, changes in knowledge and attitude take place before the actual practices change.

6. Farmers who report higher attitude levels also report higher use levels. The relationship between attitudes and level of practice is true for individual farmers as well as for areas as a whole.

E. Sources of Information

1. Radio is the most important source of new information reported by farmers. Farmers who indicated that they had heard information related to the recommended way of doing a practice were asked for their sources of information. Radio was the source most often listed.

2. Radio is the most important source of information at all stages of the adoption process. Radio was reported as the major source of information for knowledge, attitude and practice change.

3. The effect of radio diminishes over time although it remains the most important source. The analysis of the time sample survey revealed that the number of farmers indicating radio as the most

important source of information diminished considerably as programming time continued, but it still remained the major source.

4. Friends and neighbors are an important source of new information in all stages of the adoption process. "Friends and neighbors" were second only to radio as the source mentioned by the farmers with knowledge about recommended practices, those who feel that the recommended way is the best way, and by those who actually used the recommended practices.

5. The relative position of friends and neighbors increases over time and approaches that of radio. Whereas radio decreased over time, the number of responses reporting friends and neighbors as the source of new information increased, and almost reached the same level as that of radio.

6. The monitor is an important source of new information for change. The monitor was mentioned in those areas where he was working, but not as frequently as radio or friends and neighbors.

7. The relative position of the monitor increases over time and approaches the level of friends and neighbors for those farmers who are considered users of the recommended practice. The monitor is important to the farmers who are continual users of the practice at the level recommended by BVE.

8. The agronomist is rarely mentioned as a source of new information for change, although there is a slight increase over time in mentioning the agronomist. The Basic Village Education agronomist was seldom mentioned as being the source of new information. Non-BVE agronomists were mentioned more frequently. The agronomist had duties other than those of actually visiting the rural areas. In many ways he was more a part of the feedback and information development system than an element in the message delivery system.

9. Factors other than new information are involved in change. Analysis of the time sample surveys revealed that many farmers who had made changes in knowledge, attitudes, or practices in the direction of the recommended level did not attribute the change to new information. These changes may have been due, in part, to such things as a more favorable weather situation or an increased availability of agricultural supplies.

10. Friends and neighbors appear to be an important factor in diffusion and change when new information is available from a reliable

external source. In areas where the most change has taken place, there is information coming in from the outside by radio, the monitor, or an agronomist. There are strong indications that these new ideas are being exchanged through friends and neighbors.

F. Discussion of Findings

From the development of the design, to the method of measurement and analysis of the data, the following questions have guided the evaluation component of the Basic Village Education Project.

1. How effective is the radio ?

The radio is extremely effective in bringing about changes in knowledge, in attitudes, and behavior. Even in the short period of time that the Basic Village Education Project has been in operation there have been measurable changes in the agricultural practices that were a part of the message content that was broadcast. This is contrary to expectations based on the literature, in which changes in behavior occur more slowly than do changes in knowledge and attitude. This is particularly true in traditional societies such as the one reached by the BVE project. Little change was expected within the short time span of the experimental phase of the project.

It is interesting to note, however, that the impact of radio diminishes over time. In the early stages radio appears to be the important medium by which new information enters the community. Once the information is in the community, it is apparent that the local communication structure (e.g., friends and neighbors) becomes more important at the second stage of diffusion. It is not known at this time whether continual radio broadcasting over an extended period of time would have a lesser impact than some of the other media.

Radio, when combined with other sources (i.e., the monitor or monitor and agronomist) in the BVE experimental treatment areas, continues to be the most effective medium for the transmission of knowledge leading to changes in attitudes and practices. When combined with other media it also shows a decrease over time, and the more personal media such as the monitor or visits by the agronomist are reported as increasingly important source

2. Can radio communicate at a personal level ?

A question often asked with respect to radio communication and education is whether radio, being an impersonal and mass medium can reach people who are accustomed to communicating at a personal and more intimate level. BVE used an innovative system of personalizing the radio message programming, and by developing a feedback system entailing

letters and reports by the monitors and agronomists. This type of "open" system allowed the people themselves to develop a dialogue and assist in message development. These efforts at personalizing a traditionally nonpersonal medium are clearly among the most important factors in the success of BVE.

The data does not provide clear evidence that the radio station must be recognized as local input for the message to be taken seriously. While there is some evidence that there was more radio impact in the Quezada area (which immediately surrounds the radio) than in the Yupiltepeque area, it is not clear how much of this impact is attributable to the fact that the station has been operating for three years in Quezada and for only two years in Yupiltepeque. It appears that the impact of radio in Yupiltepeque will never be as high as it was in Quezada since there is evidence of a decline in the radio station's impact as a source of information in both Quezada and Yupiltepeque.

3. How effective is the monitor?

The monitor has also proven to have an important impact on change in the BVE experiment. In the area where the monitor served alone, there is evidence of rapid change in the second year of programming. The monitor as a source of new information for change never reaches the level of radio in those areas where radio also is part of the message. It is interesting to note, however, that whereas the radio declines after two years of programming the monitor has a steadily increasing impact.

When radio and monitor are combined, there appears to be no increase in total impact. In both of the areas served by radio/monitor (in Yupiltepeque and in Quezada) there is less change as reported by the practice scores than there is in those areas served by radio alone. It might be assumed that there is a factor involved by which the two tend to cancel each other out, but it is more likely that other factors in the radio plus monitor areas affect the outcome. One thing noted in the analysis on sources of information is that friends and neighbors do not play as important a role in the RM areas as they do in other areas. In the area served by monitor alone (which is in Ipala), one large village makes up the entire treatment area. Conversely, there are a number of villages that make up the treatment areas where the monitor serves in Quezada and Yupiltepeque. This may be taken to indicate that natural inhibiting factors of communication across village lines make it more difficult for friends and neighbors to communicate new information in Quezada and Yupi than in the monitor alone area in Ipala. Further investigation of community structure is necessary before any definitive conclusions can be drawn regarding the lesser effect of the combination of radio and monitor as compared to the monitor alone or radio alone conditions.

4. How effective is the agronomist?

The agronomist is not mentioned often as a source of new information for change. Nonetheless the overall impact (in terms of change) is greatest in those areas in which the agronomist is used in combination with radio and the monitor. Also, it is interesting to note that non-BVE agronomists are more frequently mentioned than the BVE agronomist in one area in Yupiltepeque, and one in Quezada. Judging from the total impact in the area served by the agronomist, it is evident that the agronomist does have some impact.

Examination of responses related to the question "Where do you receive good information for your agricultural operations?", however, reveals that the agronomist is often mentioned. When specifically asked for the source or the agency responsible for the agronomist, BVE is mentioned.

One reason why the agronomist is not specifically mentioned as often on the time sample surveys is that there are other alternative sources that may completely overshadow the agronomist. The nature of programming is such that the agronomist serves important functions other than just making personal farm visits in those areas where he serves as part of the treatment. In the non-agronomist experimental areas he is a resource person for the monitor rather than a service provider. The main function of the agronomist appears to be as a part of the feedback mechanism, and interpreter of the effect of the message as it reaches the local areas. Almost all questions from farmers to the monitor or to the agronomist are commented on and fed back into both the radio message and the message that the monitor will be using in the radio forums in the villages. Since many of the agronomist activities are more backup than direct contact, it was not totally unexpected that the agronomist is not mentioned more often as a principal source of information for change. The agronomist does not serve alone in any treatment areas such as the monitor. That is, he is not in a nonradio area, or in an area which is not served by a monitor.

5. What other factors seem to affect change?

When evaluating experimental projects such as BVE it must be realized that in the field there are many uncontrolled or uncontrollable factors. For example, as previously mentioned, messages reach experimental areas by many sources, many of them not included in the experimental design. The change observed in the control area is a clear

The only impact that could have been made by BVE in the control areas would have resulted from the baseline studies, annual surveys, and time sample surveys that were conducted there. Undoubtedly, the very questions asked served to induce some desire to know more answers, and in some cases the interviewers were pressed to give partial answers if they knew them.

Beyond the effect of the interviewing, it should be noted that other agronomists have been active in the control area, and the impact of these agronomists has been measured in the surveys. In addition, there might be some induced change by other agencies that are trying to produce changes in agricultural technology. Therefore, even in the control area changes have occured. Some of this change may be natural change that comes about from the diffusion of information from one farmer to another or between different communities. It must also be remembered that even though the BVE radio station was beyond reach of the control area, some people were able to hear some of the programs; and other radio stations have had some educational programs that do reach the area.

There are many other things that induce or deter change, and these must also be taken into account when measuring the differential impact of BVE in the treatment areas. Such things as the absence or presence of fertilizers (or other products) which are part of the recommendations are certainly important. In 1974, for example, the international oil crisis produced a shortage of fertilizers just when the farmers were becoming interested in using them. A further element that constantly affects each village in a slightly different fashion is the weather. The drought affected most areas in 1974 and in 1976, with some of the communities losing up to 85 percent of their crops. This affects the practices that are used as well as how important the message seems to the farmer at the time. If a farmer has lost his crop, then methods of adding fertilizer at the time of flowering and when the grain is forming understandably have little importance to him.

Beyond these considerations are the social and cultural factors that make it possible for new ideas, no matter what their source, to be either diffused or blocked in the natural communication channels. Even though the villages were carefully chosen to try to balance such factors, it is impossible and unrealistic to expect that all aspects would be controlled.

6. Was the experimental design a practical one for measuring results of a project such as BVE?

In responding to this question there are a number of things that need to be considered. First of all, there were several theoretical elements that influenced the evaluation design. It was basically an

experimental design in the classic sense, using both experimental and control groups and pre- and post-tests. In addition, there were a number of different treatment conditions that were to be checked one against another. Thus, the design had more than one element that was to be compared with control.

It was realized at the outset of BVE that it would be difficult to maintain a program-free control area for an extended period of time. People do not continue to accurately answer questions unless they feel there is something to be gained by such action. Because of this the first control area was expanded to become an experimental area with educational programs being offered to the people, and a new control area was initiated after the first year of programming. There were difficulties in finding completely matched areas, so matching had to be done as well as possible, trying to take into account the level at which the people were at the time of the initiation of the project.

An important element in any kind of field evaluation is the balance between the theoretical or "ideal" and that which is possible given the social and political constraints. With all of these things in mind, there were a number of important elements that contributed to a successful measuring of the results of the BVE Project.

First of all, the design was based on a strong theoretical base. It was the kind of design which has been used in experimental projects in the laboratory which was adjusted for field use in the way of a panel study.

Second, there was a complete understanding (by all of the evaluation personnel) of the setting in which the project was to be carried out. Reconnaissance surveys into the area, the analysis of baseline data, and the use of secondary information all led to a better understanding of the possiblities for gathering information and the meaning of the information once it was gathered.

Third, evaluation planning was carried out jointly with program planning from the inception of the project. Evaluation was not an after the fact element that was added once the program was underway or finished; it started from the very beginning.

The fourth element of success was the well trained field staff, both in supervision as well as in data gathering. Field personnel were chosen for their understanding of the social and cultural factors of the areas in which they would be working. In addition, the professional evaluation staff used every opportunity for training and

explaining the steps of the evaluation process, so that this could be added to the already important understanding of the cultural setting.

The fifth element was that of constant feedback. An important aspect of the design was the inclusion of a mechanism for an ongoing process of continuous inputs into the system. The mechanism included both the time sample surveys that were done throughout the year, as well as the baseline studies and the annual surveys. There were also some practical problems that confronted the evaluation component. Evaluation is often perceived as a process apart from the program being evaluated and may not be fully understood or accepted by program personnel. Because of this, attempts were made at every level to explain the reasons for each of the evaluation activities, and also to try to relay the results of the evaluation inquiry back to all levels. These results were often fed into the program and used as the basis for message content. The importance of continuous feedback cannot be overemphasized.

7. Are treatments differentially effective?

Differential treatment effectiveness was predicted but not found in the project. Differences were found that substantiated a powerful BVE effect on the experimental areas when compared to natural change in a control area, but change between different experimental areas was not consistently in favor of any one treatment.

During the development of the project, several unexpected or unanticipated changes occurred. Initially, the design was seen as composed of four discrete treatments and a control. The treatments consisted of different levels of interpersonal contact with the same message. The treatments were designed to be independent tests of different media approaches.

As the project evolved, the assumption of independence became increasingly questionable. The extra-experimental roles of the agronomist and monitor compounded the issue of independence of treatments. Through interpersonal contact and observation in the monitor and agronomist areas, feedback was provided to all treatment areas. It seems clear that the creation of such a powerful message development and feedback system resulted in the specific media delivery system being of less importance, and therefore not creating change independent of the message.

The agronomist and monitor are necessary for message development and feedback, as well as for interpersonal contact. Their interaction with the message system makes the radio a quasi-personal mode of communicating.

In summary, radio is a highly effective change medium when used in combination with a highly developed message preparation and feedback system. A message presentation system requires feedback from content specialists, i.e., agronomist, health specialist, in regular contact with the target population. Radio may be a personalized medium under appropiate conditions of content preparation.

8. What are the implications of the evaluation findings for development projects throughout the world?

First of all, it is evident that radio can be used successfully to get new information to marginal populations such as peasant farmers. Second, the use of a local person to lead study groups, either by itself or in combination with a radio message or a technician who serves as a backup, seems to be an effective way to make new information available. Third, a technician is an important backup person in a non-formal education program and should be seen as a link to the feedback system for keeping the message on target, helping in the development of meaningful content and in interpreting the message at the local level. Fourth, the local communication system between friends and neighbors should be considered as a fundamental part of any non-formal education project. Every effort should be made to increase the dialogue that takes place between local people, and the feedback from the local people back into the message development system. Fifth, the selection of appropriate technology for the message system, as it relates to the development of that message into clear and practical skills that can be communicated to the people, is of central importance. The message may be of more importance than the particular medium which is used to transmit it to the target audience. Finally, evaluation should not be left as an afterthought, but should be included in the early planning stages of non-formal education projects.

CHAPTER XVI

EVALUATION DESIGN

All human enterprises are subject to evaluation whether an informal reflection on the effectiveness of the enterprise or a detailed and predetermined method of measuring the results. This is true in development projects where goals have been outlined before the project is initiated and these goals are to be carried out within a specific time frame with predetermined resources. While the project is in process and at the end of the time period, an assessment is made to determine if the goals and objectives were reached. Such planned measurements provide the basis for future development plans to utilize resources most effectively in meeting new goals.

The Basic Village Education Program has been implemented as an experimental program with special requirements for the measurement of the results and evaluation of the outcome. In terms of the use of radio throughout the world and the use of different communication media to obtain desired ends in nonformal education, much has been written about projects that have been carried out and results that have been obtained. Close analysis of most of the published research reveals a paucity of exact measurement of results. Much of the reported measurement of results was completed after-the-fact and in an impressionistic manner. It is difficult to determine the impact of radio and other communication media in reaching desired educational goals. For this reason, the experimental nature of the Basic Village Education Project (BVE) was proposed.

It was also proposed as a regional project with broader implications for the results to be used in planning development projects in other countries facing problems similar to those in Guatemala. It was hoped that the measurement could be exact enough to reveal the many different aspects included in the process. This was planned from the beginning as a major goal of the Project.

Because of the need for evaluation of development projects, and the specific need to measure all possible components of this project, it was decided that the evaluation component would be a fundamental part from the beginning and planned with the educational programming. It was also agreed that the measurement of results would be as rigorous as possible, given the constraints of measurement in an experimental project in the field

A. Theoretical Basis of the Design

A modified form of standard experimental design was selected to best meet the evaluation requirements of the BVE Project. In this design change is measured by using an experimental group which receives the communication treatment to be measured and at the same time a control group is observed which does not receive the same treatment as the experimental group. The basic experimental design also includes

a pretest before the treatment is begun and a post-test after the treatment has been carried out. From the literature on different kinds of measurement designs the following is noted:

> Some types of study designs provide more convincing grounds for drawing causal inferences than do others; an experimental design provides both greater certainty and greater efficiency by making possible simultaneous gathering of various lines of evidence. In an experimental test the investigator selects the subjects to be assigned to different treatments and one treatment exposes the subjects to the presumed causal variable and the other treatment does not expose them to it. Thus, in a single study he can gather evidence of three kinds needed to provide a basis for inferring a causal relationship; a concommitant variation, time order, and a possible influence of other factors.[1/]

Not all experimental designs are applied in exactly the same manner and the model that was chosen for the BVE Project is most similar to the "method of difference" which is characterized by the use of an experimental and control group. The standard procedure for this method is as follows:

1. The group of subjects are selected by matching, by randomization, or by both and are presumed to be equal in all relevant respects except for the measurable chance differences.
2. One group is designated the control group and the other the experimental group. The experimental group is properly exposed to the independent variable or variables and the same is withheld from the control group.
3. If a change occurs in the dependent variable in the experimental group but such a change does not occur in the control group then the researcher attributes the change to the independent variable he manipulated in the experimental group.[2/]

Experimental design is often used in a laboratory setting where external factors are more easily controlled than in the field. When it is conducted outside the laboratory control is more difficult because there are factors other than those being tested that are not

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1/ Selltiz, Claire, et al. (eds.), Research Methods in Social Relations, (New York: Holt, Rinehart and Winston, 1959:88-90).

2/ Doby, John T., An Introduction to Social Research, (New York: Appleton-Century-Crofts, 1967:141).

controlled. This is particularly true when human behavior is the focus of the study. Many factors affect human behavior even in the laboratory, but when the participants are free agents with all of the influencing factors that come from the daily routine of interaction, special measurement considerations are necessary. This is the case in the BVE experimental project where the farmers that participated were not a captive audience.

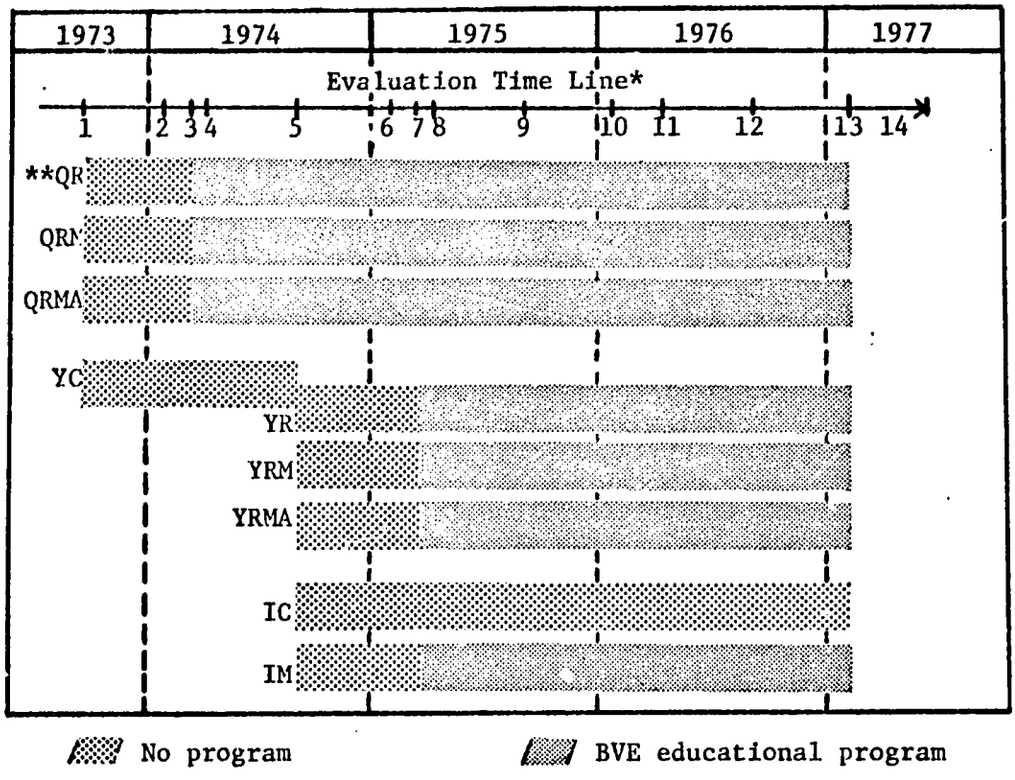
The particular application of experimental design that meets the requirements of a field setting and voluntary participation is called a panel study. In a panel study, a number of modifications have been made so that it is applicable with the same basic goals as experimental design but with modifications made for the human factor.

> A panel study is a technique for dealing with problems of development and change. The term itself simply means that a group (or panel) of the same individuals is interviewed at regular intervals over a specified period of time. It is the essence of the panel study that the researcher can individually identify those subjects chosen to be members (although their identity will remain anonymous in the final report). How many times the panel members are reinterviewed over how long a period of time and the size and selection of the panel are matters the researcher should determine in terms of the purposes of the study.
>
> There are several advantages to the panel method over those of the one-shot interview. First, it allows the researcher to determine changes both in the aggregate and individual behavior. He can then isolate and determine the relative importance of the factors that produced these changes. Second, the researcher does not have to depend so heavily on the respondent's memory of how he felt and acted in the past because by asking these questions directly at different times throughout the study he learns the person's current opinions and what he currently is doing, though of course he may still use questions that rely on the individual's memory in the course of his investigation. Finally, and really implicit in all of these, is the advantage the panel gives the researcher is some measure of before and after behavior.[3/]

These basic considerations, along with the specific needs of the experimental project, were taken into account in developing the design that was to be used to measure the results of the BVE Project.

3/ Wiseman, Jacqueline and Marcia Aron, Field Projects for Sociology Students, (Massachusetts: Schenkman Publishing Co., 1970:151-153).

Figure 6. Graphic representation of research design used in BVE experimental program, 1973-1977.



*Time Line Points — Activity

1. Baseline survey conducted in QR, QRM, QRMA and YC (initiated 8/73); also at point 5-(9/74) in expanded areas of Yupi and Ipala.

2. Crop production survey (1/74); also repeated at points 6-(1/75), 10-(1/76) and 13-(1/77).

3. Initiation of educational programming in Quezada (3/74) and in Yupi and Ipala at point 7-(3/75).

4. Initiation of time sample series (4/74); also at points 8-(4/75) and 11-(4/76).

5. Annual survey conducted in Quezada (9/74); also for all areas at point 9-(9/75) and point 12-(9/76).

13. Experimental phase of BVE program ends.

14. Final data analysis (1/77 to 7/77).

**Areas: Q=Quezada; Y=Yupi; I=Ipala
Treatments: R=Radio; M=Monitor; A=Agronomist; C=Control

B. Characteristics of the Design Used for Measurement of the Results of the BVE Experimental Program

The characteristics of the Basic Village Education design are described below:

1. It measures change over time

a. By treatment: The BVE program was prepared in such a way that one group of people received new information by way of radio (R), another group of equal size received radio accompanied by community meetings led by a local leader called a monitor (RM) who had some training, and a third group that had radio information with monitor accompaniment and the addition of a technical advisor (RMA) who visited the farms (see Figure 6). One additional aspect was also added at the suggestion of sponsoring agencies. A monitor control (M) group was added which received the same program treatment as the RM sub-area but did not have radio broadcasts.*

In order to measure the impact of these four information treatments over time using experimental design which included both experimental and control groups, the control group was selected with the same characteristics as the experimental group except that it received no treatment as part of the educational program. Both experimental and control groups were measured before the educational program was initiated and again at periodic intervals. In the BVE program, there were four experimental groups (M, R, RM, and RMA) and one control group. All were of approximately equal size (4 to 5 villages each with approximately 125 total people).

b. By geographical area: It would be expected that any change in geographical location would be accompanied by changes in many things that could effect the results of an educational program such as BVE. In order to see how geographical difference might affect the results, the original area chosen for programming and measurement in 1974 was expanded to include two additional areas in Oriente for programming and evaluation in 1975 and 1976. These areas are Yupiltepeque and Ipala.

In addition to the people and villages chosen for the expanded program, another group was chosen for a further experimental treatment. This fourth treatment (M) which was mentioned above is identical to the radio-monitor (RM) except it does not include radio. In one way it serves as a control to test radio against no radio, and in another way it gives a link between the experimental and control areas. This design can be observed in Figure 6 . The three geographical areas thus included in Oriente are Quezada, Yupiltepeque and Ipala.

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* For a complete description of the program treatments see Chapter VI.

c. Cultural areas:* One of the reasons that Guatemala was chosen as a setting for this experiment in non-formal education was because of the existence of more than one culture within the national boundaries. The contrasts between the Ladino culture of the Oriente and the Indian culture of the Occidente offer excellent possibilities for comparative measurement of change. A design was developed for Occidente which included the same features as that in Oriente.

d. By types of practices: Even within a given subject matter area such as agriculture, not all practices are equally subject to change. A comparative study of change by practice can give further assistance in the selection and timing of program content. The base-line and year-end surveys contain 260 items that can be analyzed separately and compared to each other. Further comparison of these items can be made through the analysis of the time sample surveys and yield surveys.

e. In knowledge and attitudes as well as practice: If the educational programs of Basic Village Education have been effective, there should be measureable changes in the agricultural practices of the people. At the same time it is clear that traditional people do not immediately change their behavior. The sequence of change that takes place starts at the point of new knowledge (K), continues with a favorable attitude (A), and finally may result in practice (P) change. In a short time span of a year (or even in the total evaluation time span allocated to the BVE program) there may be little change in practice. For this reason the measuring instruments (questionnaires) used have included provisions for measuring knowledge (K) and attitudes (A) as well as practices (P).

2. Relation of change to age, size of farm, education, travel, contact with change agents, group membership, risk orientation, off-farm work, diet, etc.

Not all people are equally willing or able to change. In any given population of people it is important to recognize those individuals and communities that are more receptive to change so that limited resources can be used where more impact is possible. The survey data was analyzed to give this kind of information.

3. Monthly time sample measurement of change

The monthly time sample is an additional feature of the design for formal evaluation in the BVE program. This gives immediate feedback on the results of the prior months educational programming. It also serves to explain and confirm the results of the surveys done at the end of the year, particularly in the measurement of knowledge and attitudes. The time sample feature can be observed in Figure 6.

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* This aspect of the design will be considered in a later report.

4. Modification of the design

In 1974 the control group was shifted from Yupiltepeque to Ipala. There were three reasons for the shift; radio coverage, requests of the people, and a desire to expand the experimental areas. The programs from Radio Quezada were being received by some of the people in the control area of Yupiltepeque even at the lowest power output possible. The people of Yupiltepeque requested that the full program be made available to them. At the same time it was felt desirable to expand the experimental areas so that the effects could be studied in different geographical areas. In order to do this, Ipala was chosen as a new control area because, while it met the general characteristics of Quezada and Yupi, a natural mountain barrier prevented the radio signals from entering. In addition to the radio-free control area, a similar experimental area was established which was served by a monitor only.

5. Overall evaluation design

The overall design for the measurement of change as a result of the experimental BVE program can best be observed in Figure 6. It includes provisions to measure change comparatively over time: 1) by experimental treatments; 2) by geographical areas; 3) by month for immediate feedback; 4) across-cultures; 5) by levels of knowledge, attitude and practice; 6) by practice; and 7) by socio-economic characteristics of the people and villages.

C. Choosing the Areas and the People for Interviewing

The basic design called for measuring the results of the BVE experimental program by interviewing the people who had been exposed to the educational programming to see what changes had taken place in their agricultural practices and other aspects of life. At the same time, a group of people who had not participated in the program were interviewed to see what natural changes might have taken place so that comparison could be made. The selection of the farmers for interviewing was one of the major tasks in the early stages of the project. This is generally referred to as "sample selection" and was done in the manner outlined below.

Not all subsistence farmers of Guatemala could be interviewed. Even if they could be interviewed, it would be impossible to have the same kind of training for enough interviewers in the same framework of time so that the results would be comparable. Using the scientific information available on sampling, it is possible to select a representative group that can offer results almost as accurate as those obtained by interviewing all of the subsistence farmers of the nation. To be able to generalize the findings to subsistence farmers of Guatemala that are found in many different geographical and climatic areas, the basic design and the sampling that accompanied it included representation of different geographical areas. This report concerns the measurement of the results in Oriente but at the same time

preparation has been made for measurement of the results in Occidente which differs both geographically and culturally. The same sampling procedures described here were also used in that aspect of the project, although that is not a subject of this report.

The sampling technique that was appropriate for the BVE experimental program was a multi-stage sampling system. The first stage of the sampling procedure was to select those farming areas that were representative of subsistence farmers. Subsistence farmers were considered as decision makers on a small piece of land and not laborers on a large plantation of which there are also many in Guatemala. This stage of the sampling is best described as "judgmental" in that the selection was made through discussion with people who were well acquainted with the different farming areas of Guatemala and included reconnaissance surveys in the field by both program and evaluation staff. The Quezada and Yupiltepeque (Yupi) areas of the Oriente were selected as being representative of the subsistence economy, taking into consideration such factors as soci-economic characteristics, farm size, topography, rainfall, population distribution, and prevailing agricultural practices and production.

After the basic areas were selected, the next stage in sampling was to look at the data on Quezada and Yupi already available from the population census and decide which villages or which sub-areas would be most appropriate. The villages were selected and grouped by natural communication patterns.

In the next stage of sampling, the names of all the farmers from the census information (later verified by local individuals) were listed in order and a random sample was selected which would offer at least 100 individuals per treatment area for interviewing throughout the life of the project. To be specific, the names were taken from the census lists and relisted numerically, then randomly selected using a list of random numbers. The selection was stratified by village and weighted so that the smaller villages would have a large enough sample to be representative. In some cases it meant choosing all of the individuals in the village. There were 506 farmers in the original sample and 472 of these were still included in the sample at the end of the year. They were distributed as follows:

1. Quezada (Oriente) 15 villages - 370 farmers
2. Yupi (Oriente) 5 villages - 136 farmers

In addition to the above, the following areas and individuals were added at the time of the November survey the following year (1974) to complete the design as portrayed in Figure 6.

3. Yupi (Oriente) 8 villages - 237 farmers
4. Ipala (Oriente) 6 villages - 240 farmers

The criteria used by the evaluation staff and the field staff in the selection of areas was as follows:

Criteria for Selection of Villages

1. Small farms 0.5 to 12 manzanas
2. Similar agricultural practices
3. Illiterate 50% plus
4. Communicate more with each other than with people in another village
5. Possibility of some change and improvement
6. No extraordinary social or political conditions

Criteria for Selection of Sub-Areas

1. Villages form a general cluster that tends to fit together
2. All village clusters have the necessary characteristics listed above so that the variations (i.e. size, etc.) in individual village balance out when combined.

The selection process also included: obtaining census data on the areas; obtaining maps; determining the soil types, the climate and the cropping practices; and determining the political and social characteristics of the area. As final selection was approached, contact was made with all of the political leaders and those representing the agricultural and educational agencies so that full understanding of the project would be possible.

D. Preparation of the Questionnaires

1. Annual survey

The principal instrument used for evaluation data gathering was the annual survey questionnaire. This was used for baseline measurement before educational programming began in the treatment areas and again for follow-up measurement at the end of each agricultural year. It was also used in the control area where no educational programming was offered.

The original questionnaire that was used for the baseline survey conducted in the Quezada area in 1973 represented a number of months of effort by both evaluation and field staff. A number of factors were included in its preparation:

1. The goals of the BVE Project;
2. The experience in measuring the results of similar development projects;
3. The need for repeated contact with the farmer-respondents over a period of years;
4. The characteristics of the farmers (the level of literacy, their values and customs, etc.);
5. The level of experience of the interviewers; and
6. The information needs of those preparing the educational program.

The original list of questions contained well over 1,000 items. The questionnaire used in the baseline survey in 1973 contained only those items that were absolutely essential, a total of 130 questions. The general areas of information were divided into sections including: personal information (age, family size, education, aspirations, family diet, health, living facilities, etc.); information sources; travel and mobility; community involvement; and all aspects of the agricultural enterprise. An additional survey was conducted one month later that contained 69 questions related only to agriculture. Both of these questionnaires were pretested in the field after many revisions. The final revision was made with the help of the interviewers after their training and the pretest experience. The 1973 baseline questionnaires were used as a starting point for the development of the 1974 questionnaire.

The 1973 Baseline Survey was conducted in two parts because of the need for early information for program planning and later to gather information on current agricultural practices. The total amount of information was more than could easily have been obtained in one interview without abusing the relationship with the farmer. There were many revisions that seemed necessary in 1974 but it was also important that the questions remain as near alike as possible for comparability. The interviewers who had used the 1973 questionnaires evaluated each question and their comments were included in the revisions. All of the tabulation summaries were examined to see if the old questions had been useful, accurate, and complete. The flow of questions was checked to see if the sequence was logical and non-threatening. Each of the questions was checked for adaptability to all of the geographical areas. The final refinements were completed by the evaluation field supervisor with the help of the interviewers.

The final product was a combination of the two questionnaires used in 1973. The total number of questions was increased slightly to 260 and all of the wording of the questions and related responses had been refined. The average interview time required was less than 30 minutes. The first year's experience served well as a testing period for both the evaluation instruments and the educational programming capabilities so future revisions were minimal. As a consequence, there were no fundamental changes in the questionnaires used in the annual surveys in 1974, 1975 and 1976. The trial period for both evaluation and program activities during the first year of operation in the Quezada area gave a solid base for consistent and comparable measurement of results from the time of the 1974 Annual Survey to the time of project termination in 1977.

2. <u>Time sample surveys</u>

Ideally, questions designed to measure the knowledge and attitude components of each agricultural practice (as well as practices related to health, education, diet, etc.) would have been included on the annual surveys. However, the addition of such questions to the 260 item questionnaire would have extended the already lengthy interview.

For this reason, time sample interviews designed to measure knowledge, attitude, and use of a few key agricultural practices were conducted at a different time over a period of months. Individual interviews were conducted with a small sub-sample of the farmers (200 in each time sample survey) in the more relaxed atmosphere of their homes.

The time sample surveys are designed to trace the adoption of each recommended practice by first measuring changes in knowledge about the practice. After measuring the knowledge level, the farmers are then asked what they think is the best way in order to see if they have a favorable attitude toward the practice. It is assumed that if the farmers know about the practice, and have favorable attitudes toward the practice they will be more likely to adopt it in the future.

There were six time sample surveys conducted during 1976, starting in April and ending in September. Each of the first five surveys measured three practices and the final survey contained questions concerning two practices.

Each of the 17 practices was explored in the following way:

1. Practice: What did you do last year?
2. Practice: What did you do this year?
3. Knowledge: Have you heard any ideas recently about this practice?
4. Knowledge: When did you hear this recent idea?
5. Knowledge: Had you heard about this idea before?
6. Knowledge: Where did you hear this recent idea?
7. Attitude: How does this idea seem to you?
8. Attitude: What do you think is the best way to do it?
9. Attitude: How long have you thought that this was the best way?

3. Crop production survey

A crop production survey was also included as part of the data gathering procedure. Not all of the crops were completely harvested at the time of the annual survey conducted in October and November. A sample of the farmers were reinterviewed six weeks later to gather actual crop data rather than the expected crop information that was given previously. The only questions asked on these surveys were 1) the amount of land planted to each crop, and 2) how much each crop produced.

E. Field Interviewing

1. Annual surveys

The first step in the field interviewing process was the selection of interviewers. Fourteen young men were selected for the 1973

Baseline Survey. Most of the same individuals served the following year as well. The interviewers were selected on the basis of personality, work experience in rural areas and educational programming. The final selection was made after a trial experience during the pretest of the questionnaire in an area similar to the ones that were part of the BVE experimental program. The most important quality considered was that of rapport with the village people.

Following the selection, the interviewers were trained in an intensive two-week session. The training consisted of team building exercises, interviewing techniques, understanding of survey and evaluation, field testing of the questionnaire, and final revision of the questionnaire.

Interviewing was conducted in a central location and each person who had been selected in the sample was notified as to the time and place. Prior to this, all of the necessary arrangements had been made with local leaders so that there were no misunderstanding as to the intent of the interviewing. Each interview was done separately and was of approximately 30 minutes duration. Upon completion, the interviewer checked to see if all answers had been recorded correctly. Before leaving the field, a further check was made by the team supervisor.

2. Time Sample Survey Interviews

The time sample survey interviews were conducted each month with a 20 percent sample from each treatment and control area. The sample was selected randomly from each of the five villages in all treatment sub-areas. Twenty-five people were interviewed in each of the sub-areas (there were four sub-areas in 1974 and eight in 1975 and 1976). There were seven time samples conducted in 1974 and six in both 1975 and 1976. A problem was encountered in that many of the farmers were absent from their farms due to work on the coast so that it was not always possible to interview them at the time their name was chosen for the sub-sample. In some cases they were not available for interviewing in any of the monthly surveys. Alternate names were always included in the interview lists.

The two persons selected to do the interviewing were chosen because of their prior experience in interviewing, their knowledge of the area, and their rapport with the people. The interviewing procedures for the time sample were pretested and determined to be most effectively carried out in the following way: after the sample was selected and a list of names was available, the interviewer went to the farm of the person to be interviewed; upon arrival he began with an informal conversation in which he identified himself and gave the reason for the visit; after the conversation had proceeded informally he then asked specific questions and filled in the questionnaire.

3. Crop production surveys

The crop production surveys were conducted in the same manner and

by the same interviewers as the time sample surveys. This was possible because the crop production surveys were scheduled in January and the time sample surveys from March to September. A 35% non-rotating sample of the farmers were interviewed in the crop production surveys in contrast to a 20% rotating sample in the time sample surveys.

The magnitude of the interviewing task can be observed in the following summary data. During the period covered by this report, approximately 7,800 separate interviews were conducted with 953 farmers in the 33 villages found in the 8 treatment areas covered by the project.

F. Data Processing and Analysis

In addition to the daily checking in the field at the time of interviewing, all questionnaires were checked twice in Guatemala City by different crews working on data processing. The data was then transferred either to sense sheets or layout sheets to be sent to Tampa for data processing in the computer. The questionnaires for the baseline and annual surveys remained in Guatemala for use by use by programmers and as part of the archives. The questionnaires used in the time sample surveys were of one sheet in length and were mailed directly to Tampa for data processing. The data was analyzed with the assistance of Dr. Richard Anderson.

G. Personnel Training

Personnel training has been mentioned in this chapter in relation to the different evaluation activities. It is also mentioned in Ch. X, Part C.

The Tampa Evaluation Staff has worked together with the Field Staff in formal training of the interviewers and data processors. The informal training activities are not as evident but were part of the general mode of operation. The Evaluation Staff from Tampa has worked closely with the Evaluation Field Supervisors, the Field Program Personnel and the Program Administrators in order to explain each of the steps in the evaluation process. Sometimes the training was conducted in organized groups but more often in an individual and informal setting. As a result, the BVE Project has been a training ground for skills in all aspects of research and evaluation.

H. Interpretation and Reporting of the Results

The findings coming from the formal evaluation have been updated and circulated in a number of forms. In addition to the interim and final reports required by the contract, many special reports have been prepared to meet programming needs of the BVE Project itself. Special evaluation reports have been prepared to help provide answers for those engaged in development projects throughout the world. In the following paragraphs, both the periodic reports and those prepared to meet specific needs are listed.

1. Computer output

The preliminary tabulation of the survey responses has been made immediately available to the field staff in the form of computer output. Brief training sessions were held so that the responses to any of the survey items could be interpreted by field personnel. This method gave almost immediate feedback on survey results.

2. Evaluation reports

There have been more than 100 evaluation reports prepared since the project began in 1973. These reports were prepared for immediate field use and distributed to a limited audience (see Appendix E).

3. Working papers

The working papers represent an intermediate step in the process of reporting the findings from this unique experimental program in non-formal education. These papers have been circulated to a limited audience for comments and suggestions. At a later date necessary revisions and corrections will be made so that the papers can be circulated to a wider audience through the Academy for Educational Development or other suitable publishing outlets (see Appendix E).

4. Professional papers

Measuring the results of a non-formal educational project such as BVE go far beyond the requirements for increased efficiency in the project itself. The expected findings even go beyond the needs of national development of Guatemala. The results of this unique experiment have far reaching consequences for development the world over. Not only applied natural scientists but researchers in all branches of the behavioral sciences are interested in the theoretical aspects of behavior change in non-laboratory settings. Guatemala offers a special opportunity for this study because of the present stage of development and the presence of diverse cultures. In an attempt to communicate some of the preliminary findings from the project the professional papers have been prepared by the Evaluation Staff with the assistance of the Field Staff (see Appendix E).

5. Monthly reports

A report was prepared each month that outlines the activities of the Tampa-based Evaluation Staff for the month ending and the proposed activities for the next month. These reports were from two to three pages in length and 42 have been submitted. This report also served an organizing function and helped establish job priorities. Copies were sent to Washington, to Guatemala and to administrative officials at the University of South Florida.

6. Interim reports

An interim report has been prepared each year in accordance with contract requirements.

CHAPTER XVII

MEASURING CHANGES BY SELECTED PRACTICES

One of the persistent problems in conducting evaluation research is the development of meaningful standards against which the effectiveness of programs can be evaluated. In this report a composite measure of practice level, called the "total practice index," has been introduced in response to this problem. The most important aspect of this index was that it could be used to measure change, by looking at differences in total practice scores, both within and between treatment conditions over the life of the project.

A. Development of the Practice Index

The concept of a total practice score originated early in 1974. Initially, a large number of practices were ranked and coded in terms of level of practice, from low level to high level practice. This ranking procedure was accomplished on the basis of a consensual agreement regarding the scaling of these practices between the Tampa Evaluation Staff and Field Staff in Guatemala. In 1975, 18 items were selected as components of the total practice score based on their representativeness of practices receiving major emphasis in the treatment areas. Each practice represented a separate programming package with specific content that was introduced to farmers in each of the different treatment areas. Each practice was then scaled on a continuum ranging from 1 to 5, in an approximation to an interval level of measurement, with five representing the highest level of practice.

In the 1976 Interim Report, the 18 individual practices and the total practice index were utilized as a means of comparing change by specific practice (message); and as a means of aggregating all practices into a total index of change. In the present report a similar approach was utilized. However, the practice index has been further refined based on continuing feedback from the field component, and from analysis of the practice index in Tampa. As in 1976, the rationale for using this procedure is based on the desirability of having a composite measure of change, coupled with the conceptual impracticality of having to deal with 18 or more individual items as indicators of change.

Building upon past experience, a new practice scale has been developed for this report and will be presented in this chapter along with an individual analysis of each item in the scale. The new scale includes more practices and eliminates major scoring inequities found in the previous scale.

More specifically, upon reviewing the 1976 scoring procedure for use in this final report on the Oriente, several methodological and

conceptual difficulties were noted which precluded the continued use of the "18 practice scale." First, it became clear that some farmers were being unjustly penalized (in terms of overall practice scores) if they did not plant all of the crops measured in the survey (i.e., corn, beans, and sorghum). This problem manifested itself primarily in the loss of points to practice questions involving the type of crop seed used, the storage of crops, and the amount of fertilizer used.

As an example, if a farmer did not plant sorghum (which was not uncommon), he would lose at least 10 points from his composite practice score (5 for the type of sorghum seed used, and 5 for the storage of sorghum), even though these practices did not really apply to him. It was therefore reasoned that if a farmer scored 5 on both corn and bean seed, and a 0 (i.e. did not plant) on sorghum seed, he should receive a 5 for his seeding practice. This new method, therefore, only considers what the farmer actually did in relation to the highest level of practice; and does not penalize him for not engaging in a particular practice because he may live in an area where such practices are inappropriate. This same procedure was also followed for the crop storage practices.

Other practice combinations also became necessary in order to avoid undue weighting of differential planting methods with respect to practices involving the amount of fertilizer used on crops. With the old scoring method it was possible for farmers who planted their crops in many different ways (i.e. some corn alone, some corn with beans, some corn with sorghum, etc.) to obtain significantly higher total practice scores than farmers who planted their crops with relatively fewer variations. As a result, it was felt that a fairer scoring procedure would be to compute an average fertilizer score for each farmer based on the total amount of fertilizer used divided by the number of ways in which it was used. Since farmers could fertilize their crops at either seeding time or flowering time, or both this meant computing two different amounts of fertilization composites.

The present status of the total practice score is outlined below. This new aggregated index of practice now consists of 29 practices, as opposed to the 18 included in the 1976 index, some of which are used in combination to form a single item. In order to avoid language difficulties we will henceforth refer to the total practice score as consisting of 13 practice items, not 13 practices, since some of these items refer to more than one practice. For the reasons enumerated above, this new practice index is considered to be a more reliable and valid index of what the farmer is actually doing in the field. Because of the larger number of practices, it also represents an opportunity to evaluate a larger number of programmed messages to which the farmer has had an opportunity to respond in the different treatment areas. Table 16 presents the items utilized in the revised practice scale, and a complete listing of the practices in each item may be found in Appendix F.

Table 16. Items in the total practice score.

Item#	Variable#(s)	Practice
1	15	How do you prepare your land for crops?
2	26,29,32	What type of (corn/bean/sorghum)seed did you use this year? (Sum and average non-zero values)
3	94	What crops do you plant in association?
4	99	Which insecticides did you use to control insects? How many?
5	102	If you fertilized your first crop at seeding, what type of fertilizer did you use?
6	114-120	Amount of chemical fertilizer used at seeding? (sum and average non-zero values)
7	103	If you fertilized your first crop at flowering, what type of fertilizer did you use?
8	122-128	Amount of chemical fertilizer used at flowering? (sum and average non-zero values)
9	134	Did you use herbicide to control weeds?
10	139	Did you use fungicides to control disease on your crops?
11	142	Do you destroy crop residues after the last crop of the year?
12	151,152,153	Where do you store (corn/bean/sorghum) until it is used by you and your family? (Sum and average non-zero values)
13	169	Did you borrow money for your crops? Where?

Total practice scoring method and distributions

Each of the above practice items had a range of 1 to 5 points. Thus, total practice scores could range from a minimum of 0 points (where the farmer did not utilize any of the above items at any level) to a maximum of 65 points (where the farmer used the highest level of practice for all 13 items). Table 17 summarizes the obtained distributions of total practice scores for both 1974 and 1976.

Table 17. Summary of the total practice score distributions for 1974 and 1976.

1974		1976	
Mean	= 26.137	Mean	= 31.434
Standard Deviation	= 5.770	Standard Deviation	= 7.164
Minimum Score	= 15.000	Minimum Score	= 3.000
Maximum Score	= 50.000	Maximum Score	= 55.500
N	= 820	N	= 820

B. Comparison of Change From 1974-1976 by Total Practice Index

In this section the results of the analyses of the new 13 item practice index are presented. In general, two basic types of analyses were performed: a) analysis of change within treatment conditions over time, and b) analysis of differential change between treatment conditions over time. In addition, a final series of analyses of differential treatment effectiveness were performed by combining like treatment conditions and geographical areas (e.g. combining Quezada RMA and Yupi RMA to form a single 'RMA' group).

1. Major hypotheses

The time frame for the analysis was two years (i.e., 1974 to 1976); and the data of interest was the individual farmer's relative position on the practice index in 1974 versus his relative position on the same index in 1976.* Since some natural change has occurred, the between groups comparisons of experimental and control areas were designed to reflect only those differences attributable to the BVE programming. The major hypotheses being tested are as follows:

* Data collection actually began in 1973. However, the questionnaire at this time was in a developmental stage, and was subsequently revised and improved in 1974. Consequently, the 1973 data has not been included in these analyses due to problems in the comparability of questions.

Hypothesis 1. The Basic Village Education Program (BVE) will have a positive effect on change in total practice scores over time.

Hypothesis 2. The positive impact of BVE on change will vary differentially by treatment condition. More specifically, it is hypothesized that total practice scores will increase at a rate proportionate to increases in level of treatment saturation. The following rank order of treatments by saturation level reflects the hypothesized treatment differences with respect to change over time.

1) Control (C) - this condition represents the zero point of treatment saturation in the BVE program. It is therefore hypothesized that this condition will show some natural change over time, but that this change will be significantly less than any of the following treatment conditions.

2) Monitor (M) and Radio (R) - these two conditions represent the lowest levels of treatment saturation in the experimental design. The primary difference between these two conditions is the manner in which the BVE message is communicated to the farmer (the monitor being the more personal of the two mediums of communication). It is hypotesized that these conditions will not differ significantly from one another, but will show significantly more change over time than the control condition.

3) Radio/Monitor (RM) - This treatment condition represents an incorporation of the above two conditions into a single treatment saturation level. Consequently, it is hypothesized that this treatment will show signficant increases in change over the control, and both the monitor alone and radio alone conditions.

4) Radio/Monitor/Agronomist (RMA) - this treatment condition represents the highest level of treatment saturation in the BVE program. As such it is hypothesized that this treatment will show the greatest amount of change over time, and further that this change will be significantly greater than all of the above treatment conditions.

Hypothesis 3. Differential treatment effectiveness tested through the combination of like treatments and geographical areas (e.g., combining Quezada RMA and Yupi RMA to form a single "RMA" condition) will show the same rank ordering of change as outlined above. However, by combining geographical regions it may be possible to make even stronger statements concerning differential treatment effectiveness - since this procedure reduces some of the error variation attributable to differences in micro-climates, geography and land

types, and indigenous area practices.*

2. Description of the population

Since the analysis of change over time requires a complete set of data for each farmer, it became necessary to exclude cases from the analyses that did not meet this basic requirement. That is, in order to assess change over time it was necessary to have both baseline data (i.e. 1974 practice levels) and "end point" (or 1976) data for each of the farmers in the analysis. This requirement meant that some 53 individuals who were interviewed in 1974, but were not reinterviewed in 1976, had to be excluded from the analyses. In addition, 4 other cases had to be excluded due to problems of missing data. As a result, the following analyses are based on a total of 820 farmers, for whom there was complete data for both 1974 and 1976.

3. Change over time

Has there been any change in practice levels between 1974 and 1976? The most basic way to attempt to answer this question is to simply look at a count of the number of farmers who changed their overall practice from 1974 to 1976, and the direction of this change. Table 18 presents data which show conclusively that change was indeed taking place over the life of the project and, more importantly, this change was predominantly positive. The overall effect is impressive in that 642 farmers out of the total 820 made positive changes in their overall practice, while only 159 out of the 820 changed in th negative direction (19 farmers remained at the same level between 1974 and 1976). In addition, it is interesting to note that the control condition also shows more positive than negative change - a topic which will be discussed more completely in terms of relative amount of change at a later point in this section. The table does indicate, however, that 81 percent of the sample in the experimental areas showed positive change compared to 61 percent in the control area.

Table 19 reports the same data that was reported in Table 18 in a slightly different fashion. Instead of reporting counts of farmers who changed, Table 19 presents mean practice levels for each of the treatment conditions and control. Table 19 also presents the results of a statistical analysis of changes in these mean practice levels within treatment conditions across years (e.g. QR in 1974 versus QR in 1976). This analysis corroborates the global picture of change

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* This procedure also controls for some of the variation attributable to different program years. By 1976 Quezada had been a 'treatment' area for 3 years, and Yupi had been a 'treatment' area for 2 years. Thus, combining geographical areas has the effect of restricting the analysis more to treatment conditions, as opposed to having to talk about a treatment in a given geographical region in a given program year.

Table 18. Measurement of total practice scores from 1974 to 1976 by number of individuals who changed.

Sub-Area	Positive change	No change	Negative change	Total
QR	74	1	26	101
QRM	75	1	26	102
QRMA	77	4	20	101
YR	98	3	10	111
YRM	81	2	20	103
YRMA	99	1	6	106
IM	74	1	17	92
Total	578	13	125	716
Percent Change	81%	2%	17%	
Total IC	64	6	34	
Percent Change	61%	6%	33%	
Overall	642	19	159	820
	78%	2%	20%	

Table 19. Comparison of total practice scores, 1974 and 1976 by mean score: change within treatment condition across years.

Sub-Area	N	1974 Mean	1976 Mean	t*	Sign.**
QR	101	30.38	35.64	6.88	<.001
QRM	102	27.94	33.05	6.90	<.001
QRMA	101	27.64	32.77	8.11	<.001
YR	111	23.76	29.30	10.87	<.001
YRM	103	23.24	27.55	7.29	<.001
YRMA	106	25.49	33.49	13.83	<.001
IM	92	25.97	32.18	9.11	<.001
IC	104	25.00	27.84	5.30	<.001

* t - tests for paired comparisons.
** significance tests are based on 2-tail probabilities of t.

Table 20. Differential treatment effectiveness as measured by change from 1974 to 1976.

a. Analysis of variance on change in total practice scores

Source	df	Sum of Squares	Mean Squares	F ratio	F prob.
Between Treatments	7	1589.0742	227.0106	5.567	<.001
Within Treatments	812	33115.6445	40.7828		
Total	819	34704.7187			

b. Rank order of treatments by change

Sub-Area	N	Mean change	Standard deviation
YRMA	106	8.0007	5.9545
IM	92	6.2027	6.5318
YR	111	5.5465	5.3745
QR	101	5.2566	7.6748
QRMA	101	5.1270	6.3541
QRM	102	5.1078	7.4746
YRM	103	4.3098	5.9998
IC	104	2.8461	5.4777

c. Summary of subsequent tests between treatment conditions*

Sub-area	QR	QRM	QRMA	YR	YRM	YRMA	IM	IC
QR								
QRM	No							
QRMA	No	No						
YR	No	No	No					
YRM	No	No	No	No				
YRMA	Yes	Yes	Yes	Yes	Yes			
IM	No	No	No	No	Yes	Yes		
IC	Yes	Yes	Yes	Yes	No	Yes	Yes	

* Subsequent tests were made using Fisher's Least Significant Difference Test (see Keppel, G. Design and Analysis: A Researcher's Handbook. New Jersey: Prentice-Hall, Inc., 1973). Yes indicates that there was a significant difference between groups, and No indicates that there was no reliable difference between groups.

presented in Table 18, in that each of the treatment conditions (including control) shows a significant increase in total practice scores between 1974 and 1976.

The first stage of the analysis of change in total practice scores over time shows conclusively that positive change was indeed taking place between the years 1974 to 1976. Moreover, this positive change was significantly greater than might be expected by chance, as tested by standard statistical tests of change. The question that this analysis does not answer, however, is how much of this change is attributable to the BVE project, and how much of it is attributable to natural change over time? In other words, did the experimental areas increase more than the control?, or did all groups increase at approximately the same rate? It is to these questions that the next series of nalyses were directed.

4. Evaluation of differential treatment effectiveness

In order to assess the possibility of differential treatment effectiveness on change the following procedure was utilized. Since an analysis of variance on the 1974 baseline scores indicated that treatment conditions were starting from significantly different "baselines," it became necessary to construct difference scores (1976 scor - 1974 score) for these analyses. That is, the "scores" used in these analyses were computed as the difference between a farmer's 1976 practice score and his 1974 practice score. These difference scores were then analyzed in a one-way analysis of variance model, and the results are presented in Table 20. Part (a) of Table 20 indicates that treatment conditions differed significantly in amount of change across years, and further shows that such differences could occur less than 1 time in 1000 by chance.

I In order to answer the question of which specific treatments produced more change than others subsequent analyses had to be performed. Part (b) of Table 20 shows quite clearly that treatment mean changes were not equal; however, the question is: Are these differences meaningful? or, are these differences great enough to warrant the conclusion that some treatments produced a significantly greater degree of change than others?

The hypotheses of differential treatment effectiveness were tested using Fisher's Least Significant Difference test.* The results of these analyses are presented in Table 20 (Part c), and can be summarized as follows:

1. All treatment conditions except YRM show a significantly greater rate of change than control.

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* Since these were 'planned' comparisons, Fisher's Least Significant Test is an appropriate method of subsequent statistical testing.

2. YRMA shows a significantly greater rate of change than all other treatments and control.

3. Ipala Monitor, Yupi R, Quezada R, Quezada RMA, Quezada RM, and Yupi R, while showing a significantly greater rate of change than control, did not differ significantly from each other.

4. Ipala Monitor was found to produce a significantly greater rate of change than YRM.

The results of the second set of analyses on differential treatment effectiveness do seem to support, in part, the hypotheses advanced in the first part of this section. First, all treatment conditions except RM showed significantly greater amounts of change over time than control; and the condition which showed the greatest change was YRMA. Also consistent with the hypotheses was the finding that the Monitor (IM) and the two Radio Conditions (QR and YR) did not differ significantly from each other. Contrary to expectation, however, the Radio/Monitor conditions (QRM and YRM) and the Quezada Radio/ Monitor/ Agronomist condition (QRMA) did not produce significantly greater amounts of change than the Monitor or Radio conditions. In fact YRM was significantly less effective in producing change than the monitor condition, although it did not differ significantly from the radio conditions.

5. Differential treatment effectiveness when like treatments are combined by geographical region

The final series of analyses on change in total practice scores were made by combining like treatment areas in Quezada and Yupi in an attempt to partially control for some of the error variation in total practice scores attributable to micro-climates, geography and land types, and indigenous area practices. These data were analyzed in the same fashion as in the previous series of analyses on differential treatment effectiveness (see above), and the results of the analyses are presented in Table 21.

Subsequent analyses of differences in mean changes by treatment conditions (using Fisher's Least Significant Difference test) indicated the following:

1. All treatment conditions produced significantly greater rates of change than control.

2. RMA was found to produce a significantly greater rate of change than RM; however, RMA, IM, and R did not differ significantly from one another in rate of change.

3. IM, R, and RM did not differ significantly from one another

Table 21. Differential treatment effectiveness when treatment areas are combined.

a. Analysis of variance on change in total practice scores (1974-1976)

Source	df	Sum of squares	Mean squares	F ratio	F prob.
Between Treatments	4	1124.86	281.21	6.83	<.001
Within Treatments	815	33579.11	41.20		
Total	819	34703.96			

b. Rank order of treatments by change

Sub-Area	N	Mean change	Standard deviation
RMA	207	6.5986	6.3043
IM	92	6.2027	6.5318
R	212	5.4083	6.5570
RM	205	4.7068	6.7689
C	104	2.8461	5.4777

In general, this analysis corroborates the results of the earlier set of analyses dealing with differential treatment effectiveness. In this analysis, however, all treatments were found to produce significantly greater rates of change than control(it should be remembered that YRM was not found to be greater than control when separated from QRM - see above). Again Ipala Monitor and the new combined Radio conditions were not found to differ significantly from one another. However, while the RMA condition was found to be significantly greater than the RM condition (consistent with hypothesis 2), RM was not found to produce a significantly greater rate of change than IM or R (inconsistent with hypothesis 2). For all practical purposes there were no differences between the M,R, or RM conditions.

6. Summary of results

Based on the preceding analysis the following statements may be made in regard to the hypotheses being tested:

1. There is evidence of an overall Basic Village Education effect as measured across years, and when treatments are compared against control between years.

2. There is limited evidence of differential treatment effectiveness with some tendency for the RMA treatment to appear to be superior. All other between treatment differences are insignificant.

3. When treatment conditions are combined by geographical area to control for variations in agricultural practice and other geographic variations (e.g., varying weather patterns), again no differential treatment effectiveness is shown except in comparison with control. The RMA condition continues to be the highest treatment, but not at a level significantly different from the other conditions except for RM.

4. The hypothesized order of treatment effectiveness was based on treatment saturation level. The predicted and obtained orders as shown below:

Predicted	Obtained
RMA	RMA
RM	M
M	R
R	RM .
C	C

Condition RMA and condition C are found in the predicted order. All treatment conditions are significantly higher than C, but no differences emerged between RM, M and R. Even though the differences between M, R, and RM are not significantly different from chance, it is interesting to note that RM was the only condition that did not follow the predicted order.

Further interpretation of these findings will require analysis by field staff. In addition, some further interpretation of individual and uncontrolled differences in some of the treatment areas will be necessary. The high rate of change noted in Yupi RMA is the main contributor to the RMA position in the statistical analysis. This impact of YRMA may need tracking to see if other agencies, agronomists, or workers were active in that area, since the same major difference did not appear with QRMA. In the same way, Yupi RM was consistently at the lowest level of change in the analyses, and other factors may prove helpful in explaining their position in change. It might be noted, however, that YRM is a very poor area (economically) with a lower level of literacy compared with other sub-areas. Although literacy is not a requirement of the BVE project, it is (as Chapter XVIII will show) significantly related with higher levels of practice. It is important to realize, however, that it may not be 'literacy' per se which is the important factor in high practice farmers. Rather it might be some other quality of these individuals that is related to being literate. Other differences may also be detected with continuing analysis.

C. Changes in Individual Practices

In the preceding section, the total practice index was examined to evaluate the major hypotheses of the BVE Project. In this section each of the 13 items will be briefly reviewed to add to the understanding of the differences found in the total practice scores. An overview of the variation found in the 13 items may aid in understanding the process by which change takes place, since it is unevenly reflected in different practices and different areas.

Following the format utilized on total practice score, for each of the variables, the first presentation will reflect the number of people who changed from 1974 to 1976, the second statement will relate to a comparison of mean differences across years, and a third will refer to differential treatment effectiveness. The final statement, the summary, will reflect the relative standing of the different treatment areas when aggregated for geographical and climatic differences.

As previously noted, each practice represents a separate message package. The purpose of these analyses is to extend the means of identifying where change took place, and to provide a stronger basis

for interpretation. Some of the factors which may have influenced change are as follows:

1. Factors associated with the message provided; including appropriateness, repetition and quality.

2. The level of technology involved in change.

3. Relationship of a message to current practices and cultural values.

4. Variations and climatic or geographical conditions.

5. The availability of local support systems. For example, access to credit or the supply of fertilizer.

6. The reliability and validity of the system of measurement.

Interpretation from all of these areas will be necessary for a full understanding of the findings.

In addition to the summary statements concerning each item in the 13 item index, it should be noted that they are presented in an approximate order of efficiency in terms of reflecting a BVE impact.

Individual Practice Scores: Summary Interpretation

a. Item #1 is variable 15 on the questionnaire and relates to the question "How do you prepare your land for crops?" See Appendix G Item #1, Tables 1-4.

1. When the number of persons who changed is considered, 256 changed in a positive direction and 86 in a negative direction.

2. The mean change between 1974 and 1976 was significant for all areas except Ipala Monitor and Ipala Control.

3. The analysis of change scores indicates that all experimental areas except QRM and Ipala Monitor changed significantly more than did Ipala Control.

4. When treatment areas are aggregated, the treatment order is as follows: from high to low, RMA, R, RM, M, C.

   Differences in terrain and ownership of animals account for some of the variation on this item. In general, this practice requires a low level of technology.

b. Item #2, is an average of the sum of variables 26, 29, and 32 in response to the following question, "What type of corn/bean/sorghum seed did you use this year?" See Appendix G, Item #2, Tables 1-4.

1. When the number of persons who changed is considered, 508 changed in a positive direction and 38 in a negative direction.

2. The mean changes were significant in all areas including Control condition from 1974 to 1976.

3. The analysis of change scores indicates that all experimental conditions except for Ipala Monitor were significantly greater than Control in mean change from 1974 to 1976.

4. When treatment areas are aggregated, the treatment order is as follows: RM, R, RMA, M, C.

   The availability and cost of seed are major considerations which influence change.

c. Item #3 is variable 94 and the question is "What crops do you plant in association?" See Appendix G, Item #3, Tables 1-4.

1. When the number of persons who changed is considered, 202 changed in a positive direction and 132 in a negative direction.

2. Significant change in the means across years was found in all areas except YR, YRM, YRMA.

3. When experimental areas are compared to Control, in terms of change all experimental conditions show a greater change than Control which showed a large negative change.

4. When treatment areas are aggregated the treatment order is as follows: M, RM, R, RMA, C.

   Cropping systems often minimize risk to the farmer, thus providing some cultural resistance to improved cropping methods.

d. Item #8 is based on variables 122-128 and the question is "Amount of fertilizer applied at flowering?" See Appendix G, Item #8, Tables 1-4.

1. When the number of persons who changed is considered, 455 changed in a positive direction and 329 in a negative direction.

2. Mean changes from 1974 to 1976 were significant in all areas.

3. All experimental areas changed at a significantly higher rate than Control, with Control showing a negative change.

4. When areas are aggregated, treatment order is as follows: RMA, M, R, RM, C.

   As will be shown in analyses which will follow (section D-3), benefit is obtained from almost any amount of fertilizer applied at flowering. This may be due, in part, to the fact that farmers probably would not apply fertilizer at flowering unless their crop has developed to the point that such a practice could be beneficial.

The above use of practices appear to be the most effective practices in the series of 13 items. The second group of practices to be presented also show change, but somewhat less than was found in the first group (particularly in terms of differences with the Control area).

e. Item #4 is variable 99, refers to the questions "Which insecticides do you use to control insects?" See Appendix G, Item #4, Tables 1-4.

1. When the number of persons who changed is considered, 190 changed in a positive direction and 119 in a negative direction.

2. Mean change as measured from 1974 to 1976 was significant only in QR,YR, IM, IC.

3. No differential treatment order emerged, and the Control area was not significantly different from the experimental areas.

4. When aggregated the following order emerged: R, M, RMA, C, RM.

   Insect control requires only a small credit investment, but does require a high level of technology.

f. Item #5 is variable 102 and the question refers to the type of fertilizer at seeding. See Appendix G, Item #5, Tables 1-4.

1. When the number of persons who changed is considered, 408 changed in a positive direction, and 64 in a negative direction.

2. All areas, experimental and Control, showed significant mean change from 1974 to 1976.

3. Experimental areas were not significantly different from Control as measured by change.

4. When aggregated the following order emerged: RMA, R, C, M, RM.

   Decisions regarding the type of fertilizer to use at seeding are more complex than at flowering.

g. Item #6 includes variables 114-120, and these questions refer to the amount of fertilizer at seeding. See Appendix G, Item #6, Tables 1-4.

1. When the number of persons who changed is considered, 251 changed in a positive direction and 69 in a negative direction. ion.

2. All experimental and control areas showed significant mean change from 1974 to 1976.

3. Ipala Monitor was the only experimental condition showing significantly greater change than Control.

4. When aggregated and ranked the following order emerged: M, RMA, R, RM, C.

h. Item #7 is variable 103, and the question refers to the type of fertilizer at flowering. See Appendix G, Item #7, Tables 1-4.

1. When the number of persons who changed is considered, 358 changed in a positive direction and 45 in a negative direction.

2. Significant increases in practice level were found in all experimental and Control conditions from 1974 to 1976.

3. The analysis of change scores indicated that the only significant difference was that found between YRMA and Control. Control was not significantly lower than any other treatment condition.

4. When aggregated the following order emerged: RMA, M, RM, R,C.

The BVE message here is simple, and involves the use of only one kind of fertilizer.

i. Item #12 includes variables 151-153 and refers to storage of corn/beans/sorghum until used. See Appendix G, Item #12, Tables 1-4.

1. When the number of persons who changed is considered, 188 changed in a positive direction and 264 in a negative direction.

2. There were only two significant changes across years, and these were negative. All other changes were either negative or no-change; however, these were not significant.

3. The analysis of change scores revealed that Ipala Control was significantly lower than all experimental areas except for YRM. YRM shows the greatest negative change compared to the other experimental areas.

4. When aggregated and ranked the following order emerged: M, R, RMA, RM, C. All except M showed negative change.

While some drop in scores is noted with respect to this practice, overall practice remains at a high level in all areas.

j. Item #11 refers to variable 142, where the question is "Do you destroy crop residues after the last crop of the year?" See Appendix G, Item #11, Tables 1-4.

1. When the number of persons who changed is considered, 417 changed in a positive direction and 193 in a negative direction.

2. Mean differences in all areas from 1974 to 1976 were positive and significant.

3. The greatest mean change was shown by Ipala Control with no experimental effect shown.

4. When ranked the following order emerged: C, RM, M, R, RMA.

k. Item #10 reflects variable 139, "Did you use fungicides to ontrol disease on your crops?" See Appendix G, Item #10, Tables 1-4.

1. When the number of persons who changed is considered, 163 changed in a positive direction and 304 in a negative direction.

2. QR, QRM, IM and IC all showed significant change from 1974 to 1976 in a negative direction. Non-significant negative change was also shown in areas YR, QRM, YRM. YRMA showed a slight but non-significant positive change.

3. QRMA, YR, YRM, and YRMA showed significantly less negative change than Control.

4. Order of change was as follows: RMA, RM, M, R, C, with all having negative change.

High yearly variation is found in the use of this practice, and the control and identification of problems is very sophisticated.

1. Item #9 refers to variable 134, "Did you use herbicide to control weeds?" See Appendix G, Item #9, Tables 1-4.

1. When the number of persons who changed is considered, 251 changed in a positive direction and 265 in a negative direction.

2. Mean changes were noted in negative direciton in QR, QRM, and no significant change in QRMA, YR, YRM, and YRMA was observed. Both Ipala Monitor and Ipala Control show significant change in the positive direction.

3. When experimental and control areas are compared Control is significantly higher in change than all areas except Ipala Monitor.

4. Rank order of the items were as follows: M, C, RMA, RM, R.

This practice was programmed with little expectation of any immediate change, since it may not be practical for most farmers at this time.

m. Item #13 refers to variable 169, "Did you borrow money for your crops?" See Appendix G, Item #13, Tables 1-4.

Few individuals changed in either a positive or negative direction on this variable, so no further analysis was attempted. In 1976, the requirements for obtaining credit were more stringent. In addition, information on many types of informal credit (such as a father lending his son some fertilizer) tended to obscure what happened with respect to credit.

D. The Impact of Change in Agricultural Practices on Crop Yield and Production*

Previous sections have just shown that significant changes in practice levels occurred between the years 1974 to 1976. Moreover, this change has been predominantly positive. This section will attempt to delineate more precisely some of the implications of these changes with respect to crop yields and production.

Although the major focus of BVE has always been on determining the effectiveness of various communication channels in the transfer of technology, it is reasonable to ask the question: "What does the adoption of this new technology mean to the individual farmer in terms of tangible outcomes (i.e. the effect of adoption on yield and production)?" It is important to realize, however, that BVE was not designed to be a field test of the viability of agricultural technology. It was assumed at the outset of the project that the practices selected for programming were important components of "good farming" - as determined by agricultural experts based on previous research and past experience.

In addition, not all of the practices in the system were thought to be directly related to crop yields or production. That is, some practices (e.g., the storage of crops after harvesting - the conservation of crops for later use) are clearly not production oriented; but rather are related to some of the more general characteristics of good farming practice.

The purpose of these analyses is twofold. In the first place, this type of analysis provides a test of the assumptions that were made at the outset of the project with respect to the relationship between practices and crop outputs. It is hypothesized that increases in total practice scores will be positively associated (as measured by the correlation coefficient) with crop yields and production. Secondly, the multiple regression results reported at a later point in this section are designed to indicate which specific combination in the program package were most highly related to crop yields (regression was not done with the production data). These latter analyses will also be utilized in subsequent benefit/cost analyses of BVE.

1. The relationship between total practice scores and crop yields: corn, beans, and sorghum.

Pearson product-moment correlations were used to assess the relationship between total practice scores (see Part A of this chapter)

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* The major crops measured in the survey were corn, beans, and sorghum. Yield refers to the number of quintales per manzana, and Production refers to the absolute number of quintales produced regardless of the amount of land planted.

and crop yields. As Table 22 indicates, the relationships between total practice scores and crop yields were positive and significant in each year of the project, and for each of the major crops under consideration. Further, these relationships were generally strongest in 1975, and weakest in 1976. Perhaps the most tenable explanation for these latter findings might be given in terms of the differences in weather conditions for the two years (See Chapter XII, Sec. C).

Given the range of factors other than practice levels that can affect crop yields (e.g., rainfall, soil types, temperature, physiography, etc.), it is impressive that all of these correlations reached statistical significance. These results, therefore, provide consistent support for the assumed positive relationship between improved practice and crop outputs. More importantly, the results indicate that it was advantageous for farmers to increase their practice level, which would seem to be an essential precondition for change to occur.

2. The relationship between total practice scores and crop production: corn, beans, and sorghum.

Pearson product-moment correlations were again used to assess the relationship between total practice scores and crop production. Production is a measure of absolute crop output, and in contrast to yield (which is a measure of crop output efficiency, i.e. relative production per unit area of land), it may be the more important outcome in subsistence-level economies. The primary advantage in using yield as a measure of crop output is the fact that these figures are standardized in relation to the amount of land planted. The major disadvantage in using yield, however, is that these figures do not accurately reflect the absolute quantity of a crop that a farmer has at his disposal.

Table 22 indicates, again, that total practice scores were positively (and significantly) related to crop production in each year of the project, and for each of the major crops under consideration. Although the magnitude of these correlations are somewhat different than those obtained for yield, they nevertheless corroborate the earlier findings.

Of particular interest in these analyses is the general increase in the magnitude of the correlations between practice and bean and sorghum production (as opposed to yield), and the general decrease in the magnitude of these relationships in the case of corn production (versus corn yield). The explanation for these findings is undoubtedly related to the fact that yield is the more sensitive of the two measures of crop output (i.e. yield adjusts crop outputs by the amount of land planted, while production makes no such correction).

Table 22. Correlations between total practice scores and crop yields: 1974, 1975, and 1976.

		CORRELATION	N	SIGNIFICANCE
1974	Corn	.39	818	<.001
	Beans	.18	768	<.001
	Sorghum	.17	704	<.001
1975	Corn	.46	817	<.001
	Beans	.34	697	<.001
	Sorghum	.34	680	<.001
1976	Corn	.18	815	<.001
	Beans	.13	723	<.001
	Sorghum	.19	647	<.001

Table 23. Correlations between total practice scores and crop production: 1974, 1975, and 1976.

		CORRELATION	N	SIGNIFICANCE
	Corn	.16	819	<.001
1974	Beans	.31	768	<.001
	Sorghum	.22	704	<.001
	Corn	.43	817	<.001
1975	Beans	.45	697	<.001
	Sorghum	.31	680	<.001
	Corn	.29	815	<.001
1976	Beans	.31	723	<.001
	Sorghum	.26	647	<.001

In summary, the assumptions that were made at the outset of the project concerning the positive relationship between practice levels and crop outputs were consistently supported by these results. In general, these results indicate that increase in total practice scores were consistently associated with increases in both yield and production (although not all of these relationships were particularly strong). Similarly, decreases in total practice scores were associated with decreases in yield and production. The results were also encouraging in another way. Since farmers could hardly be expected to improve their agricultural practice in situations where such change had either no tangible effect or a negative effect, these results provide support for the notion that it was advantageous for farmers to improve.

3. Multiple regression results: Are some practices more predictive of crop yields than others?

The preceding analyses have dealt with the relationship between total practice scores and crop outputs. While it is important to look at the global picture, this level of analysis does not indicate which specific practices were more highly related to crop yields than others. As a result, subsequent multiple regression analyses were performed in order to determine which specific practices were most strongly related to which specific crops.

Multiple regression is a statistical method of analyzing the collective and separate contributions of two or more independent or predictor variables to the variation in a single continuous dependent variable.* In the terminology of regression, agricultural practices were the independent or predictor variables in these analyses, and crop yield was the dependent variable. In general terms, the objective of regression is to construct a weighted linear combination of independent variables which accounts for the maximum possible variance in the dependent variable. Practices were selected as components in this linear combination on the basis of their correlation with crop yield, while at the same time controlling for the fact that practices are themselves correlated with each other. The fact that practices are correlated to some extent with yield, and are also correlated with each other, indicates that they offer both unique and "overlapping" contributions to the variance in yield. The primary objective of regression, therefore, is to select practices which are most strongly associated with yield based on their unique or independent contributions. Since each of the selected practices accounts for an independent portion of the variability in yield, they may be weighted and

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* Kerlinger, R.M., and Pedhazur, E.G., Multiple regression in behavioral research. New York: Holt, Rinehard and Winston, Inc., 1973.

added together in such a way as to produce the highest possible correlation between specific practices and yield.* This weighted linear combination of practices is known as the "regression equation."

In most cases, the procedure known as cross-validation is an essential subsequent step in regression analyses. Cross-validation refers to the process of taking a regression equation derived on one set of data, and applying it to another data set in order to see if the original equation predicts these new data as well as it predicted the first set. In general, cross-validation will reveal that a regression equation does not afford equal predictability when applied to another data set. However, the relationship should still be significantly better than chance provided that the first equation was based on a large enough number of subjects.

There are cases, however, where one would not expect that the same predictor variables would be the best predictors of a dependent variable in situations where other environmental factors can change. This is particularly true in these analyses. That is, given the large amount of variability associated with different crop years (e.g., weather, the availability of fertilizer, etc.), it was assumed at the outset that different practices would be important in different years. Therefore, a formal cross-validation procedure was not used in these analyses. Rather, a separate regression equation was derived for each crop (corn, bean, and sorghum) and for each year (1974, 1975, 1976), resulting in nine individual regression equations.

a. Regression of corn yields on 13 practice items:** 1974, 1975, and 1976

Table 24 presents the results of the regression of corn yields on the 13 individual practice items. This table presents the following information for each regression equation: a) the multiple correlation (R) and its square (R squared - the percentage of variance accounted for), for each of the obtained regression equations and yield, b) the significance of the regression equation (F), and c) the number of cases upon which the regression equation was based. In addition, the following information is provided for each of the items included in the analysis: a) the item's zero-order correlation with yield, i.e., the correlation with yield which is not corrected for the fact that the item is also correlated with other practices, b) regression coefficients and beta weights - which are the unstandardized and standardized weights applied to the items in the regression equation, c) covariate F-ratios - which indicate the significance of each of the individual practice items while taking the other items into account, and d) significance levels for the covariate F's.

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* Ibid. See Kerlinger and Pedhauzur for a more complete treatment of the procedures involved in the development of regression equations.

** A stepwise regression procedure was utilized in all of the following analyses.

Table 24. Summary of the multiple regression results for corn: 1974, 1975, and 1976.

1974

Multiple R = .46 | F (df = 4,788) = 54.26; p < .001
R Squared = .22 | N of cases = 793

Item#*	Zero-order r with yield	Regression coefficient	Beta weight	Covariate F-ratio	Sign.
7	.40	1.99860	.32323	85.140	<.001
3	.23	.84734	.17936	31.720	<.001
10	.16	.75087	.10144	10.109	<.01
6	.26	.88012	.10478	9.098	<.01
Constant		2.44009			

1975

Multiple R = .49 | F (df = 4,789) = 63.43; p < .001
R squared = .24 | N of cases = 794

Item#	Zero-order r with yield	Regression coefficient	Beta weight	Covariate F-ratio	Sign.
7	.35	1.28289	.21603	41.865	<.001
5	.34	1.05964	.18913	31.733	<.001
1	.34	2.02339	.20230	36.170	<.001
3	.23	.95738	.15089	22.947	<.001
Constant		-2.41842			

1976

Multiple R = .29 | F (df = 4,787) = 17.97; p < .001
R Squared = .08 | N of cases = 792

Item#	Zero-order r with yield	Regression coefficient	Beta weight	Covariate F-ratio	Sign.
7	.18	.79007	.18827	29.635	<.001
3	.17	.77247	.15439	20.248	<.001
9	.14	.70395	.13463	15.428	<.001
4**	-.06	- .45100	-.08656	6.298	<.05
Constant		3.71812			

* See Table 13 in order to identify which practices are associated with item #'s.

** Suppressor variable.

The major overall findings of these analyses may be summarized as follows:

1. The multiple R for each of the regression equations (1974, 1975 and 1976) was significant beyond the .001 level, and was higher than the corresponding zero-order correlation between total practice scores and corn yields (see Table 22 for comparative purposes). Moreover, each of the regression equations consisted of 4 individual items, as opposed to the 13 items which comprise the total practice score.

2. Although it was hypothesized at the outset that the relative importance of specific practices in the regression of different years would vary with environmental factors, it is interesting to note that 2 practices (i.e. type of fertilizer used at flowering time - item #7; and crops planted in association - item #3) appeared in all 3 equations.

b. Regression of bean yields on 13 practice items: 1974, 1975, and 1976

Table 25 presents the results of the regression of bean yields on the 13 individual practice items. The overall findings may be summarized as follows:

1. The multiple R for each of the regression equations (1974, 1975 and 1976) was significant at the .01 level or greater, and was higher than the corresponding zero-order correlation between total practice scores and bean yields (See Table 22 for comparative purposes). Regression equations consisted of as few as 2 items (1976), to as many as 4 items (1975).

2. There were also some interesting consistencies in the obtained regression equations for beans. Both item #5 and item #1 (i.e., type of fertilizer used at seeding time, and preparation of the land for crops) appeared in both 1974 and 1975. Also, item #8 (amount of chemical fertilizer at flowering time) appeared in the regression equations for both 1975 and 1976.

c. Regression of sorghum yields on 13 practice items: 1974, 1975, & 1976

Table 26 presents the results of the regression of sorghum yields on the 13 individual practice items. The results of these analyses indicated the following:

1. The multiple R for each of the regression equations (1974, 1975, and 1976) was significant beyond the .001 level, and was higher than the corresponding zero-order correlation

Table 25. Summary of the multiple regression results for beans: 1974, 1975, and 1976.

1974

Multiple R = .20 — F (df = 3,739) = 10.79; p < .01
R Squared = .04 — N of cases = 743

Item #*	Zero-order r with yield	Regression coefficient	Beta weight	Covariate F-ratio	Sign.
7	.17	.62706	.11863	9.213	<.01
5	.15	.41358	.08944	5.286	<.05
1	.12	.53078	.07728	4.354	<.05
Constant		4.12620			

1975

Multiple R = .36 — F (df = 4,699) = 25.59; p < .001
R Squared = .13 — N of cases = 674

Item #	Zero-order r with yield	Regression coefficient	Beta weight	Covariate F-ratio	Sign.
5	.30	.89350	.23234	36.500	<.001
1	.23	.99922	.14049	13.233	<.001
8	.20	.61126	.10032	6.977	<.01
12	.11	.65041	.08410	5.377	<.05
Constant		-1.80818			

1976

Multiple R = .21 — F (df = 2,697) = 15.31; p < .001
R Squared = .04 — N of cases = 700

Item#	Zero-order r with yield	Regression coefficient	Beta weight	Covariate F-ratio	Sign.
8	.17	.34415	.17587	22.499	<.001
9	.11	.41425	.10873	8.599	<.01
Constant		4.17762			

* See Table 13 in order to identify which practices are associated with item #'s.

Table 26. Summary of the multiple regression results for sorghum: 1974, 1975, and 1976.

1974

Multiple R = .24 F (df = 3,675) = 13.75; $p < .001$
R Squared = .06 N of cases = 697

Item#*	Zero-order r with yield	Regression coefficient	Beta weight	Covariate F-ratio	Sign.
3	.19	1.56137	.16601	19.169	<.001
1	.14	1.39457	.10147	7.038	<.01
5	.13	.83854	.09014	5.574	<.05
Constant		3.46876			

1975

Multiple R = .39 F (df = 6,651) - 19.47; $p < .001$
R Squared = .15 N of cases = 658

Item#	Zero-order r with yield	Regression coefficient	Beta weight	Covariate F-ratio	Sign.
3	.27	1.29264	.18198	22.800	<.001
5	.25	.75820	.13790	12.306	<.001
1	.23	.99035	.09922	6.342	<.05
10	.17	.95576	.12128	10.801	<.01
11	.11	.83009	.10890	8.875	<.01
7	.19	.45679	.07735	3.902	<.05
Constant		.96927			

1976

Multiple R = .28 F (df = 4,619) = 12.69; $p < .001$
R Squared = .08 N of cases = 624

Item#	Zero-order r with yield	Regression coefficient	Beta weight	Covariate F-ratio	Sign.
3	.21	1.06223	.16401	16.191	<.001
7	.18	.45405	.13160	10.545	<.01
10	.08	.81984	.08926	5.299	<.05
5	.12	.46168	.08022	4.175	<.05
Constant		7.40023			

* See Table 13 in order to identify which practices are associated with

between total practice scores and sorghum yields (see Table 22 for comparative purposes). Regression equations consisted of as few as 3 items (1974), to as many as 6 items (1975).

2. Several items again appeared in 2 or more of the regression equations for sorghum. Both item #3 and item #5 (i.e., crops planted in association, and type of fertilizer used at seeding time) appeared in all 3 years. Item #1 (preparation of land for crops) appeared in both 1974 and 1975; and item #10 (use of fungicides) appeared in both 1975 and 1976.

The regression analyses of crop yields on the individual practice items were designed to indicate which specific practices were most strongly related to which specific crops. It was assumed at the outset that different practices would be most important in different years, due primarily to the variation in weather conditions between years. While the above assumption was given some support by the obtained results, it is nevertheless interesting to note the consistencies in the data. A few significant practices appeared in all three years for both corn and sorghum, and several others appeared in at least two of the three years for both beans and sorghum. Furthermore, in each case the multiple R for the obtained regression equations was higher than the corresponding correlations between total practice scores and crop yields. The most important overall result, however, was the finding that different practice combinations were found to be more important than others for specific crops

CHAPTER XVIII

POPULATION CHARACTERISTICS AND THEIR RELATIONSHIP TO LEVEL OF PRACTICE AND LEVEL OF CHANGE

In Chapter XVII the analysis was focused on differences between treatment areas and the relative effectiveness of different levels of message saturation. In the present chapter, some of the personal and agricultural characteristics of farmers are examined by level of practice or amount of change. This approach provides insight into some of the factors that may serve to impede or accelerate response to the Basic Village Education program.

Subsistence farmers, the subject of this study, represent a heterogeneous mixture of personal life-styles, belief systems, agricultural practices and quality of life. At the same time they are found to be living in generally common circumstances with strong traditional bonds that are so obvious to the casual observer that the wide range of differences in the population often tends to become obscured. Recognizing the breadth of these differences, the purpose of the present section is to present some of the characteristics of people who responded differentially to the treatment systems in BVE and were at different levels of agricultural practice.

When target populations are being considered for radio education, or any other developmental approach, a better understanding of the subpopulations within any group is a vital aid in programming and in understanding the factors which influence practice and change.

In this section, two major comparisons are presented. The first is a comparison between farmers defined as high practice and low practice in terms of the 13 item index described in an earlier section. The major comparisons were made by comparing the upper quartile or upper 25 percent of the population with the lower 25 percent of the population. The second comparison was made between groups of farmers defined in terms of 1974-1976 differences in practice scores, and again the major comparison was made by use of the upper quartile (25 percent) and the lowest quartile (25 percent). Similarities and differences were explored in two general ways. The first set of comparisons was made using chi-square tests. Secondly, supporting analysis was made using Pearson product-moment correlations on certain selected items to which this statistic was applicable. (See Apendix H).

The material described here does not refer to any specific individual farmer, but will be discussed in the sense of the general characteristics of farmers. That is, comparisons were made between farmers (as groups) who had high practice scores versus other farmers who had low practice scores. In the same manner, a general description of the characteristics of the high change individuals as compared to those persons who showed little or negative change will be provided.

A. High and Low Practice Farmers

High and low practice farmers were defined in terms of their 1976 total practice score levels. As previously noted (Chapter XVII), total practice scores have a potential range of 0 to 65 points, based on the 13 item practice index. In 1976 these scores actually ranged from 3 to 55.5 points. The 1976 total practice score distribution was then divided into quartiles, with approximately 205 farmers in each quartile, in order to define high and low practice farmers. The upper quartile (i.e., High Practice) of farmers included those who had total practice scores of 36.50 or greater in 1976, and the lower quartile (i.e., Low Practice) of farmers included those who had total practice scores of 25.67 or less in 1976.

Table 27 gives the distribution of high practice and low practice farmers by treatment area. The Quezada area had the highest number of high practice farmers, followed by Yupi RMA and Monitor. Control and Yupi RM have the lowest numbers of high change farmers, consistent with previous findings (Chapter XVII) of overall change in practice in these areas.

1. Some general characteristics

Both high and low practice farmers tend to own their own home and are about the same age, with the only general difference being that high practice farmers appear to have slightly larger families. One interesting difference between these groups is that the high practice farmers are more likely to report the use of Incaparina to enrich their diet.

2. Mobility

The high practice farmer travels much more frequently than his counterpart to the municipio or departmental capital and even to Guatemala City, presumably to take advantage of some of the goods and services available. Both low and high practice farmers tend to do some work on the coast, but this is found with about equal frequency in both groups.

3. Group membership

High practice farmers are much more likely to belong to an organized group. This may indicate that the high practice farmer is more in the mainstream of things, and more communicative with other members of his community. In addition high practice farmers tend to make slightly fewer decisions alone.

4. Land ownership

High practice farmers show a tendency to own more land than low practice farmers. They also rent less land, but show a tendency to sharecrop more than low practice farmers. Both high and low practice farmers also tend to share some communal lands.

Table 27. Number of high and low practice farmers by sub-area.

Sub-area	High practice	Low practice
QR	58	12
QRM	33	20
QRMA	30	15
YR	19	39
YRM	9	51
YRMA	29	17
IM	23	19
IC	7	37

5. Animal ownership

The possession of animals is a very important factor in responding to higher levels of technology, particularly in terms of land preparation. Therefore, it is not surprising to find that high practice farmers have more horses and oxen, and consequently they are able to work their farms more efficiently.

6. Crop sales

High practice farmers report selling more corn and beans than low practice farmers. This probably results in more available cash which can be used to buy other items such as fertilizer, and other necessities of life. It was also observed that some low practice farmers will sell some of their crop, although probably for different reasons. That is, they too must have some cash available to them, even though they may have insufficient corn and bean supplies to last for the year. In any case, the major finding here is that there is a clear relationship between high practice and having corn and beans to sell.

7. Risk

While few items deal directly with the concept of risk, one question dealing with concern over the dangers associated with new crop seed was utilized. While almost all farmers see little danger with new seed; there is a tendency for the high practice farmers to see even less danger than low practice farmers. This perceived danger on the part of the low practice farmers perhaps indicates a more traditional orientation.

8. Source of information

In general, high practice farmers report receiving more new knowledge than low practice farmers. High practice farmers are less likely to rely on friends and neighbors and more likely to report getting information from the radio or monitor. High practice farmers are also more likely to report that they have changed their planting methods. Of those farmers who did change, high practice farmers report the radio, agronomist, friends and neighbors, and "other" (in that order), as sources of information. In contrast to this, low practice farmers report friends and neighbors first, agronomists second, and radio third, as sources of information; thus showing a much heavier reliance on the friends and neighbors network.

High practice farmers report radio far more often than low practice farmers as a source of information. High practice farmers are in more frequent contact with agricultural technicians, but consider visits from the agronomist less important than do the low practice farmers. Both high and low practice farmers are about equal in mentioning the BVE agronomist. Table 28 provides the distribution of responses on sources of information.

Table 28. Sources of information reported by high practice and low practice farmers.

Response	High practice	Low practice
Nothing new	110	164
Friends and neighbors	16	33
Agronomist	19	9
More than one source	1	0
Saw it somewhere else	7	0
Salesman	0	0
Radio	40	4
Monitor	6	0
Other	9	0

Response of High Practice and Low Practice farmers to: "Who advised you to make these changes (in planting)?"

9. Level of aspiration

There is a tendency for high practice farmers to feel that a person can advance in life as a farmer, as opposed to other alternatives. High practice farmers also express hopes for higher levels of education for their children in comparison with low practice farmers.

10. Radio listenership

High practice farmers tend to listen to the radio more often, and also tend to have their own radios. More high practice farmers report listening to the radio all day, and enjoying educational programs more than low practice farmers.

11. Literacy

High practice farmers report writing and receiving more letters. They also report themselves as being literate. High practice farmers report more years of school and more literate family members.

Differences were found between high and low practice farmers on most of the variables investigated. Some of these differences make it clear that high practice farmers may have had some economic advantage in order to obtain this status.

B. High and Low Change Farmers

This section will look at the differences between high and low change individuals, compared on the same items that were used in the previous section on high and low practice farmers.

High and low change farmers were defined in terms of their relative increase or decrease in practice level between 1974 and 1976. The distribution of 1974-1976 change scores ranged from -19.00 (or a loss of 19 points between 1974 and 1976), to 25.00 (or an increase of 25 points between 1974 and 1976). This distribution was then divided into quartiles, again with approximately 205 farmers in each quartile. The upper quartile (i.e., High Change) of farmers included those who increased their practice level 9.7 points or greater between 1974 and 1976, and the lower quartile (i.e., Low Change) of farmers included those who increased .7 points or less between 1974 and 1976.

Table 29 gives the distribution of high change and low change farmers by treatment area. The number of high change farmers in YRMA is most striking, with M, QR, QRM, QRMA and YR showing change but in smaller numbers. YRM and Control show the smallest number of high change farmers, again consistent with earlier findings.

Table 29. Number of high and low change farmers by sub-area.

Sub-area	High change	Low change
QR	29	32
QRM	29	27
QRMA	23	28
YR	21	21
YRM	14	26
YRMA	43	10
IM	30	21
IC	15	42

1. Some general characteristics

Virtually all high and low change farmers own their own home. High change people have a slight tendency to be younger than the low change people but these differences are not large. There are no differences between groups in family size, or with respect to the use of incaparina as a dietary supplement.

2. Mobility

High change individuals tend to be more mobile than low change individuals in terms of visits to the municipality, departmental capital, or visits to Guatemala City. However, this relationship was at a low level even though it is significant. There is also a tendency for the high change people to spend less time on the coast; however, this is a very low level of relationship.

3. Group membership

Both low and high change persons tend to make their decisions alone, although high change persons do tend to belong more to organized groups.

4. Land ownership

High change individuals tend to own more land, but there was no significant difference in the pattern of land rental between groups. There were also no differences in the utilization of communal land, sharecropping, or other arrangements. Both groups felt that they could improve their land with more fertilizer.

5. Animals

High change individuals have both more horses and oxen than low change individuals. This allows them to carry out improved technology, especially with respect to land preparation.

6. Cash crops

High change farmers sell more corn and beans than low change farmers. The assumption is that they have more of these crops available to them due to more efficient farming methods.

7. Risk

The only item dealing with risk was concern for the use of new seed, and no differences were found. In general, there was very little concern about the use of new seed for either high or low change farmers.

8. Source of information

High change individuals tend to report friends and neighbors as information sources less than do low change individuals. High change farmers do not report changing planting methods more than their counterparts, but if they did change the source of information was most likely the radio, friends and neighbors, agronomists, and monitors--in that order. Low change farmers tended to report their sources of information in the following order: friends and neighbors, radio, and then agronomists. High change farmers also report being in contact with agricultural technicians more frequently than low change farmers. There is no difference between high and low change individuals in terms of the perceived importance of visits from the agronomist; however, high change persons do report more advice from agronomists. See Table 30 for a distribution of sources of information reported by high change and low change farmers.

9. Aspiration level

No differences were found between high and low change farmers in their attitudes towards their ability to advance as a farmer. However, high change individuals tended to have a higher aspiration for their children's education, desiring more years of education than low change persons.

10. Radio listenership

High change persons listen to the radio more often, and are more likely to have their own radio. There is also a tendency for high change farmers to listen to the radio throughout the day, and to have a greater interest in educational programming.

11. Literacy

High change individuals receive letters more frequently than low change individuals, and also tend to be slightly more literate than low change farmers. There was little difference between high and low change farmers in terms of years of school attended. High change individuals did, however, tend to have slightly higher family literacy, but this difference was at a marginal level.

Summary

On many of the characteristics studied, high practice farmers and high change farmers have striking similarities. How these variables interact to produce high practice and change poses a question not answered by this level of analysis. However, it is clear that several conditions are critical for High Practice and for High Change. They are as follows:

Table 30. Sources of information reported by high change and low change farmers.

Response	High change	Low change
Nothing new	125	138
Friends and neighbors	13	30
Agronomist	12	16
More than one source	0	1
Saw it somewhere else	6	2
Salesman	1	0
Radio	32	16
Monitor	8	2
Other	7	2

Response by High Change and Low Change farmers in response to: "Who advised you to make these changes (in planting)?"

1. Ownership of adequate amounts of land and farm animals allow for improvement in technology.

2. A receptiveness to new ideas is related to belonging to community groups and travel in areas outside the farm. A regular habit of listening to radio also seems to provide a basis for change.

3. Greater reliance is placed on technical advice made available through radio, monitors and agronomists. Friends and neighbors are still major sources of information also, but in balance with information from outside the community.

4. Personal skills for improvement in the form of higher levels of individual literacy, schooling and family literacy seem to be basic to reaching out for and using new knowledge. Recognition of the value of these factors is also reflected in their higher aspiration levels in relation to their children's education.

CHAPTER XIX

TRACKING THE PROCESS OF CHANGE: KNOWLEDGE AND ATTITUDES AS COMPARED TO PRACTICE

Previous chapters have focused on the changes that have taken place in the experimental areas as indicated by farmers' use of improved agricultural practices. The content of the educational programs that have been presented by radio, by the monitor, and through the agronomist has been directed toward this goal. If a project such as this is successful there should be changes in behavior, i.e., improvements in the agricultural practices that the farmers use in their production of crops. These changes are evident in the data that have been presented in Chapter XVII. In addition to overt changes in behavior, changes in knowledge and in attitudes were also expected. While these changes are not as easily measured as changes in behavior, it is important that they are measured in order to understand the full impact of educational programs. This chapter presents a summary analysis of the time sample surveys that were designed to measure knowledge and attitude levels and their relationship to agricultural practices.

A. Relationship of Responses on Time Sample Surveys and Annual Survey

The annual surveys could have been designed to include measures of knowledge and attitudes as well as practice. The fundamental problem in this inclusion is the length of this required to measure knowledge and attitude components. These measures require in-depth interviewing, and would have lengthened the time required to complete the annual surveys beyond that allowable in one setting. As a result, the time sample survey method was introduced to measure knowledge and attitudes. These surveys were administered to a small sample of the farmers each month, and were designed to focus on a limited number of recommended practices in depth.*

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* In addition to these duplicate questions included as reliability checks, the time sample surveys also included some questions that were specifically related to special programming that had been presented in the previous weeks. For example, a problem developed in the control of an insect in the bean crop in 1975. Specific instructions were included in the educational program presented by the radio, the monitor and the agronomist which gave the exact name of the product that was available. When the results were tabulated it was found that 24% of the farmers in the experimental areas identified the product. This was included in one time sample survey but was not part of the annual survey because of the necessity of maintaining equivalent questionnaires from year to year so that comparable data could be gathered.

Although the time sample surveys were not designed to be exact duplicates of the annual surveys, there were several duplicate questions in both surveys. The 1976 time sample surveys included four questions concerning agricultural practice which were identical to annual survey questions. As a test of reliability, it was expected that farmers' responses on the time sample would be consistent with their responses on the annual surveys. Practice levels reported by the respondents for all four of these practice questions during the time sample interviews were reasonably consistent with those reported in the annual surveys, and all were more closely associated than would have been expected by chance. For example, if a farmer reported a high level of practice in relation to the other farmers during a time sample interview, he similarly reported a relatively high level when asked the same question during the annual survey interview. (See Appendix I for complete results of reliability analysis).

B. Representativeness of Farmers Selected for Time Sample Survey

Farmers were selected through a randomization procedure for interviewing in the time sample survey. There is always a chance, however, that those chosen may not be representative of the larger group. As a test for the possibility that farmers who participated in each of the time sample surveys were not representative of the total population, farmers who were interviewed were compared against all those who were not interviewed on a series of background characteristics. The results of these analyses indicate no consistent differences that might lead us to believe that the farmers interviewed in the time sample surveys were different from those not interviewed. For example, farmers interviewed in Time Sample 14 were neither older nor younger, had neither more nor less land available for planting, did not differ with respect to education, literacy, family size, number of literate family members or any of the other characteristics thought to be related to receptivity to change. (See Appendix J for further details concerning sample representativeness).

Because the farmers interviewed in the various time samples appear to be representative of all farmers included in the BVE project, and because they tend to give similar answers to identical questions on the time sample and annual surveys, it is therefore possible to make generalizations concerning knowledge and attitudes that are probed in more depth in the time sample surveys.

C. Relationship of Knowledge and Attitudes to Behavior

In evaluating development projects it is important to measure changes in knowledge and attitudes because of the difficulty in obtaining evidence of significant behavior change during the relatively short

time frame of major program inputs. This is particularly true where development projects are initiated (with international assistance) in traditional settings where change in behavior is particularly slow. The experimental phase of the BVE Project has a planned duration of three years, yet the literature on the adoption of new agricultural practices suggests that changes of this type do not take place immediately even in more change oriented settings. For example, Rogers and Shoemaker 1/ and Lionberger 2/ indicate that 5 or 10 years may be necessary for widespread use of a new practice to take place.

Practices do change slowly, but this does not mean that the process of change has not started. It is generally understood that the change process starts with an awareness of a new way of doing something, which is then followed by a period of learning more about it, and finally by a period of decision. In the decision stage the new practice is either seen as desirable and approved of, or as being impractical and thus rejected. If the diffusion process is successful the farmer may try the new practice and decide whether he wants to use it continually.

One of the most valuable contributions of the time sample surveys to the BVE evaluation design is their ability to measure the farmer's knowledge and attitudes* about various agricultural practices as well as his actual use of those practices.

Based on the literature, we have hypothesized the following set of relationships:

a) Average knowledge and attitude levels will be higher than average usage levels for all practices. There will be more people reporting that the highest practice level, or the level just below the highest level, on the 5 point scale is the "best way" than there are who actually use these higher levels of practice. (See Chapter XVII, Part A for a discussion of practice levels and how practices were scaled).

1/ Rogers, E.M. and F. Floyd Shoemaker, Communication of Innovations. New York: The Free Press, 1971.

2/ Lionberger, Herbert, Adoption of New Ideas and Practices. Ames: Iowa State University Press, 1960.

* "Attitude" is a relatively enduring organization of an individuals belief about an object that pre-disposes his actions(See Rogers and Shoemaker, p. 109). Most of the attitude scales are based on an intensity of feeling related to the object or situation. The attitude measurement used here is in answer to the question "What do you think is the best way to--(do the practice in question)?" The alternative answers vary from the level recommended by the BVE program to the least desirable level. The answers are scaled from 1 to 5; 5 being the recommended level.

b) Farmers who report high knowledge and attitude levels will also report relatively higher practice levels than farmers who report lower knowledge and attitude levels. More specifically, farmers who report that the highest level of practice is the "best way" (attitude) will also report using a higher level of practice than those who feel that a level lower is more desirable.

1. Methods of analysis

Measures of knowledge and attitude were combined in these analyses for their comparison to levels of practice. The interview sequence asked first if the farmer had heard any new information about a given practice. For example: "Have you heard any new information recently about land preparation?" This was followed by another question, "What do you think is the best way to prepare your land?" This second response gives a more adequate measure to compare attitude with levels of use. The first question measures new knowledge only, rather than total knowledge. It is therefore useful in measuring change in knowledge but does not compare to attitude levels and levels of use.

While the attitudinal component for a total of 17 practices was measured in the 1976 time samples (level of use was also measured), only five of the practices were selected to be included in the present analysis. These practices were selected on the basis of two criteria: 1) the usage and attitude components had to be measured by identical questions in which each category on the 5 point scale was equally applicable to both components and; 2) the percentage of respondents giving valid replies (replies other than "no answer" or "doesn't know") to both components had to be substantial.

The following five practices met the above criteria, and thus were used in the analysis of the relationship between attitudes and practice usage levels: land preparation method, soil erosion prevention, corn storage method, time of fertilizer application at flowering, and method of fertilizer application in relation to hilling.

Construction of a total "practice" or "attitude" index of the type presented in Chapter XVII was precluded by the fact that these five questions were asked during different time samples, each with a different sub-sample of the population. Thus, a single farmer is not likely to have been asked about all five of the practices, and therefore, a total practice score based on his responses to the individual component items could not be constructed. For this reason, the attitude/usage analysis was performed on each of the five items individually; and where applicable, averages have been computed to aid in interpretation.

The analysis also indicates that practices and attitudes are significantly related when considering the farmers both individually or as a group.

Following the rationale of the diffusion process, if new knowledge is introduced and if the attitudes toward the knowledge are favorable, then this process will result in adoption of new practices. It is hard to predict just how many of the farmers with favorable attitudes will actually use the recommended practices in the future, but the results of the analysis suggest the adoption process is well under way.

Only a few practices were used in the comparison of attitude levels (and related knowledge component) and usage levels. Because of the linkage that was established between these practices (which were measured in-depth in the time samples), and the larger number that were measured in the annual surveys, it is further suggested that the same general pattern holds for all of the recommended practices.

2. Findings

a) As can be seen from Figure 7, more high level responses were obtained with respect to the attitude questions for the five practices than the "use" questions for these items. While only 53.3 percent of the responses indicate use of the practices at the recommended level, 80.4 percent of the responses indicate an attitude that the recommended way is the "best" way. By the nature of the interview format, this also means that the farmers had knowledge of the recommended practices. It is important to realize that the above figure represents the pooled responses for all five practices together. In reality, each of the practices differed in average levels of use and attitude when considered individually. This can be observed in Figure 8.

It is clear from the graph and table that the average attitude level is higher than the average use level for each of the five selected practices. While it is apparent that attitude/usage differences varied by practice (the difference is much greater in practice 4 than in practice 2), the observed difference in each of the five practices is greater than would have been expected by chance. (See Table 31.)

b) A further step that remains in the analysis is to establish a firmer relationship between attitude and practice. The measures presented up to this point are global in that the attitude responses of all farmers are compared against the corresponsing practice responses. The question now becomes: "Is this true also for the individual farmers?"

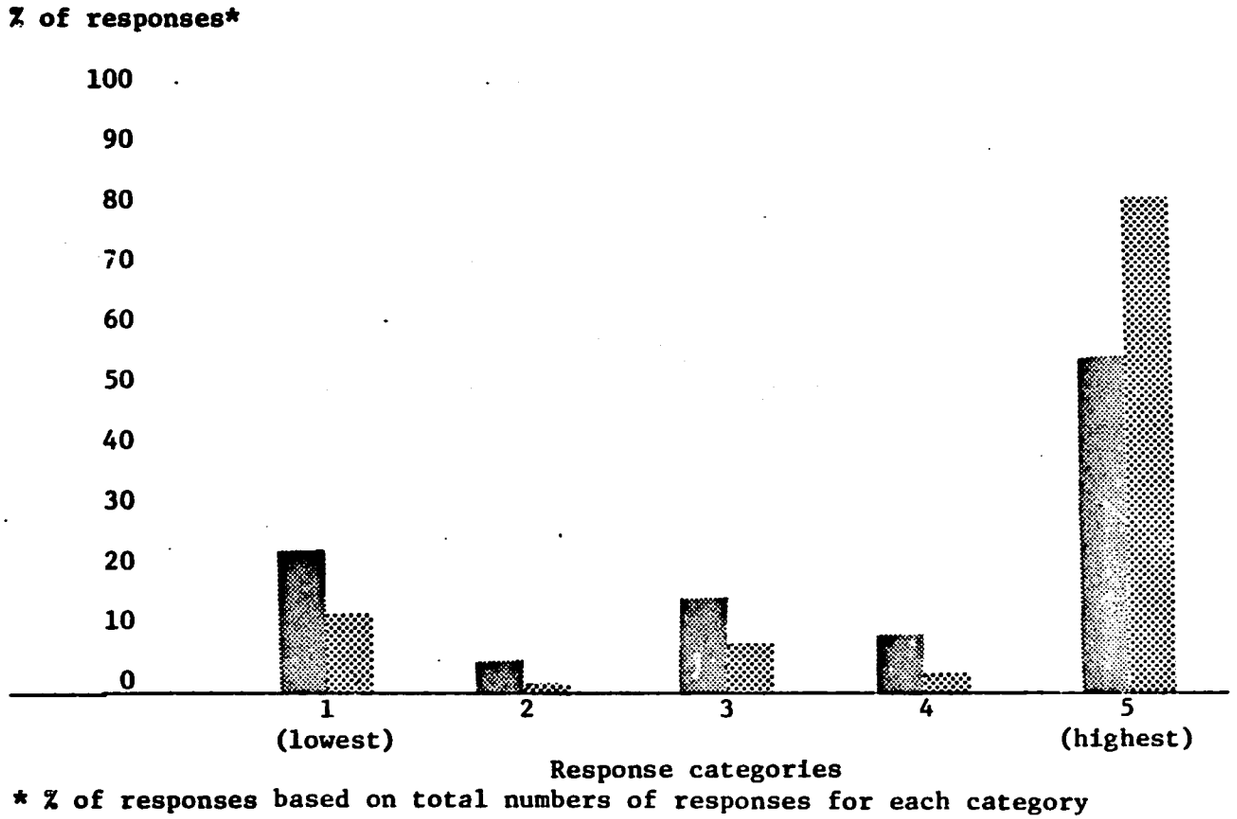
Individual farmers' attitude levels and usage levels were found to be associated. Those farmers who reported a high attitude level also tended to report higher levels of use for that particular practice. This relationship was found to be true both overall (for all five practices taken together) and for each practice taken individually.

Table 32 presents the standard measures of correlation and shows that for each practice for which a correlation coefficient was computed the relationship between a farmer's attitude and use levels was stronger than would have been expected by chance.

3. Conclusions

The former chapters have indicated that there have been significant changes in agricultural practices as a result of the BVE experimental program. In addition to the changes in practice, the results of the time sample surveys indicate the levels of favorable attitudes toward the recommended practices (and the corresponding knowledge components) are presently much higher than the practice levels.

Figure 7. Comparison of frequency distributions of usage and attitude levels for all five practices combined.



* % of responses based on total numbers of responses for each category

Usage level

Attitude level

Figure 8. Average attitude and usage levels by practice.

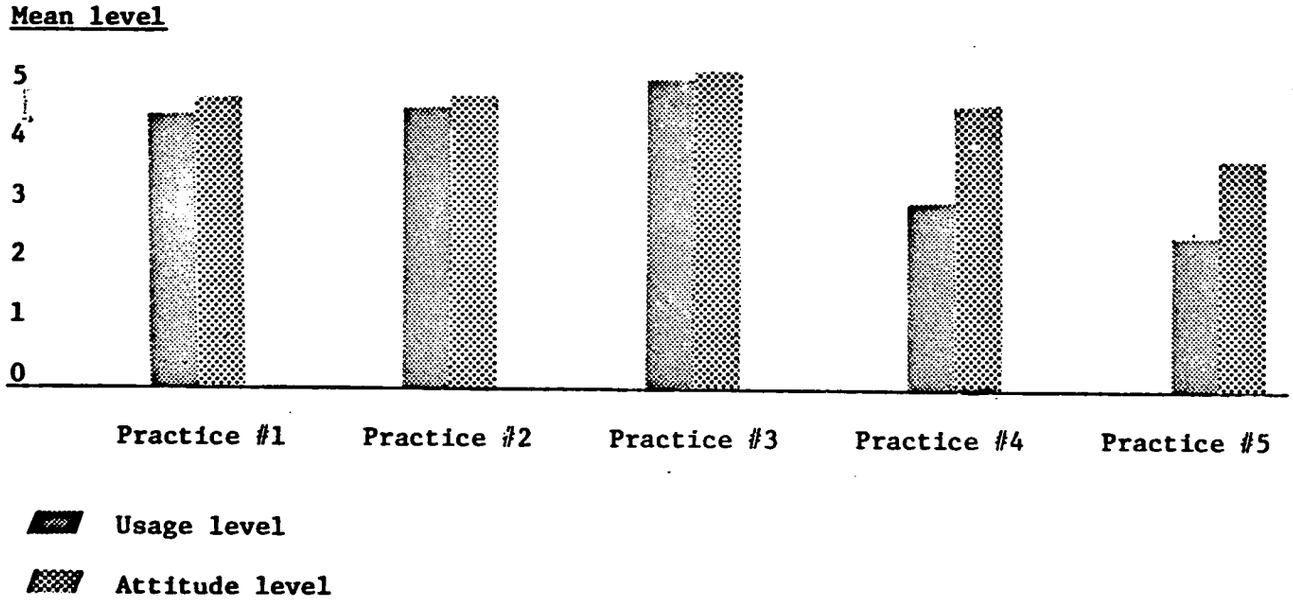


Table 31. Comparison of average attitude and usage levels.

			Attitude				
	Mean	Std. dev.	Mean	Std. dev.	t*	Sig.**	N
Land preparation (#1)	4.27	0.926	4.54	0.870	6.10	p .001	147
Soil erosion (#2)	4.30	0.915	4.53	0.848	4.66	p .001	142
Corn storage (#3)	4.89	0.627	5.00	0.000	----*** ----		191
Time of fertilizer application (#4)	2.96	1.996	4.36	1.470	9.26	p .001	200
Method of fertilizer application (#5)	2.46	1.779	3.68	1.861	8.19	p .001	200

*t-test for paired comparisons

** Significance tests for t are based on 2-tail probabilities

*** t not computed due to lack of variance in attitude scores

Table 32. Association between individual farmers' attitude and usage levels.

	r*	Significance**
Land preparation (#1)	0.83	p=.001
Soil erosion (#2)	0.79	p=.001
Corn storage (#3)	----	-----***
Time of fertilizer application (#4)	0.27	p=.001
Method of fertilizer application (#5)	0.34	p=.001
Average	0.58****	-----

* Pearson's product-moment correlation coefficient (r)

** Significance tests for r are based on 1-tail probabilities

*** r not computed due to lack of variance in attitude scores

****Average correlation coefficient computed using Fisher's r to z transformation

CHAPTER XX

SOURCES OF INFORMATION FOR CHANGE

One of the fundamental goals of the BVE experimental project is to determine which source* of information has the greatest impact. In reality, it is unlikely that a single source is responsible for as much change as a combination of sources. The literature on this subject suggests that the effectiveness of a given source also varies as the target person moves along in the adoption process. One source may be important in the early stages when new knowledge is being acquired, and another source may be more important as the person is actually trying to decide whether to use the new practice or not.

In general, the literature indicates that mass media such as radio may serve well to call attention to a new idea, but because it is impersonal, it does not play a central role when a person is at the point of implementing the new idea. At this latter point, the advice of, or adoption by, a friend or a close group of associates is much more convincing. This is particularly true when the target person is a member of a traditional culture.

It is therefore hypothesized that farmers in the BVE experimental areas would regard radio as an important source of information for new knowledge, and perhaps for some attitude change, but not very often as a source responsible for actual changes in practice.

It is also hypothesized that the monitor, as a more personal source, and the weekly group meetings of neighbors that are led by the monitor, would be particularly important at the later stages of adoption.

It is further hypothesized that the agronomist, as an outside expert who also makes personal visits (along with the monitor), to the farmer's fields would also be an important source of information for practice adoption.

A. Method of Measurement of Information Sources in Time Sample Surveys

Each farmer interviewed in the time sample was asked if he had heard any new information concerning the particular agricultural

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* Source as used in this chapter includes such media as radio, monitor (local para-professional), agronomist, friends and neighbors.

practice in question. If the farmer's response indicated that he had heard the BVE recommendations concerning the practice, it was counted. This is not to say, however, that the BVE project is the exclusive source of good agricultural information. Since information could conceivably come from various sources, only those recommendations that were part of the BVE message were considered in these analyses.

If the farmer indicated that he had heard recent information related to a recommended practice, then he was asked where he had obtained this information. He could have answered: "Radio Quezada" (the BVE radio station), "the BVE Monitor," the "BVE agronomist," "Friends and/or neighbors," and/or any combination of these sources. In tabulating the responses for this section the combinations were added to the basic source; that is, the responses listed under radio include radio alone or in combination with another source.

In order to better understand the effects of different information sources in the BVE experimental project, the relative importance of each source is examined first for the whole Oriente area, followed by separate analyses of all of the treatment (and control) areas.

The results of the time sample surveys conducted in both 1975 and in 1976 are included so that the relative impact of the different sources can be compared by year. This also parallels the time span for the annual survey data used in chapters XVII and XVIII.

B. Sources of Information: Overall Impact

1. Sources of new information for farmers reporting upward movement in their agricultural practice levels: "Improvers"

Many farmers made positive improvement in their agricultural practices during the experimental period of the BVE project. This was conclusively demonstrated in the practice score analysis from the annual surveys reported in Chapter XVII. The data collected from the time sample survey for the same time frame also confirms these results.

Table 33 is a summary of the responses from the time sample surveys conducted in 1975 and 1976. A total of 6,742 responses were recorded during these two years. Seventeen practices were investigated each year, and some of these were common to both years. In addition, some of the same practices were investigated using common questions on the annual survey. Table 33 also notes that 1,956 of the total responses indicate that improvements had been made in agricultural practices during these two years. Of particular importance to the present analysis are the 1,072 responses which identified improvement in agricultural practice and a related source of new information.

Table 33 Agricultural practice improvement and sources of information reported on time sample surveys in Oriente during 1975 and 1976.

Response Category	Year 1975	Year 1976	Total 1975-76
Total responses	3400	3342	6742
Responses of farmers reporting change	897	1059	1956
Responses of farmers reporting change and new information	518	554	1072 (100%)
Responses of farmers reporting "Friends and Neighbors" as source of new information	57	200	257 (24.0%)
Responses of farmers reporting "Other Agronomist" as source of new information	31	56	87 (8.1%)
Responses of farmers reporting "BVE Radio" as source of new information	380	236	596 (55.6%)
Responses of farmers reporting "BVE Monitor" as source of new information	76	95	171 (16.0%)
Responses of farmers reporting "BVE Agronomist" as source of new information	1	4	5 (0.5%)

The reported sources of information for "Improvers" between the years 1975-1976 can be compared in order of their importance.

BVE Radio	= 596 (55.6%)
Friends and Neighbors	= 257 (24.0%)
BVE Monitor	= 171 (16.0%)
Other Agronomist	= 87 (8.1%)
BVE Agronomist	= 5 (0.5%)

The relative importance of the sources also changed during the two year period. As can be observed in Figure 9, "BVE Radio" was much more important in 1975 than in 1976; "Friends and Neighbors," in contrast to the radio, increased greatly in 1976 over 1975; the "BVE monitor" started in second place in 1975 and increased but not as much as friends and neighbors so that it ranks third in 1976; "Other agronomist" is in fourth place and increased in 1976; and, the "BVE agronomist" is reported in last place with a slight increase in 1976.

As previously noted, there were 1,956 responses that reported some improvement in their agricultural practices during 1975 and 1976. For most of these, it was merely an improvement (i.e. any positive movement) and they still had not reached the highest level of practice.

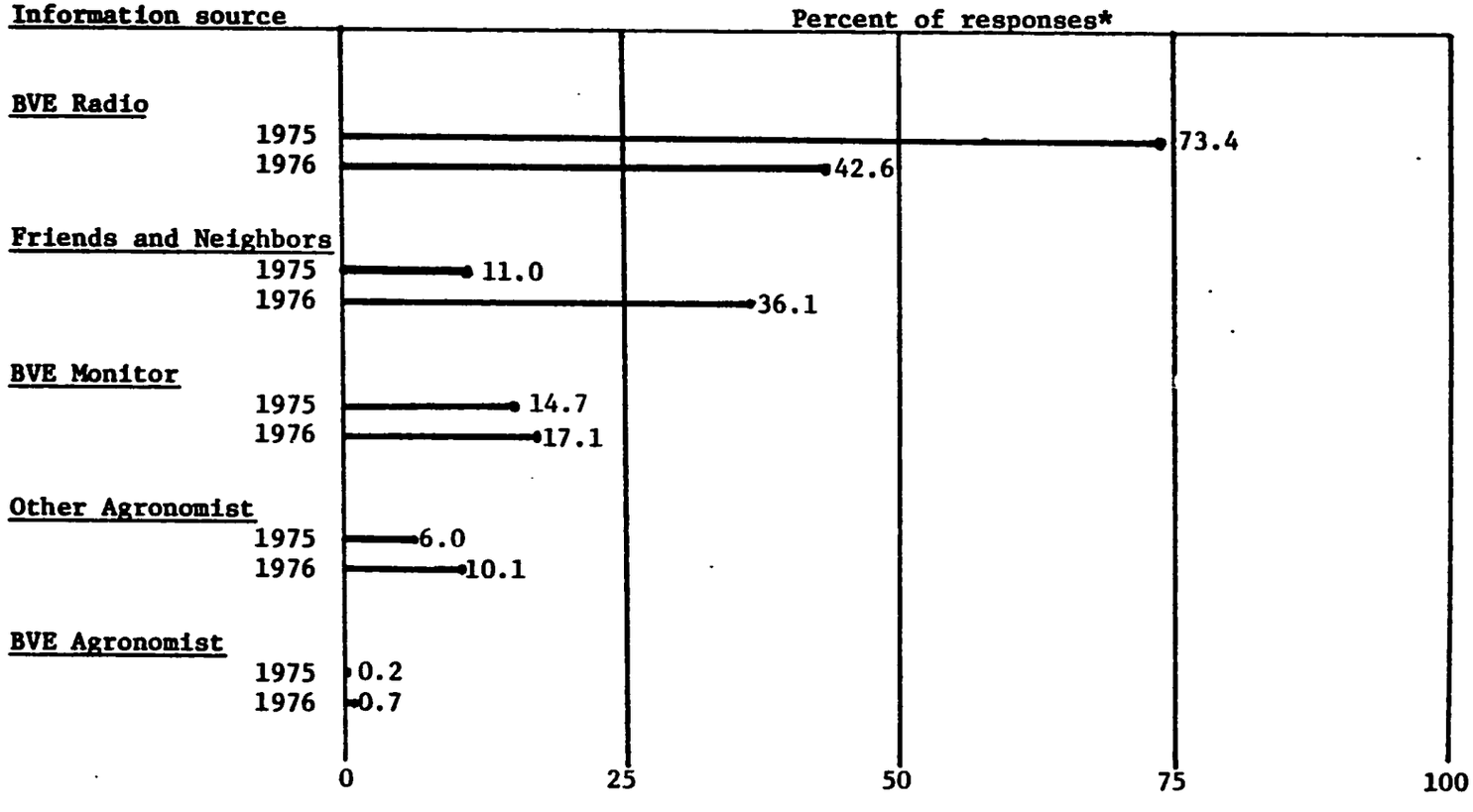
It is also important to know how many farmers have actually reached the highest level of practice ("Adopters"), and to find out if there is any difference between these individuals and "Improvers" in the sources of new information that they have used.

2. Sources of new information for farmers adopting the recommended (highest) level of practices: "Adopters"

There was a total of 575 responses by "adopters" (i.e., individuals who responded at level 5 on a practice) in the 1975-1976 period as recorded in the time sample surveys. More specifically, an "adopter" is a farmer who used a practice at the recommended level during the year he was interviewed, but did not use it at that level the previous year.

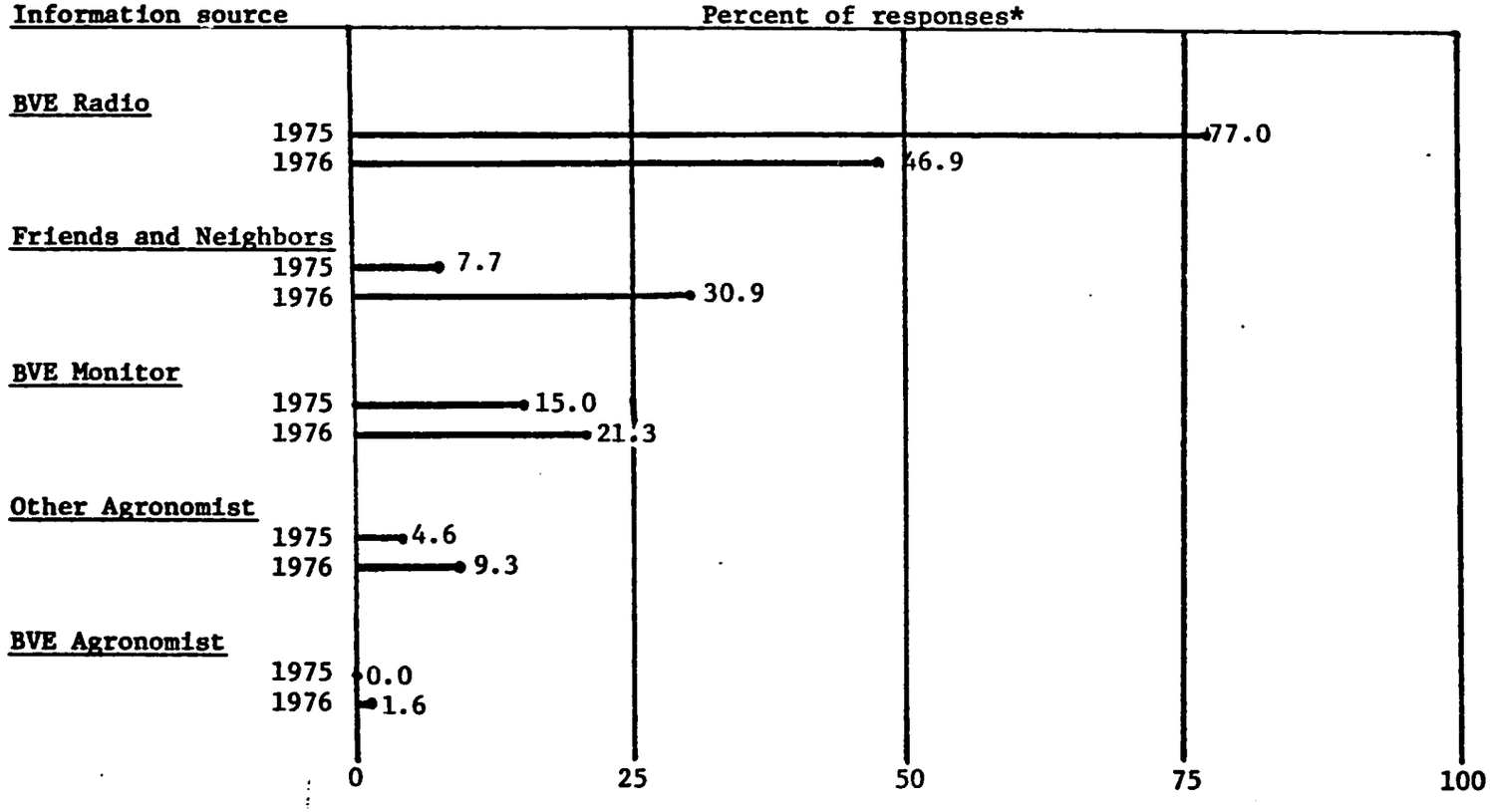
The relative importance of the information sources for "adopters" can be observed in Figure 10. These sources are ranked in order of relative importance: "BVE Radio" is the most important but it decreased considerably in 1976; "Friends and Neighbors" are of second importance

Figure 9. Sources of new information for farmers who improved their agricultural practice



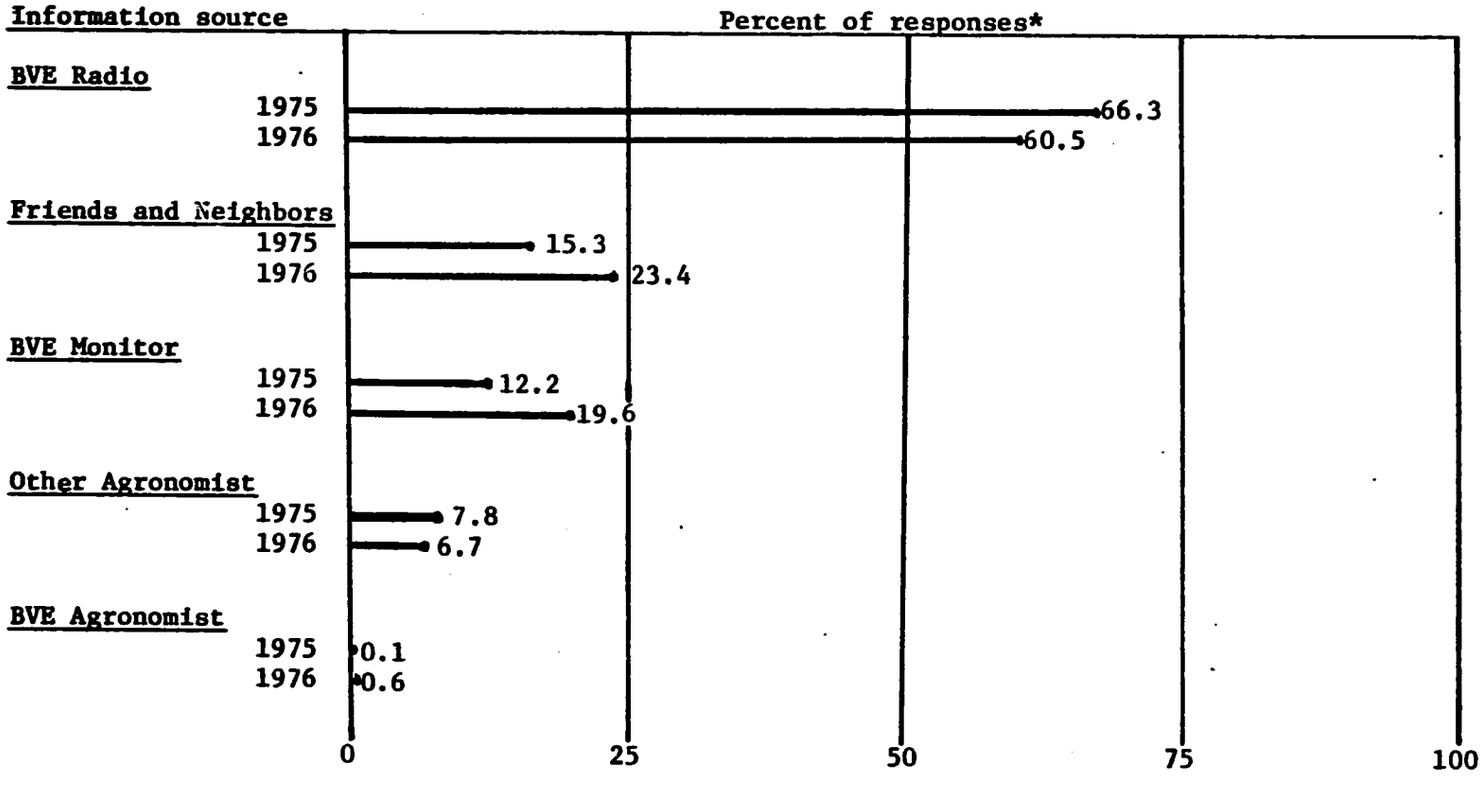
ource: Time Sample Surveys 1975 and 1976
Time responses: 1975 = 518 (out of 3400 possible responses)
1976 = 554 (out of 3342 possible responses)

Figure 10. Sources of new information for farmers adopting recommended practices



Source: Time Sample Surveys 1975 and 1976.
* Total responses: 1975 = 326 (out of 3400 possible responses)
1976 = 249 (out of 3342 possible responses)

Figure 11. Sources of new information for farmers using recommended practices.



Source: Time Sample Surveys 1975 and 1976.
* Total responses: 1975 = 842 (out of 3400 possible)
1976 = 1075 (out of 3342 possible)

in 1976 and there was a great increase over 1975; the "BVE Monitor" was in second position in 1975 and there was an increase in 1976; "Other Agronomist" is reported in fourth position in both years and there was an increase in 1976; the "BVE Agronomist" is in final position, increasing from zero in 1975 to 1.6% in 1976.

Since there were a number of farmers who had already been using the practice at a recommended level before they were interviewed, just counting the "adopters" in a given year does not account for all of the "users." It is also important to see if there are any differences in their sources of new information from those reported by "adopters" and "improvers."

3. Sources of new information for farmers using practice at the recommended (highest) level: "Users"

There was a total of 1,917 responses indicating use of the recommended level of practice in the two year period covered by the time sample surveys. The relative importance of the different sources of information for the two years can be observed in Figure 11.

Sources, ranked in order of importance, were: "BVE Radio" is the most important although it decreased slightly in 1976; "Friends and Neighbors" are second in importance and increased in 1976; "BVE Monitor," is of third importance and increased in 1976; "Other agronomist," is of fourth importance and decreased slightly in 1976; and, the "BVE Agronomist" is in final position with a slight increase in 1976.

4. Sources of new information for farmers having a favorable attitude toward the recommended level of practice

Chapter XIX showed that there were changes in attitudes toward the recommended level of practice in addition to the changes in actual use of these practices. Since these changes came earlier and logically precede change in practice, it is also important to know the sources of new information related to attitude change.

There was a total of 2,797 responses indicating favorable attitudes toward the recommended level of practice. (Note: This is in contrast to 1917 responses indicating use of the practices at the recommended level. This follows the findings presented in Chapter XIX.)

The relative importance of the different sources of new information to those farmers indicating a favorable attitude is reported in Figure 12. Sources ranked in order of importance were: "BVE Radio" being the most important but decreasing in 1976; "Friends and Neighbors" is second in importance and increased in 1976; the "BVE Monitor" is of third importance and increased in 1976; "Other Agronomist" is of fourth importance and maintained the same proportion in both years; and "BVE Agronomist" is in final position with a slight increase in 1976.

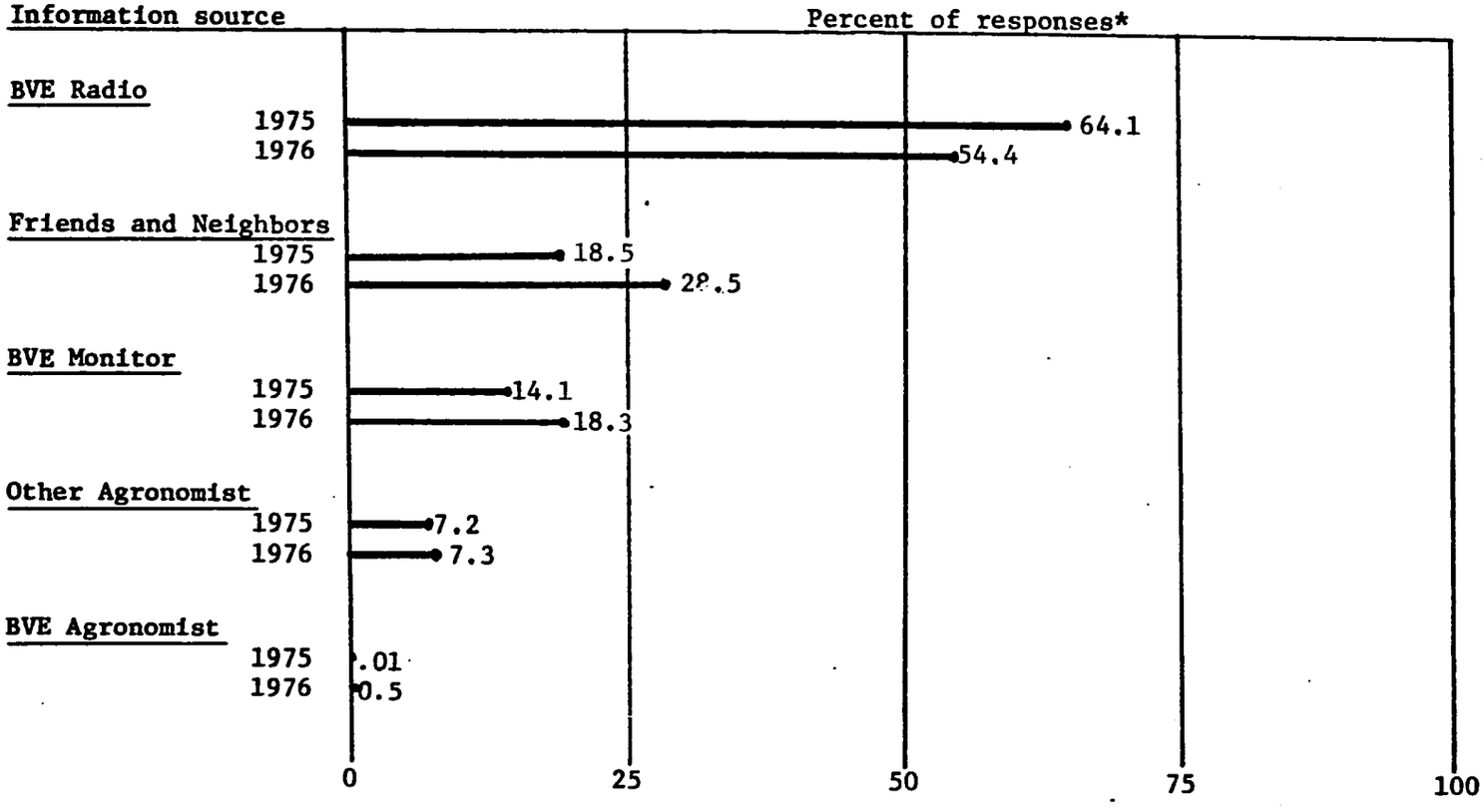
5. Sources of information: Summary

Radio is by far the most important source of information. This is true for "improvers," "adopters," and "users," as well as those reporting favorable attitudes. It is interesting to note, however, that the importance of radio decreases greatly from 1975 to 1976. This is particularly true for the "changers" and "adopters." There are a number of possible reasons for this. Since the message in 1976 may be repeated from 1975 there may have been a "heard before" or a "what else is new?" type of reaction on the part of the farmer. It may also be related to the drought in 1976 which made it difficult or impossible to utilize new information because the crops were beyond help. Another potential explanation is the gradual movement of information from an external source to the local sources of "friends and neighbors" and "monitor." The latter explanation would follow the "two stage" theory of mass communication which suggests that external sources reach some people directly, but, for most, the message is diffused through local sources and in a slightly delayed time period. This theory also indicates the new idea must be evaluated locally and if found to be a good one, will then be recommended to others.

The effect of friends and neighbors increases almost in the proportion that radio decreases. This is particularly true for the "users" and the "adopters". It might follow, then, that unless new information related to practice imporvement is available (i.e., coming from the radio or through the monitor), the natural communication system between friends and neighbors has little effect on the adoption or improvement of recommended agricultural practices. It would also suggest that as the knowledge of these recommendations from external sources increases, then the natural communication system takes on increased importance.

The effect of the "BVE Monitor" is intermediate and it increases with all groups except the "adopters." The changes between the two years are not great, thus suggesting a rather stable intermediary position of the monitor as a local person with direct access to an

Figure 12. Sources of new information for farmers having favorable attitudes toward the recommended practice.



Source: Time Sample Surveys 1975 and 1976.
* Total responses: 1975 = 1280 (out of 3400 possible responses)
1976 = 1517 (out of 3342 possible responses)

external message. If there had been a dramatic decrease in the monitor as was observed with the radio, this would suggest a rejection of the BVE message itself.

The effect of the agronomist (any agronomist) increased in 1976 over 1975, yet the impact is minimal when compared with the other sources. There are a number of things, however, that should be mentioned with regard to this finding.

First, not all of the experimental areas are served by an agronomist (only two of the eight experimental areas have the service of a BVE agronomist). Also, the BVE agronomist has many other responsibilities in addition to his direct contact with the people, and it can be assumed that other agronomists have similar plans of work. It is also important to note the crucial role played by the agronomist in the feed-back system for message development in future BVE programs. Any inquiry sent directly to the station or through the monitors for aid regarding specific problems are investigated and become part of future programming. Thus, the agronomist may not be seen as a source of information in the community, but he is an important component of the total information system.

C. Sources of Information: Differential Impact by Treatment Area

The original design of the BVE project included several differential "communication treatments." One area had radio (R) alone, another had radio plus a monitor (RM), and another with radio plus a monitor plus an agronomist (RMA). These same treatments were repeated in two areas, Quezada and Yupi. In addition, in Ipala there was a control area (C) that was beyond the radio broadcasting range, and also another area that did not receive radio but did receive the help of a monitor (M).

It was seen in the measurement of change as reported in Chapter XVII, that not all of these areas responded in the manner expected at the outset of the project. However, all of the treatment areas did change more than the control area. The sources of information were examined to see if further explanations could be offered for the differences in change between treatment areas.

The sources of information reported by farmers who improved their agricultural practices in 1975 and 1976, as measured in the time sample surveys, are presented in Table 34.

As can be noted in the table, there is considerable variation in the number of responses between the treatment areas. The ranking of

Table 34. Sources of new information reported by farmers who improved their agricultural practices in 1975 or 1976 in the BVE experimental areas of Oriente.

Responses of farmers reporting:	Experimental areas							
	QR	QRM	QRMA	YR	YRM	YRMA	IM	IC
Change and new information	259 (100%)	164 (100%)	234 (100%)	77 (100%)	77 (100%)	130 (100%)	83 (100%)	48 (100%)
Friends and neighbors	13.1%	4.3%	9.8%	40.3%	39.0%	43.1%	55.4%	62.5%
Other agronomist	8.1%	4.3%	0.9%	6.5%	9.1%	9.2%	19.3%	35.4%
BVE radio*	76.1%	88.4%	79.5%	42.9%	31.2%	23.1%	-	2.1%
BVE monitor*	-	16.5%	28.6%	-	27.3%	27.7%	24.1%	-
BVE agronomist*	0.4%	-	0.9%	-	-	1.5%	-	-

*alone or in combination

Source: Time sample surveys 1975 and 1976

the treatment areas by new information change responses is as follows: QR-QRMA-QRM-YRMA-IM-YR-YRM-IC. It should be noted that the order of change as measured by the practice score on the annual surveys and reported in Chapter XVII is: YRMA-IM-YR-QR-QRMA-QRM-YRM-IC. One of the reasons for the difference in ranking is that the time sample survey analysis presented here is a measure of only new information-related change. There are other reasons for change also, such as weather and availability of resources. The practice score from the annual surveys is an all inclusive measure of change that is not limited to new information.

There is one further difference in the measures used that is important to note. The time sample analysis of "Improvers" counted all responses indicating an upward movement in 1975 and 1976. The annual survey analysis measured the difference between the levels of practice in 1974 and 1976, thus taking into account any changes in the negative direction as well. The dry weather in 1976 is known to have lowered the practice level for many farmers, particularly in the Quezada areas.

1. <u>QR treatment area</u>

This is the area that reported more new information related change than any other area. It also had an intermediate ranking on the total change score on the annual surveys. (See Chapter XVII, Part B). "BVE Radio" is the most important source although it is reported much higher in 1975 than in 1976 (data not shown in table). "Friends and neighbors" are also of some importance and the "other agronomist" (non-BVE) is mentioned as well.

2. <u>QRM</u>

This area reported the lowest amount of new information related change of the Quezada areas. It ranked near the bottom in the change score on the annual surveys (See Chapter XVII, Part B). Radio is of high relative importance here also, although there is some decline in 1976 over 1975 (data not shown in table).

The monitor and the non-BVE agronomist are also reported as information sources. Also, this area reports less new information from friends and neighbors than any other experimental area.

3. <u>QRMA</u>

This area reports approximately the same amount of new information related change as QR. It did not rank as high in the total change score from the annual surveys (See Chapter XVII, Part B). Radio is of

high relative importance, although it decreased in 1976 over 1975 (data not shown in table). The monitor is reported more often than in any of the other experimental sub-areas. This is the sub-area served by the BVE agronomist although neither he nor the non-BVE agronomists are reported as important sources. Friends and neighbors are also not reported as highly important when compared to the other experimental areas.

4. YR

This is one of the lowest areas in new information-related change. It did, however, rank high in total change on the practice score from the annual surveys (See Chapter XVII, Part B). Radio is an important source although it declined greatly from 1975 to 1976. Friends and neighbors are also an important source, and this increased in 1976 over 1975. There is also some increase of a non-BVE agronomist as a source.

5. YRM

This area is again one of the lowest in new information-related change. It ranked next to the bottom in total change as measured in the practice scores in the annual survey (See Chapter XVII, Part B). Friends and neighbors are the most important source reported and this increased in 1976 over 1975. Both the radio and the monitor are also important (these both remained stable in 1975 and 1976.)

6. YRMA

This is the area that had the highest position of change measured by the practice scores in the annual survey (See Chapter XVII, Part B). It also is the highest in the Yupi area in new information-related change. Most of the change took place in 1976, and there is a great increase in all of the sources reported as compared to 1975 (data not presented in table). Friends and neighbors are the most important source, followed by the monitor, and then radio. Agronomists are also reported as information sources.

7. IM

This area also had a high position of change as measured by the practice scores in the annual survey (See Chapter XVII, Part B). It had an intermediate position in new information-related change. As with YRMA, almost all of the new information-related change is reported in 1976 rather than 1975. Friends and neighbors are the most important source, and monitor and non-BVE agronomist are also important.

8. IC

This is the control area and had the lowest amount of new information-related change of any of the areas. It also was the lowest in change as measured by the practice scores on the annual surveys (See Chapter XVII, Part B).

Some change did take place in the control area, and most of it in 1976 (data not in table). Friends and neighbors are most often mentioned and the non BVE agronomist is also reported. There is also some indication that the BVE radio broadcasts are entering the area.

9. Comparison of combined treatment areas.

The like treatment areas of Quezada and Yupi are combined in Table 35 in order to further investigate the change related information sources. This gives a more adequate measure of the effect of the treatment rather than the geographical or time factors that differ in Quezada and Yupi.

As can be seen in Table 35 there is a relatively low number of responses in the RM areas as compared to R and RMA areas. This follows the analysis of the total impact of the BVE programs as measured by the annual survey practice score (See Chapter XVII, Part B). Radio is reported more than in any other treatment but friends and neighbors are proportionally under-reported.

When the RM treatment areas are compared to M treatment alone (which was also a high change area as measured on the annual survey practice score) the relatively low reporting of friends and neighbors is also noted. The relative importance of the monitor as a source is almost the same in both treatments. From the data presented here it appears that the RM combination does not add anything to the R or M treatments alone. In reality it may even lower the impact of the message.

The involvement of friends and neighbors seems to be an important factor and this may be due to the social characteristics of the areas more than anything else. It is true that the IM area is one large village whereas the QRM and YRM areas are each composed of a number of separate villages. Because of this, the natural communication patterns may vary.

D. Summary of Information Sources and BVE Treatments

The material presented in this chapter on the sources of information and the relative changes in agricultural practices must be taken as suggestive rather than conclusive.

Table 35. Sources of new information reported by farmers who improved their agricultural practices in 1975 or 1976 in the BVE experimental areas of Oriente (Quezada and Yupiltepeque combined).

Responses of farmers reporting:	Experimental areas				
	R(QR+YR)	RM(QRM+YRM)	RMA(QRMA+YRMA)	M	C
Change and new information	336 (100%)	241 (100%)	364 (100%)	83 (100%)	48 (100%)
BVE radio*	66.5%	73.9%	59.3%	-	2.1%
BVE monitor*	-	24.5%	28.0%	24.1%	-
Friends and neighbors	19.3%	15.4%	21.7%	55.4%	62.5%
Other agronomist	7.7%	5.8%	3.8%	19.3%	35.4%
BVE agronomist*	0.3%	-	1.1%	-	-

*alone or in combination

Source: Time sample surveys 1975 and 1976.

The impact of radio diminishes over time while the more personal media seem to increase. It appears that after new information is made available externally by radio, an agronomist, or the monitor, it is later picked up by the local communication networks of friends and neighbors and spread throughout the community. As an over-all impression, it appears that the greatest impact was found in the areas where friends and neighbors reinforced the other sources. For some reason, friends and neighbors are not reported as an important source in QRM (there was less relative change there also as compared to other areas). It would be interesting to know more about the people in that area in order to understand why inter-personal communications are not reported.

It is also evident that other factors in addition to new information are responsible for change. YR seems to be an example of this. Some of these factors are weather, availability of agricultural supplies, and time itself. There is no doubt that these factors have affected each of the areas in a different manner.

The hypotheses that were listed at the beginning of the chapter can not be conclusively accepted nor rejected. Radio is an important source of information and it is related to practice change as well as changes in knowledge and attitudes. On the other hand, there is evidence that its impact diminishes as it is used over time.

The monitor is also an important source in both changes in knowledge and attitudes as well as practice. It is hard to predict the final outcome, but it is possible that if the program were continued, the monitor, as he works among friends and neighbors, would have a greater impact than the radio.

There is little evidence that the BVE agronomist is recognized as a distinct source of information for change. Although not tested in this analysis, he probably makes his greatest impact in an indirect way as a back-up for the monitor and as part of the message feedback and preparation system.

CHAPTER XXI

SIGNIFICANT QUESTIONS FOR FURTHER STUDY

In addition to the findings presented in the evaluation section of this report, there remain several significant unanswered questions that will require consideration in future analyses. Some of these have been partially investigated, but all of them should be subjected to a more complete analytical approach. The volume of data collected over the life of the BVE project provides an ideal opportunity to investigate some of these important questions. The questions presented below are representative of the type which might be raised, and are by no means exhaustive.

The BVE project has dealt with essentially three specific areas of knowledge. The project is first and foremost a program in non-formal education, and the bulk of the analyses to date have been directed with that focus. Second, although BVE was not fundamentally an agricultural project (i.e., the principal focus was on the process of education and communication rather than on agriculture), the content of the educational (agricultural) message has been studied for impact on the target areas. Third, the project was also interested in social and cultural change, and several aspects that make up the social and cultural milieu have been considered and are open for further investigation.

A. Non-formal Education

The following representative list of topics is worthy of further investigation.

1. Individual literacy vs. family literacy

Most of the investigations to date have taken for granted that modernization is related to individual literacy. There are strong indications from this study that literacy in a traditional society may not necessarily be an individual characteristic so much as a family or group characteristic. If a member of the family or group that the individual belongs to is literate, then there is evidence that this may be sufficient for written materials to be of use to that person.

2. Future literacy

This project was designed with the expectation that at least 50 percent of the target audience, namely the rural decision makers, would be illiterate. The transmission and understanding of the message has not required literacy. The materials prepared and distributed included very few words. It would be interesting, however, to pursue the question concerning whether a project such as BVE

stimulates interest in and provides the motivation for people to become literate.

3. Necessary learning factors

The basic orientation of this project has been the study of sources of new information and their effect on change. There has been some investigation of individual characteristics and how these affect change. More detailed investigations could be made using all of the items included in the evaluation questionnaire to determine which characteristics are most crucial for learning, at the individual, the family, and community level.

4. Localness of radio station

There are indications that part of the impact of radio in the BVE project can be attributed to the ability to personalize the message. The importance of personalizing the radio station by its location in the community is a topic worthy of further study.

5. Radio effectiveness over time

There is some indication that radio does lose some of its effectiveness over time, while other more personal media become more effective. Further analysis of the BVE data could provide valuable insights regarding the effect of radio over time.

6. Relationship of outside technicians and local paraprofessionals

The job descriptions of the agronomist and the monitor have been outlined in the field operations presented in this report. There is some indication that certain aspects of their work were more effective than others. The data could be further analyzed to identify more precisely the effective areas of the personnel training in non-formal education projects.

7. Effect of program year

How many years are necessary for a non-formal education program? What is the comparative impact of first year programming vs. second year programming? Some analysis of program year effectiveness has been included in this report but it could be analysed much further.

8. Floor and ceiling effects

It is generally understood that those near the bottom of the scale lack the necessary conditions for change and those near the top have a hard time making any further changes. Is this true also among peasant farmers? There is some indication that the high change farmers come from middle range areas but further analysis could help clarify this point.

9. Order of attitude/behavior change

Most of the literature from diffusion of innovations, communication, and nonformal education sources suggests that the learning sequence goes from knowledge change to attitude change and finally behavior change. Is it possible that behavior change may be the source of attitude change in the BVE and similar projects? This also could be investigated further with the present data and verified with follow-up field interviewing.

B. Major Area Topics Related to Agricultural Development

The vast majority of the items included in the surveys were related to agricultural practices. Some of these have been analyzed, especially in the development of the practice scores and in correlations with sources of information for change. The following questions are also open for further analysis.

1. Best package of agricultural practices

Only a partial analysis of the data has been made to date concerning the optimum package of practices for agricultural production. There were some basic assumptions by the technicians at the time of programming, and perhaps further statistical analyses can be made concerning an optimum package of agricultural practices for subsistence farmers.

2. Practice-media relationship

Which practices can best be transmitted by radio, and which practices need a technician with more personal contact for their effective adoption in the rural areas? This is a fundamental question in terms of agricultural development and effective means of transferring agricultural technology. The data provides the opportunity for further analysis regarding which practices go best with the media.

3. Order of practice adoption

Which practices are adopted earlier and which ones take more time in the adoption process? Since the BVE project spans several years, further analysis may provide insights into which practices can be expected to change at an earlier date, and which ones take more time and therefore should not be expected to change as early.

C. Social and Cultural Items

One of the basic elements of the BVE experimental design is the opportunity for cross-cultural measurement between Indian and Spanish cultures. This aspect is yet to be analyzed as the project is not

finalized in the Indian area. However, beyond the analysis that will be completed for the final report, there are further questions that can be analyzed using the data that is available.

1. Level of community resources

Is there a minimum level of community and village facilities that is necessary for change to take place? What are the necessary transportationand communication facilities? How much schooling is necessary? These and several other questions can be researched further with the available data from this project.

2. Individual vs. group decision making

How do group decisions and individual decisions affect change? An issue that has not been sufficiently investigated in development projects in traditional societies is the effect of the group on the individual. All of the literature indicates that group decisions are important, and that very few changes are made by individuals if they are to remain an integrated part of the community. The data from BVE could be combined with further field observations to determine the effect of group decisions and individual decisions in change.

3. Interrelated change

How do changes in agriculture affect changes in diet, housing, education, work habits, aspirations, etc.? Some suggestions have been proposed from the analysis of the data, but much more could be analyzed in order to obtain some answers to these important questions.

4. Land tenure

How does land tenure affect change and also how is it affected by change? One of the fundamental questions in the study of rural societies is the relationship of man to land and how this affects all other aspects of individual and community life. The BVE project has gathered considerable data on the amount of land that is available and the tenure arrangement. Those data would offer a great opportunity for analysis of these fundamental questions in terms of the development of rural societies.

It is also expected that as change takes place in one aspect of life, change will also take place in other aspects. A reasonable hypothesis is that as farmers improve their crops, community land tenure may also change. Some farmers may become more able to acquire land. Farmers who do not change their techniques may gradually fall behind and become agricultural laborers rather than farm operators. All of these elements can be studied to some degree with the data that is available already. Further investigation in the field would confirm some of the effects over time.

5. Settlement patterns and change

It has been suggested in the analysis of the data that a fundamental aspect in change has been the communication patterns between friends and neighbors. At the same time it is well known that some communities, because of geographical as well as cultural factors, provide greater ease of communication between the members. With a small amount of additional investigation, using the maps that are already available from the project, it would be possible to investigate settlement patterns and the changes that have taken place as measured by the BVE project.

6. Accessibility and change

Accessibility and settlement patterns are related. We know that some of the villages are closer to the highways that lead to the outside world. Does this make a difference? The data presently available, and some additional field investigation, could give important insights in to this question.

7. Community leadership

Local leaders are even more specific than "friends and neighbors" as an important link in the communication process. All of the names of people classified as "leaders" have been gathered so that an analysis of their characteristics and contributions can be analyzed.

8. Natural change vs. planned change

This is related to an issue that is fundamental for development projects. The use of a control area in the BVE project was helpful in measuring some aspects of natural change. This could be focused on even more for futher answers.

The above items are only some of the suggestions for further analysis related to the fundamental problems that are facing development throughout the world today. The volume of the BVE data would provide raw material for the study of some of these problems. A further and more complete investigation may require additional studies in the communities, but of a limited nature. The BVE project has provided a storehouse of information and skills that can well be used in answering some of these problems.

D. Methodology and Additional Analysis

There has been considerable debate in recent years concerning the issue of whether or not experimental design has any practical application to the evaluation of developmental projects such as BVE. Experimental design has often been categorized as a laboratory method of investigation, with very little practical application to field settings. While it is true that one can maintain a great deal more control over extraneous variables in the laboratory, it is important to recognize that there are many valuable techniques of experimentation that can be used in program evaluation.

There is no question, however, that field research requires considerable more time and effort than laboratory studies. This is particularly true in a project of the magnitude of BVE. Since 1973 there have been over one million bits of data collected in both the Oriente and Occidente. Such vast amounts of data require continuous checking, updating, and rechecking. Despite these restrictions, the total process has worked effectively in the BVE project. Moreover, the sheer volume of data collected over the life of BVE provides an opportunity for additional sophisticated analyses rarely seen in the development literature. The results obtained thus far, and the practical experience of having had the opportunity to deal with the quality of data obtained, may have tremendous implications for those engaged in similar projects throughout the world.

APPENDIX A

FOREIGN TECHNICAL ASSISTANCE STAFF PROVIDED FOR THE BASIC VILLAGE EDUCATION PROJECT BY THE ACADEMY FOR EDUCATIONAL DEVELOPMENT

FOREIGN TECHNICAL ASSISTANCE

Guatemala:

William Bradford	Formerly Senior Administrative Officer
Dr. Howard Ray	Rural Development Advisor; (formerly Program Field Leader)
Robert Terzuola	Project Operations Officer; (formerly Field Evaluation Supervisor, and Deputy Program Leader)
Maximo Sanchez	Formerly Radio Specialist
Dr. Royal Colle	Formerly Audio-visual Specialist
William Ross	Formerly Agricultural Specialist
Jerrold Arnold	Formerly Agricultural Specialist
Gordon Straub	Program Field Leader; (formerly Field Evaluation Supervisor: Occidente)
David Thompson	Formerly Field Evaluation Supervisor: Oriente
Sergio Garcia	Graphic Arts Specialist
Victor Stephen	Formerly Graphic Arts Specialist
Oscar Vigano	Graphic Arts Director

U.S.:

Stephen Moseley	Project Coordinator
Cheryll Greenwood	Logistics Manager
Michael Foley	Administrative Support

(Prepared by Academy for Educational Development, March, 1977)

PROJECT IMPLEMENTATION PHASE

Dr. Richard Anderson
University of Florida
Data Processing
Life of Project
Develops and implements computer analysis of evaluation data.

Dr. John Arnaud
Teleconsult, Washington, D.C.
Radio Engineer
Life of Project
Installed, tests and helps maintain radio hardware.

Dr. Robert Carmack
SUNY
Anthropologist
January 1974 to June 1975
Studied anthropological aspects of project design and implementation.

Dallas Fanning
Information Materials Press, New York
Visual Arts Specialist
October 1975 to June 1976
Contributed to IMP's visual arts design and production efforts.

Thomas Fanning
Information Materials Press, New York
Visual Arts Specialist
October 1975 to June 1976
Directed IMP's visual arts design and production activities.

Hector Marchisio
Information Materials Press, New York
Visual Arts Specialist
August 1973
Contributed to IMP's visual arts design and production efforts.

Dr. Edgar Nesman
University of South Florida
Evaluation Component Co-Director
Life of Project
Co-directs data analysis for evaluation component of BVE.

Dr. Douglass Norvell
INCAE (Instituto Centroamericano de Administracion de Empresas), Nicaragua
Agricultural Economist
November 1974 - End of Project
Develops cost/benefit analysis for project evaluation.

Dr. Thomas Rich
University of South Florida
Evaluation Component Director
Life of Project
Directs data analysis for evaluation component.

Rockwell International (various technicians)
Rockwell International, Inc.
Radio equipment maintenance personnel
December 1975 and April 1976
Made needed repairs on broadcasting equipment in Guatemala.

Omar Seritella
Information Materials Press
Visual Arts Specialist
August 1973
Contributed to IMP's visual arts design and production efforts.

Dr. William Ward
Cornell University
Agricultural Information Specialist
September 1973
Planned, in conjunction with other staff, agricultural aspects and communication treatments included in project design.

FEASIBILITY STUDY

Dr. Richard Adams
University of Texas, Austin
Anthropologist
July to August 1972
Studied anthropological aspects of contemplated BVE program.

Dr. John Arnaud
Teleconsult, Washington, D.C.
Radio Engineer
July 1972
Developed technical radio hardware requirements for BVE.

Mr. Thomas Fanning
Information Materials Press, New York
Visual Arts Specialist
July to August 1972
Studied visual arts materials requirements and applicability.

Mr. Clyde Hostetter
California Polytech State U.
Multi-Media Specialist
June to July 1972
Studied various media forms and their applicability in Guatemala.

Dr. Billy Kluver
Experiments in Art and Technology, New York
Electronic Media Specialist
July to August 1972
Investigated applications of electronics media in Guatemala for development and education.

Dr. Thomas LaBelle
University of California, Los Angeles
Anthropologist
August 1972
Reviewed Academy reports under feasibility study in light of his own research into Guatemalan society.

Dr. Everett Rogers
Institute for Communication Research, Stanford University
Innovation Specialist
July to August 1972
Studied roles and capacities of change agents in rural areas.

Dr. Jean Wight
North Carolina State University
Home Economics and Nutrition Specialist
June to September 1972
Studied needs in areas of home economics and nutrition for possible inclusion in BVE.

Dr. Laurence Wolff
Latin America Education Division, World Bank
Systems Analysis and Planning
June to September 1972
Helped develop research design for feasibility study.

APPENDIX B

November 29, 1976

STAFF REPORT ON

BASIC VILLAGE EDUCATION PROJECT CONFERENCE/SEMINAR

GUATEMALA CITY, GUATEMALA

OCTOBER 18 - 19, 1976

The Basic Village Education Project (BVE) has attracted widespread attention and interest both in Guatemala and elsewhere in Latin America since its inception in 1973. Requests for information have been received from numerous organizations and individuals. Although final results and conclusions from the Project will not be available until mid-1978, some preliminary findings can now be reported.

Such findings were presented and discussed during a two-day conference/seminar organized by the Project in mid-October, 1976, in Guatemala City. Participants included representatives from twelve Guatemalan and ten outside institutions. More than 80 participants, including about 30 from the Project, were in attendance at one or more of the sessions.

The objective of the seminar, as stated in the program was:

> "To inform the agencies and institutions of the Ministries of Education, Agriculture and Health and other National and International institutions of the preliminary results of the different educational communications mixes developed by the Project for the rural regions of Guatemala."

The decision to hold the first such seminar at this time was based largely on two factors (although there is always an element of risk involved in presenting incomplete and preliminary results such as those presently available). Numerous programs are being planned and implemented in Guatemala and elsewhere which will utilize information delivery systems similar to those under test in BVE (Guatemala's Programa de Educacion Extraescolar is a prime example). Such programs cannot wait until final BVE results are available. They need and want to take immediate advantage of what is being learned as the Project progresses. Second, BVE is seeking interaction with a diverse audience to help to define the relevant and crucial questions which may be answered at least in part through this Project and its evaluation.

I. BACKGROUND

Conceptually, "BVE is an experimental program of information and education for the rural adult in Guatemala. Its objective is to

determine effectiveness and relative costs of different mixes of communications media, used to supplement the work of extension agents (limited in number), in influencing change in agricultural practices and production among the Ladinos and Indians of rural Guatemala." 1/

Functionally, "BVE is comprised of two equally important parts: 1) a carefully controlled non-formal education program which initially does not require literacy, and 2) a rigorous evaluation of that program in relation to its objectives and underlying hypotheses." 2/

Operationally, BVE is administered by the Guatemalan Ministry of Education in close coordination with the Ministries of Agriculture and Health. Financial and technical assistance support is provided to the Project by AID through a contract with the Academy for Educational Development. An independent evaluation of the Project is being conducted by a University of South Florida team under subcontract with the Academy.

For purposes of the experiment, three basic "communications treatments" are being tested in each of two highly distinctive regions. Educational content is constant in all treatment areas within a region. A control area receiving no educational programming is also maintained in each region. 3/

The Project is now completing its third year of educational programming in the Oriente (southeastern Guatemala) and its first full year in the Occidente (western Highlands). The experimental phase of the program will terminate at the end of 1976 in the Oriente as scheduled, but will continue in the Occidente through 1977. (Beginning in 1977, the Ministry of Education plans to convert the Oriente part of BVE into a GOG-funded expanded ongoing program similar to present communication treatment RMA.)

The University of South Florida evaluation team participated in development of the BVE experimental design, and has been responsible for a rigorous independent evaluation of the Project since its inception. Substantive preliminary results and conclusions from that evaluation became available for the first time in August, 1976, in the Third BVE Interim Report - Evaluation Component prepared by the evaluation team. That report focused sharply on overall effectiveness of the educational program and relative effectiveness of the three communication treatments in influencing change among farmers in the experimental areas of

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1/ Basic Village Education Project-Guatemala; Project Implementation Plan, P. 1, August, 1973.

2/ Ibid.

3/ For a description of the treatments, see Appendix C to this report or BVE Staff Report "Mixes of Communications Media Utilized in the Project" (Attached as Appendix A to Second Interim BVE Report - Field Operations).

Oriente during the first two years of operations.

The above report, supplemented with additional data from both regions provided the basis for results presented and discussed during the seminar.

II. PREPARATION

Preparation for the seminar began in July and August, 1976, with informal discussions among the evaluation team, field project staff and the chief of the USAID/Guatemala Education Division. The Guatemalan Project Director agreed that the seminar should be sponsored by the Project; a two-day format was accepted, and the dates of October 18-19, 1976, were established.

Project staff were given in-depth briefings on preliminary findings by Dr. Nesman, co-director of evaluation, during the month of August, and the process of selection and organization of data to be presented was undertaken in September. Project field staff agreed to handle logistics for the seminar, to prepare the graphic materials to be utilized, and to assume major responsibility for sessions on the first day. The evaluation team agreed to provide information necessary for graphic preparation and to develop the second-day presentations which would deal with specific findings. Each person on the program was given responsibility for preparing a written resume of his presentation for distribution to participants.

A pre-seminar, led by Nesman, was held on October 15 with all BVE personnel. All findings to be presented during the seminar were discussed during that session. Finally, a "dry run" was held on October 16 in the auditorium reserved for the seminar to check out facilities, P.A. system, suitability of graphics, etc. That session also provided an opportunity to critique presentations scheduled for Monday, October 18.

III. THE PROGRAM

Factors considered in developing program format and content for the seminar included:

1. Primary focus should be placed on presentation and discussions of preliminary project results.

2. Since many of the participants would have little previous knowledge of the Project, meaningful discussion of results would be possible only if preceded by a brief review of Project design and operations.

3. Opportunity should be provided for interaction between the evaluation team (and Project field staff) and participants from other institutions concerning implications of BVE results for other programs and organizations.

4. The two-part composition of the Project -- an educational program and a rigorous evaluation -- should be made clear at the outset of the seminar.

5. The anticipated size of audience during the first day of the event would likely preclude the possibility of a true seminar setting.

6. The smaller audience expected to attend the second day should permit a more informal, i.e., seminar, approach.

7. It would be desirable to divide the participants into small discussion groups to facilitate discussion and interaction. That was not feasible, however, as Nesman is the only member of the University of South Florida evaluation team whose Spanish is adequate for leading such a group.

8. Although the Project is being subjected to detailed cost and cost/benefit analysis, that work is still in its early stages. Therefore, no attempt should be made during the seminar to present or discuss this aspect. If the question should arise, the approach being taken should be described in general terms and the seminar informed that results will be reported later.

The final format included a general session on the first day in a conference setting. Following inauguration of the event by the Minister of Education, the Guatemalan Project Director and the Co-Director of Evaluation would present the Project's two major components in overview. That would be followed by four brief presentations on various aspects of Project operation. The afternoon session would include presentation and discussion of formative evaluation activities carried out by field staff and of summative evaluation methodology. The final program for the first day was as follows:

Inauguration	- Lic. Guillermo Putzeys Alvarez Minister of Education
BVE Project overview	- Prof. Mario Dardon, Project Director
System of evaluation	- Dr. Edgar Nesman, Co-Director of Evaluation
The philosophy underlying BVE agricultural programming	- Dr. Howard Ray, Program Leader
BVE programming	- Ing. Jaime A. Carrera, Agricultural Section Coordinator
BVE materials production	- Prof. Jorge E. Garcia, Head of A/V Production Unit
BVE delivery systems	- Prof. J. Gilberto Gonzalez de Leon, Coordinator of Agricultural Programs

Formative evaluation	- Robert G. Terzuola, Deputy Program Leader and Oscar O. Vigano, Graphic Arts Specialist
Summative evaluation	- Dr. Edgar Nesman, Co-Director of Evaluation.

The second day was planned as a technical session organized around four key themes derived from preliminary findings of the evaluation team. The entire day would be led by the evaluation team supported by a small panel of field staff. The setting was to be made less formal through re-arrangement of tables, chairs, easels, etc. It was anticipated that, for each theme, Nesman would make a brief presentation to be followed by discussion and interaction. Time would be allocated on that afternoon for general questions and interaction. The four themes were:

1. Results of the Project to date with respect to the combinations of communications media utilized by BVE.

2. The effectiveness of the radio, the monitor and the agronomist in influencing changes in knowledge, attitudes and use of improved agricultural practices by small farmers.

3. Characteristics of two classes of farmers: a) those who were already using improved agricultural practices before the Project started; and b) those who have adopted such practices since the Project started educational programming.

4. The results of a study of critical practices which would increase production of subsistence farmers, and their implications for BVE programming.

Nesman led the discussion on the first three themes, and was joined by Dr. Richard Anderson, University of Florida, for the fourth. They were supported throughout the day by a panel consisting of Project Director Dardon, Program Leader Ray, Agricultural Section Coordinator Carrera, and A/V Production Unit Head Garcia. The panel (and other field personnel) participated in the discussion, contributing field experience that could help in interpretation of findings presented by Nesman and Anderson.

A copy of the printed program is attached as Appendix A.

IV. THE PARTICIPANTS

Consistent with the objective of sharing BVE results with the greatest possible audience, general invitations were sent to more than 100 persons. In addition, the Guatemalan Project Director wrote letters to more than 20 Guatemalan and international agencies inviting them to designate institutional representatives to participate in all sessions.

Attendance was somewhat greater than anticipated. More than eighty representatives from twelve Guatemalan and ten outside institutions and

agencies were present at the opening session. At least forty participated in the technical sessions on the second day as well.

Institutions represented at the conference/seminar were as follows:

Guatemalan

Programa de Educacion Basica Rural - Ministerio de Educacion
Programa de Educacion Extraescolar - Junta Nacional de Educacion Extraescolar
Direccion de Alfabetizacion y Educacion de Adultos - Ministerio de Educacion
Oficina de Planeamiento Integral de Educacion - Ministerio de Educacion
Programa de Educacion de Adultos por Correspondencia - Ministerio de Educacion
Proyecto de Extension y Mejoramiento de la Educacion Primaria - Ministerio de Educacion
Socio Educativo Rural - Ministerio de Educacion
Banco Nacional de Desarrollo Agricola - Ministerio de Agricultura
Direccion General de Servicios Agricolas - Ministerio de Agricultura
Instituto de Ciencia y Tecnologia Agricolas - Ministerio de Agricultura
Oficina Nacional de Servicio Civil - Presid. de la Republica
Secretaria General del Consejo Nacional de Planificacion Economica

Other

Ministerio de Educacion de Honduras
Instituto de Nutricion para Centro America y Panama
UNESCO
UNICEF
Stanford University
Cornell University
University of Florida
University of South Florida
USAID/Guatemala
ROCAP

A list of participants who registered at the conference/seminar is attached as Appendix B.

V. HANDOUTS AND PUBLICITY

Five reports covering various facets of the Project were prepared for distribution during the seminar:

Presentacion a los asistentes al seminario realizado el 18 y 19 de octubre de 1976 de los resultados preliminares de evaluacion

Resultados descubiertos durante el analisis de la evaluacion del Programa E.B.R.

Filosofia de programacion agricola del Programa de Educacion Basica Rural

Programacion de Educacion Basica Rural

Materiales graficos en las areas rurales y la necesidad de evaluar para maximizar la efectividad.

The above reports are attached in their entirety as Appendices C through G, respectively.

Pre-conference publicity was limited to the invitations and letters described above, plus personal contacts by BVE and USAID/Guatemala personnel and others interested in the Project. A Press Bulletin (attached as Appendix H) was prepared for distribution on the opening day.

During the conference/seminar, USIS collaborated by providing a photographer to cover the opening session. In addition, USIS arranged to interview Project Director Dardon and Co-Director of Evaluation Nesman in their recording studios for a weekly radio program distributed to stations throughout Guatemala.

The conference subsequently received limited coverage in the local press (see Appendix I).

VI. OBSERVATIONS

The auditorium was of adequate size, and equipped with P.A. system, blackout drapes and large screen. Lighting was a minor problem during the first day when drapes were closed to permit use of slides. A smaller, more intimate setting would have been desirable for the second day to facilitate discussion. On balance, however, the meeting facility was considered to be good.

During the inaugural address, the Minister of Education inadvertantly referred to the Project as "Socio Educativo Rural." (He later apologized to Dardon for that lapse). Dardon corrected the matter in his opening remarks following the inauguration, and no apparent harm was done.

The graphic materials used in the various presentations were generally well received. The use of slides was perhaps somewhat excessive on the first morning due to the necessity to cover design and operational aspects of the Project in a short time. The charts and graphs were of adequate size and clarity to be read from all parts of the auditorium. There was some mild criticism that the charts were over-used -- shown too many times -- and that they could have been better organized.

Sustained high attendance and the heavy demand for handouts were evidence of the interest in BVE and its results. Unfortunately, representatives of some international agencies were able to attend only a portion of the first day.

As indicated earlier, the technical sesson on October 19 was devoted to presentation and discussion, led by Nesman and Anderson, of preliminary findings from the Project evaluation. Nesman summarized the session as follows:

> "This session was prepared to explore the evaluation findings in greater depth and to see how they might relate to other projects. The setting was less formal and the audience was not as numerous as on Monday. A general background was presented so that any that were not present the day before could see the findings in light of the total Project. The charts and graphics were used as points of discussion rather than backup illustrations." 4/

That session was only partially successful, as assessed during the day, in achieving the objective of promoting in-depth discussion and interaction with representatives of other institutions. In retrospect, the following factors may have been inhibiting:

- The number of participants was still too large to permit effective informal discussion.

- Although the setting was improved through rearrangement of chairs, tables, etc., the participants were still too widely dispersed in the large auditorium.

- The panel moderator provided little positive direction to the discussion. He should have received a more complete briefing in advance as to both materials to be presented and results desired from the session.

- Presentation of the first discussion topic was general, and included little concrete data related to that topic. As a result, the following discussion strayed far from the stated theme. Although subsequent presentations were crisp, lucid and sharply focused, efforts to achieve meaningful interaction met with only limited success.

- Too much was expected from Nesman. His performance was highly professional and excellent throughout. However, he apparently suffered somewhat from over-exposure, and did not receive adequate support from either the moderator or the panel.

4/ Evaluation Report No. 82, October 29, 1976, University of South Florida BVE Evaluation Team.

Feedback following the conference/seminar would indicate that the above observations are probably too harsh. Requests for additional information and clarification from various sources would indicate that the session did have significant impact, and that implications of BVE results for other programs are now being considered in a meaningful way by several other institutions.

VII. SUMMARY OF FINDINGS REPORTED

The volume of data accumulated to date precluded the possibility of an exhaustive review of results obtained to date. On the other hand, all findings to date must be considered as preliminary in that they represent change measured during the early years of educational programming. Both the nature of change and factors contributing to it may be modified over time. Also, data interpretation has not yet progressed to the stage where effect on results obtained of factors external to the Project can be properly evaluated.

In view of the above, the evaluation team selected two catagories for presentation: 1) overall findings to date concerning treatment effectiveness and related factors; and 2) example of findings concerning specific factors. Emphasis was placed throughout on the preliminary nature of results, and the need for caution in their interpretation.

In terms of overall treatment effectiveness, results to date indicate that radio appears to be a powerful instrument for changing knowledge, attitude and practice. As of now, no clear pattern has emerged concerning the effectiveness of monitor, radio forum, agronomist and demonstration plot -- perhaps such effects have been masked to date by the overpowering impact of the radio. In general terms, the message appears to be of much greater importance than the specific medium or media through which it is delivered. A summary of general findings to date is attached as Appendix J.

Two examples of specific findings reported at the seminar are attached as Appendices K and L. The first summarizes change and information source data obtained from monthly time sample interviews. The second discusses characteristics of farmers in relation to their tendency to change.

The reader is referred to "The Basic Village Education Project Third Interim Report -- Evaluation Component" for a complete treatment of findings to date, including backup data.

VIII. CONCLUSIONS

1. The conference/seminar was timely and well-received, and achieved in large measure its objective of exposing the Project to a much broader audience.

2. The diverse interests and backgrounds of those in attendance made it difficult to achieve effective discussion and interaction of results on a technical level. That problem was exacerbated by the large size of the group.

3. The conference/seminar was probably too long, taking into consideration the heavy load placed on one individual -- Dr. Nesman.

4. There is strong interest in the results obtained by BVE as evidenced by both the large attendance at the conference/seminar and subsequent feedback. However, the Project is still viewed by many as an experiment whose results may have only limited relevance to other programs due to its "high cost". Reporting of results of cost and cost/benefit analyses is urgently needed.

IX. RECOMMENDATIONS

1. Evaluation reports (in Spanish) used during the October 18 - 19 conference/seminar should be distributed to all participants as early as possible.

2. Follow-up conferences of a similar nature should be organized in mid-1977 and mid-1978. Such conferences should be restructured and shortened to one day. The objective should be primarily to inform rather than to interact.

a. The mid-1977 conference should highlight Project costs and cost/benefit analyses, although not to the exclusion of results in terms of change induced.

b. Advance notices should be sent out approximately one month, and invitations at least two weeks, in advance of the conference.

c. Invitees should also receive in advance of the conference a background paper summarizing material to be presented.

d. Audio/visuals aids should be carefully planned, and the materials prepared far enough in advance to permit the speaker to become adept in their use.

e. To avoid excessive extra work in preparation of handouts, Interim Report summaries (in Spanish) should be reproduced in volume for such use.

f. The mid-1978 conference should represent the final general report to our clientele of the Project and its results, presented in concete form.

3. A series of technical seminars, perhaps four or five by mid-1977, could be highly productive in terms of adequate interpretation of results,

and of assessing the relevance of BVE results to other development programs.

a. Such seminars should be limited to not more than 25 participants each of whom has professional competence and interest in the material to be discussed. The invited participants should, however, represent a diversity of programs and areas of specialization. It would be advantageous to have a core group of participants continuing through the entire series.

b. A background paper, including relevant data, should be supplied to each participant at least two weeks in advance of the seminar. That paper should clearly define the objectives and the specific points to be discussed.

c. The participants of each seminar should be involved in determination of content and format for the succeeding seminar.

d. A summary report of each seminar (in Spanish) should be prepared and distributed to all who will be invited to the general conferences.

APPENDIX C

STAFF REPORT ON

THIRD ANNUAL REVIEW OF THE
BASIC VILLAGE EDUCATION PROJECT

MARCH 21-22, 1977

Review conducted by the Office of Education, Science and Technology, Office of Development Resources, Bureau for Latin America, Agency for International Development.

The Basic Village Education Project is conducted by the Academy for Educational Development under Contract No. AID/CM/la-73-19 in cooperation with the Ministries of Education and Agriculture of the Government of Guatemala.

SUMMARY OF THE REVIEW

1. PARTICIPANTS

The third annual review of the Basic Village Education Project was conducted at AID in Washington, D.C. to provide an opportunity for presentation and discussion of the interim findings and results to date of the project. The presentations were based on the field operations experience from three years and the analysis of two years of evaluation data.

Dr. Howard Lusk, Chief, Office of Education, Science and Technology of AID's Latin American Development Resources Office chaired the two day meeting. The principal participants were: Dr. Howard Ray, former Program Leader of the BVE project, and currently Rural Development Advisor for the Academy for Educational Development; Dr. Thomas Rich of the University of South Florida, Director of the evaluation component; Dr. Edgar Nesman, also of USF, Co-director of the evaluation component; Mr. Gordon Straub, currently Program Leader of the BVE project; Dr. Douglass Norvell of the Citadel, who is working on the cost/benefit analysis of the project; and Dr. Richard Anderson of the University of Florida, whose computer center is being used for data analysis for project evaluation. Dr. Lusk then turned the meeting over to Dr. Howard Ray.

2. BACKGROUND AND PROJECT SUMMARIES

Dr. Ray began the presentation with an introduction to the project, detailing first the extensive background investigation that preceded the project's inception, the formation of an experimental design, and the general structure of the project as it developed. He discussed the planning that determined the message systems to be used, the agricultural emphasis of the program, the geographical areas chosen, and the development of personnel for the project. Dr. Ray also outlined the process whereby agricultural information is developed into radio programming, pre-recorded cassettes, flipcharts, posters and printed handouts, and how these different media are used to reach farmers in the experimental areas. He touched upon the role of evaluation as it helps determine message content and delivery, and also some of the problems that have been encountered during the implementation of the project. He ended by noting that one of the most significant aspects of the BVE project is that the radio has become a "personal medium" for the farmers who listen to it. Any mass media education system will be more readily accepted, and therefore more effective, if it gains this place within a community.

HIGHLIGHTS:

- **BVE's objective is to determine which of a number of different media mixes is most effective in promoting change in knowledge, attitude and practice.**

- Three project areas each receive different levels of saturation of educational programming: first, one area receives only radio broadcasting; second, another area receives the same radio programming plus the services of a local individual acting as a "Monitor" who conducts weekly meetings to reinforce the radio's message; third, another area receives the radio plus the Monitor, and also the services of an agronomist, who conducts crop demonstrations and identifies local agricultural problems. A fourth area receives no programming and serves as a control.

- Monitors and agronomists provide feedback to modify and develop message content to insure applicability and appropriateness. Materials testing is an ongoing concern.

- Messages are localized and coordinated with growing schedules.

- The project operates in two distinctly different cultural settings: the Eastern "Oriente" and the Western "Occidente." The former is predominantly Spanish speaking, the latter Quiche Indian speaking.

- Effective coordination between the BVE staff and the Ministry of Agriculture is stressed throughout the project.

For a more detailed discussion of the project's history, development and status, see H.E. Ray's paper, "The Basic Village Education Project--Concept and Operations." A slide series accompanies this presentation.

3. CURRENT ACTIVITIES OF THE PROJECT

Mr. Gordon Straub continued the discussion with a review of BVE activities since December, 1976. He noted that program activities in the Oriente are completely in the hands of the Guatemalan government's staff, since evaluation interviews and data gathering have been completed in that area. Experimental programming in the Occidente is continuing, with final surveys to be completed by the end of 1977. In response to questions, Mr. Straub remarked that other than the obvious need for translation of programming materials, and some changes in message emphasis, programming in the Quiche speaking highland areas does not differ substantially from that used in the Spanish speaking Oriente. He went on to discuss some of the investigations that have been made into the characteristics of the radio audience in both experimental areas: radio signal penetration tests, for instance, show where the radio reception is strongest. Mr. Straub also discussed improvements that have been made in program materials production with the addition of silk-screen techniques and more experience gained by the audio production staff. He stressed the experience gained by the field staff as well, and noted that the monitors, with only a few exceptions, have become well accepted by the communities in which they work.

HIGHLIGHTS:

- **Radio listenership in the areas covered by the project has risen since the advent of BVE.**

- **BVE has become the most popular radio programming for the majority of listeners in the experimental areas, with educational programming considered the most popular.**

- **Literacy statistics may be misleading due to the high incidence of "family literacy": homes where at least one person is literate, usually a child.**

4. SUMMARY OF EVALUATION RESULTS

Dr. Thomas Rich and Dr. Edgar Nesman continued the presentation with a discussion of the evaluation component of the BVE project. They noted the objectives of the program: to determine the levels of change in knowledge, attitude and practice among the target population as those changes relate to agricultural techniques offered by the program, the various media used to present them, and the widely different cultural settings of the experiment. They illustrated through the use of transparencies what was considered to be the ideal experimental design at the project's inception, and compared that to the actual design as it had been modified to take into account circumstances beyond the planners' control. These factors included political pressures, the reluctance of some control area groups to be the subjects of an experiment with no perceived benefit to them, and of course the earthquake of February, 1976. The team went on to discuss the tools that they use to gather data for analysis: the baseline survey, the annual survey at the end of the agricultural and programming year, the time sample surveys made throughout the year, and the annual crop production survey. They outlined the measurements that are made using the surveys: changes in knowledge, attitude and practice are measured over long and short periods of time, and between the different treatment and control areas. Changes in the use and acceptance of each individual technique offered by the program are measured and compared with other techniques, both improved and traditional. Change characteristics of individual farmers within the various areas are measured and compared, and case studies are prepared in hopes of determining common factors that induce farmers to change. Finally, change patterns in the Oriente are compared with those in the Occidente to arrive at a cross-cultural comparison between the two areas. Besides forming data for analysis, survey results provide continual feedback to the message development staff.

The evaluation staff went on to discuss some of the findings of their efforts so far. They stressed that the results gained up to this time are preliminary; more conclusive data gathered later in the experiment could add to or change conclusions made at this stage.

HIGHLIGHTS:

- Contrary to expectations, radio alone seems to be an effective agent of change. This is at least partly because in the BVE project, through careful planning and message development, the radio has come to be considered a "personal medium" and part of the audience's community.

- The monitor is mentioned with increasing frequency as a source of information and seems to be valuable in reinforcing the radio's message.

- The monitor and the agronomist are unique in BVE in that they form an integral part of the message development system through feedback designed to increase the relevancy of the message.

- As was anticipated, knowledge has changed more than attitudes, which in turn have changed more than practice.

- There is no consistent evidence that one treatment is better than another. This indicates that a well developed message can be presented successfully a number of different ways.

- The message is reaching the people: radio listener surveys indicate that the number of people listening to the radio daily is increasing, that the number of hours spent listening is also increasing, and that the majority of listeners prefer educational programming.

- There does not seem to be a relationship between high change as measured by the experiment and either land ownership or literacy. This indicates that BVE works beyond traditional barriers to learning.

Additional brief presentations were made by Dr. Norvell and Dr. Anderson regarding the cost-benefit analysis and data analysis methods. Detailed costs have been maintained for each aspect of the experimental project. Based on these data, cost models are being prepared to show the probable program costs of an operational project. The cost benefit analysis is also attempting to show the crop production relationship to each of the treatments. This analysis based on the first three years of cost data is planned for a complete draft in September, 1977.

5. DISCUSSION SUMMARY

Following Dr. Anderson's presentation, the formal panel format was dropped in favor of a more informal discussion arrangement. It was decided that the topics remaining on the agenda could be covered more satisfactorily by the panel members responding to specific questions. The ensuing discussion centered on three central aspects of the BVE project: the design and implementation of the program, the evaluation results gained so far, and the transferability of the project's design and results. Below are some representative questions and their responses.

Q: Do you lose "local color" with the expansion of the project? How can the local problems of a given area be addressed while making the project large enough for efficient administration and production capability?

A: Of course, if a project using mass media becomes too large, and the area it covers is not relatively homogeneous, then local relevancy can be lost. Feedback becomes especially important as a project becomes larger. BVE has achieved a good balance between local priorities and wider concerns for administration and production.

Q: What about buying time on commercial stations instead of operating separate project radio stations? Was this option considered in planning BVE?

A: Since BVE is an experimental project, it was decided that more control of saturation and message localization could be achieved by using project stations. Some of the lessons learned from BVE, especially regarding message development, could be implemented through commercial stations, but there is a danger of losing "community identification" with such an approach.

Q: Why was agriculture chosen as BVE's primary message area rather than, say, literacy or health?

A: Agriculture was chosen because it was felt that changes in knowledge, attitudes and practice regarding agricultural techniques could be measured with more accuracy. Also, it was felt that crop production figures could be used to help determine a cost/benefit ratio more effectively than could literacy or health statistics. Finally, the existing agricultural services operated by the Government of Guatemala in the areas chosen were judged to be more complete than those for literacy training or other concerns. Such an infrastructure provides more potential for improvement.

Q: Does the project seek to motivate farmers or simply to inform them of available techniques?

A: BVE serves the farmers as an information service. The choice of whether or not to implement the suggestions offered by the program lies with the farmer himself.

Q: How does the Guatemalan government view the project? Are their feelings similar to those of AID?

A: The Guatemalan government obviously feels that something of value has been learned from the BVE experience. They are implementing their new National Non-formal Education System (BRE) using many of the techniques developed in BVE. For example, the BVE program production staff is working closely with their BRE counterparts in the development of the new program's facilities.

Q: How does the monitor selection process work?

A: Representatives of the project meet with officials of the area i which the monitors are to work. The officials are given job des criptions and qualifications and are asked to prepare lists of people they feel are qualified. Candidates are interviewed by members of the project staff and are tested for verbal and writt proficiency and agricultural knowledge. In the Occidente, candi dates are also tested for fluency in Quiche, the predominant language in that area. All candidates chosen are approved by th Guatemalan Project Director.

Q: In those areas where radio is used alone, what feedback system is employed equivalent to the role of the monitor and the agrono mist in other experimental areas?

A: The primary source of feedback from those areas where radio is the only program used is the Time Sample Surveys, which are made every two months to measure changes in the target audience. The BVE radio stations also receive a large volume of mail, and whil most of the letters are requests for music or community related messages (birthdays, meeting announcements, etc.), some agricultural information is directly requested this way.

Q: According to the presentation, the quality of audio and visual materials produced in the project has improved. Have equal improvements been noted in the quality of the monitors and agronomists?

A: Training is an ongoing part of the BVE program design. As the monitors and agronomists gain experience, their work improves. One indication of this is that the monitors, who were completely untrained at the outset, are now working in the field without a great deal of supervision, and have gained the trust and respect of the communities in which they work.

Q: If the BVE project was expanded to include health or nutrition training, could the monitors function with the increased subject areas?

A: Judging from the BVE experience, local personnel, if properly trained, could work with many different subject areas with complete competence.

Q: So far, have there been any indications as to a relationship between the adoption of recommended practices and increased yield?

A: Though the data are not yet complete, as of this time there are indications that those farmers who adopt the practices recommended by the program do get increased yields.

Q: Does change in practice increase with more intensive treatments?

A: At this time, there is no consistent evidence that any one treatment is more effective than any other. The data that are being analyzed now, and that will be included in the final report, should answer this question more completely.

Q: What if the project is a success and yields increase? Can the marketing system absorb the increased output?

A: Conversations with transportation companies, packers, and wholesale distributors indicate that the marketing system would have anough flexibility to handle an increased output of basic grains.

Q: Does the evaluation component answer the question "What does the farmer do with the increased production he may have if his yields increase?"

A: No specific questions or surveys are designed to answer this question. However, it would be safe to assume that since they are subsistence farmers any surplus would be used for basic necessities or reinvested in their farms through equipment or supply purchases.

Q: According to the presentation, lack of rainfall was a contributing factor to low crop yields, especially in 1976. Do we have any micro-weather statistics for the control or experimental areas?

A: Unfortunately we do not have detailed information on rainfall in the small area covered by the experiment. Statistics for larger areas are not very helpful because of local variations.

Q: How can the things learned in BVE be utilized? What about a series of "How to Do It" papers?

A: The development and implementation of the BVE project has been carefully documented through reports by many members of the project staff. These reports could be used to write a "How to Do It" paper for similar projects.

Q: Can the BVE project be broken down into its component parts to find what is relevant, or is it necessarily "wholistic"?

A: The BVE project's planners attempted to take into account the unique characteristics of the population for which the project was designed and the political framework within which it was implemented. However, many of the project's aspects that helped contribute to its successful implementation and operation can be noted for use in other settings. These include: the extensive background study of the experimental area, including the cultural

and economic life of its citizens; the understanding and support that was obtained in the beginning and has been sustained throughout the life of the project from the Government of Guatemala and its agencies; the careful choice of technology to be offered to insure its relevance and affordability; a continuing emphasis on staff development; and an integral approach to educational programming that includes ample feedback mechanisms, ongoing substantive and formative evaluation, and effective coordination between its various parts.

The final discussion session focused on the possible followup activities to the project to disseminate the results and findings of the program. There was general agreement expressed by the discussion participants that it was important to prepare and distribute widely both the technical evaluation and the field operation reports on different aspects of the program's planning and implementation. Suggestions included the development of siminars and workshops, with film and printed materials. It was agreed that by the fall of 1977, plans should be developed on alternative utilization and dissemination approaches.

APPENDIX D

SELECTED WRITINGS ON FIELD OPERATIONS

BASIC VILLAGE EDUCATION PROJECT

GUATEMALA

A. OFFICIAL REPORTS

A-1. Staff. January, 1973. The Basic Village Education Project in Guatemala; (Feasibility Study). Typed report, 93 pp. + Appendices. (English).

Report of the study to determine the feasibility of an experimental project using radio for rural development in Guatemala. The report outlines possible experimental areas, the information to be distributed, media used, administrative structure and requirements, and the nature of the evaluation component. The two volume appendix contains individual reports by consultants who developed the program's initial strategies.

A-2. Staff. August, 1973. Basic Village Education Project: Guatemala; The Project Implementation Plan. Typed report, 64 pp. (English).

Fundamental planning document for the project; the design, philosophy, chronology and personnel requirements for the BVE program.

A-3. Staff. July, 1974. First Interim Report, Field Operations; May, 1973 - June, 1974. Typed report, 68 pp. (English).

A-4. Staff. Oct., 1975. Second Interim Report, Field Operations; July, 1974 - June, 1975. Mimeo report, 71 pp. (English).

A-5. Staff. July, 1976. Third Interim Report, Field Operations; June, 1975 - June, 1976. Multilithed report, 67 pp. (English).

B. THE SETTING FOR THE EXPERIMENT

B-1. Carmack, Robert M. May, 1974. Final Report; Communication of agricultural information in the Guatemalan Highlands. Typed report, 47 pp. (English).

B-2. Straub, Gordon A., and Jaime Solórzano. May, 1975. Información crítica concerniente a la región occidental del Programa EBR. Mimeo report, 3 pp. (Spanish).

General information about the Indian cultures of Highland Guatemala with specific reference to customs, social structure and agricultural practices.

B-3. Staff. June, 1975. The setting and the people. Mimeo report. 5 pp. (English).

A general description of Guatemala and its population with emphasis on the distinctive characteristics of Indian and Ladino cultures in areas of BVE Project operations.

C. DEVELOPMENT OF BVE AGRICULTURAL MESSAGE CONTENT

C-1. Monterroso, José Luis. Jan., 1975. Actividades de la Sección Agrícola y responsabilidades del personal. Typed report, 7 pp. (Spanish).

Describes the principal responsibilities and activities of BVE field and staff agronomists in the development of program materials, field operations and Project evaluation.

C-2. Ray, Howard E., and José Luis Monterroso. March, 1975. Transferencia de tecnología. Presented to Intensive Course, "Systems of Agricultural Production in the Tropics" at CATIE, Turrialba, Costa Rica. Mimeo report, 15 pp. (Spanish and English). (Also, included as Appendix G to reference A-2 above).

Identifies and discusses ten factors which must be considered by any program seeking to promote the adoption of new technology.

C-3. Carrera, Jaime. Aug., 1975. Actividades de la Sección Agrícola y responsabilidades del personal. Typed report. 8 pp. (Spanish).

Revision of reference C-1 above.

C-4. Ray, Howard E., Oct., 1976. Filosofía de programación agrícola del Programa de Educación Básica Rural. Mimeo report. 5 pp. (Spanish).

The philosophy underlying development of agricultural programs in BVE.

C-5. Carrera, Jaime. Oct., 1976. Programación de Educación Básica Rural. Mimeo report, 3 pp. (Spanish).

An overview of the BVE agricultural program materials development system.

C-6. Sección Agrícola. 1976. Contenidos técnicos, Oriente, 1976. Mimeo report, 195 pp. (Spanish).

Basic technical agricultural information for Oriente region used in BVE programming; organized around 19 major themes.

C-7. Sección Agrícola. 1976. Contenidos técnicos, Occidente, 1976. Mimeo report, 212 pp. (Spanish).

Same as reference C-6, but for Occidente region.

D. BVE COMMUNICATIONS "TREATMENTS"

D-1. Staff. June, 1975. Mixes of communications media utilized in the Project. Mimeo report, 16 pp. (English). (Also, included as Appendix A to reference A-2 above).

E. RADIO

E-1. Staff. June, 1975. The story of one BVE radio program (Revista Agrícola No. 303). Mimeo report, 4 pp. (English). (Also, included as Appendix I to reference A-2 above).

Describes the production of one BVE radio program from the agricultural investigation stage through script-writer orientation, approval of final scripts, recording, editing, and field distribution.

E-2. Straub, Gordon A. Sept., 1975. Radio signal penetration obtained in tests conducted September 23, 25, 26, 1975. Typed report, 3 pp. (English).

Methodology and results of a field test to determine boundaries of Radio Momostenango reception.

E-3. Thompson, David. June, 1976. Radio signal penetration results obtained in tests conducted May 18-22, 1976. Typed report, 2 pp. (English).

Methodology and results of a field test to determine boundaries of Radio Quezada reception.

E-4. Terzuola, Robert G. Nov., 1975. BVE radio listener survey. Typed report, 2 pp. (English).

Brief description, including methodology and results, of BVE listener survey conducted in April, 1975.

E-5. Terzuola, Robert G. Nov., 1975. Analysis and summary of radio listener survey of June, 1975. Typed report, 2 pp. (English).

E-6. Straub, Gordon A. June, 1976. BVE Radio listener survey of May, 1976 -- Occidente. Typed report, 1 p. (English).

E-7. Thompson, David. June, 1976. Radio listener survey, May 18 - 19 and 28, 1976 -- Oriente. Typed report, 1 p. (English).

E-8. Straub, Gordon A. March, 1977. Radio Quezada signal penetration results obtained in tests conducted March 15 - 17, 1977. Typed report, 4 pp. (English).

F. MONITOR

F-1. Terzuola, Robert. Dec., 1973. Monitor training program. Typed report, 3 pp. (English).

Describes the first BVE monitor training program undertaken in the Oriente region in December, 1973.

F-2. Arnold, Jerrold C., and Howard E. Ray. Dec., 1974. Guía para la selección, adiestramiento, capacitación y utilización de monitores. Draft typed report, 23 pp. (Spanish).

Guidelines for selection, training and utilization of monitors in BVE. Includes selection criteria and procedures; pre-service and in-service training; supervision; monitor functions.

F-3. Staff. June, 1975. The story of one BVE radio forum (Radio Foro 10-75). Mimeo report, 5 pp. (English). (Also, included as Appendix J to reference A-2 above).

Describes the production of one BVE Radio Forum from the first steps of agricultural research through production of audio and graphic components, monitor orientation and community meetings.

F-4. Straub, Gordon A. June, 1975. Monitor selection in the Occidente. Mimeo report, 2 pp. (Spanish and English).

Describes the process of BVE monitor selection in the Indian Highland region, including background research and specific problems encountered.

G. CROP DEMONSTRATIONS

G-1. Arnold, Jerrold C. May, 1975. El uso de parcelas demostrativas en el Programa EBR en Guatemala. Typed report, 30 pp. (Spanish).

Describes the BVE crop demonstration program. Includes criteria, objectives and field procedures.

G-2. Peña, René. Dec., 1976. Parcelas demostrativas de 1974 - Oriente. Typed report, 36 pp. (Spanish).

Summary report of 1974 BVE crop demonstrations conducted in the Oriente region.

G-3. Thompson, David. Dec., 1976. Experiencia sobre parcelas demostrativas de Educación Básica Rural, 1975. Typed report, 22 pp. (Spanish).

Summary report of 1975 BVE crop demonstrations conducted in the Oriente region.

G-4. Carrera, Jaime, René Peña, Jaime Solórzano, Oscar López, José Jiménez, Guillermo Menegazzo. Jan., 1977. Parcelas demostrativas de 1976; informe final. Typed report, 109 pp. (Spanish).

Summary report of 1976 BVE crop demonstrations conducted in Oriente and Occidente regions.

H. DEVELOPMENT AND FIELD TESTING OF PROGRAM MATERIALS

H-1. Terzuola, Robert G. July, 1975. Consumer Cassette volunteer orientation report. Typed report, 3 pp. (English).

Description of orientation course for unpaid (volunteer) monitors in BVE consumer cassette pilot study.

H-2. Colle, Royal D., Robert Terzuola, and Susana Fernandez. 1975. Stretching manpower resources for non-formal education in rural development: a case study in communications. Prepared for Adult Education Research Conference, St. Louis, Mo. Printed report, 15 pp. (English).

Final report of BVE consumer cassette pilot study including objectives, methodology and results.

H-3. Staff. Mar., 1976. The BVE materials testing program. Typed report, 5 pp. (English).

Preliminary report on field evaluations of BVE graphic materials.

H-4. Staff. Mar., 1976. Field evaluation of selected graphics produced by BVE for National Emergency Comittee. Typed Report, 6 pp. (Spanish and English).

H-5. Stephen, Victor. June, 1976. Summary report (February 1 - June 30, 1976). Typed report, 12 pp. (English). (Also, excerpts included as Appendix E to reference A-3 above).

An overview of BVE graphics production and field testing, including methodology and results.

H-6. Grijalva, Victor. July, 1976. Informe de las visitas de evaluación formal de la historieta "Control de Plagas". Typed report, 9 pp. (Spanish).

Preliminary report of field evaluation of illustrated booklet on insect control.

H-7. Viganó, Oscar. Oct., 1976. Materiales gráficos en las areas rurales y la necesidad de evaluar para maximizar la efectividad. Mimeo report, 5 pp. (Spanish).

Discussion of graphic materials used in the rural areas and the need to evaluate them for maximum effectiveness.

H-8. Grijalva, Victor. Nov., 1976. Informe de la prueba formal de la historieta "Fertilizantes" realizada en Oriente con una muestra de Occidente, los meses de julio, agosto, y septiembre de 1976. Typed report, 21 pp. (Spanish).

Preliminary report of field evaluation of illustrated booklet on fertilizers and their use.

H-9. Viganó, Oscar. Dec., 1976. Estudio sobre aceptación y efectividad de las fotonovelas e historieta en la comunicación de conocimientos en las areas rurales de Guatemala. Typed report, 17 pp. (Spanish).

Study concerning the acceptance and effectiveness of photo and picture booklets in the communication of ideas in rural Guatemala.

H-10. Grijalva, Victor. Dec., 1976. Informe anual de la evaluación no-formal realizada en el campo por el equipo de evaluación de materiales. Typed report, 12 pp. (Spanish).

Report on graphic materials evaluation.

H-11 García, Sergio. Dec., 1976. Informe final y análisis de los trabajos realizados en el campo de nuevos materiales en el período enero-dic. 1976. Typed report, 5 pp. (Spanish).

Summary report of new graphic materials testing in the BVE Project, including historietas (graphic booklets with simple text), special posters and artist training aids.

I. SUMMATIVE EVALUATION

I-1. Terzuola, Robert. Sept., 1973. Summary of field experience: baseline survey - Quezada/Yupiltepeque. Typed report, 3 pp. (English).

Operational details of the first BVE baseline survey conducted in the Oriente region.

I-2. Terzuola, Robert. Oct., 1973. Selection and training of field interviewers. Typed report, 2 pp. (English).

Detailed description of field interviewer's training program prior to first baseline survey in Oriente region.

I-3. Terzuola, Robert G. Oct., 1974. 1974 survey field report. Typed report, 4 pp. (English).

A detailed description of 1974 annual survey field activities.

I-4. Terzuola, Robert G. Nov., 1974. 1974 Baseline/follow-up survey instrument: preparation and utilization. Typed report, 4 pp. (English).

I-5. Terzuola, Robert G. Apr., 1975. Time sample procedures, 1975. Typed report, 3 pp. (English).

Brief description of instrument development and field procedures for 1975 BVE time sample surveys.

I-6. Terzuola, Robert G. Aug., 1975. Training report - Occidente. Typed report, 2 pp. (English).

Summary of training program for interviewers preparatory to BVE annual survey.

I-7. Nesman, Edgar. Oct., 1976. Resultados descubiertos durante el análisis de la evaluación del Programa EBR. Mimeo report, 4 pp. (Spanish).

Summary of preliminary results from analysis of BVE evaluation data.

I-8. Thompson, David. Oct., 1976. Field report, 1976 Year-end survey: Oriente, Parts I and II. Typed report, 6 pp. (English).

I-9. Straub, Gordon A. Dec., 1976. Occidente annual survey report - Parts I, II and III. Typed report. (English).

J. PROGRESS AND SPECIAL REPORTS

J-1. Fanning, Thomas and Serritella, Omar. September, 1973. Report on the Organization and Implementation of a Department of Audiovisual Materials for the Program of Basic Education in Rural Areas. Typed report, 19 pp. (Spanish and English).

Report on the nature of the audiovisual component of the BVE Project, and guidelines as to its use.

J-2. Marchisio, Hector. September, 1973. Ideas and Plans related to the Utilization of Radio broadcasting in the Quezada

Area. Typed report, 13 pp. (Spanish and English).

J-3 Dardón, Mario R., and Howard E. Ray. Nov., 1973. Reporte del progreso del Programa de Educación Básica Rural. Typed report, 4 pp. (Spanish and English).

An early progress report which describes preliminary activities undertaken in preparation for baseline survey and commencement of Project field operations in the Oriente region.

J-4. Ray, Howard E., and Mario R. Dardón. Apr., 1974. Basic Village Education: an experiment in non-formal adult education. Mimeo information bulletin, 7 pp. (English).

A brief, overall description of the BVE program in its early stages including background, project duration, planning and preparation, evaluation, facilities and staff, and intersectoral coordination.

J-5. Ray, Howard E., Thomas R. Rich, Edgar G. Nesman and M.R. Dardón. Apr., 1974. The role of modern communications technology in strategies to accelerate rural development (A preliminary report on the Basic Village Education Project). Presented to the International conference, "Non-Formal Education: New Strategies for Developing an Old Resource," at Michigan State University. Mimeo report, 10 pp. (Spanish and English).

An early discussion paper which provides a broad perspective and background to the Project. Includes working hypotheses, design, analysis and evaluation, and project operations.

J-6. Terzuola, Robert G. Feb., 1975. Evaluation activities conducted by BVE Program, September, 1973 - February, 1975. Typed report, 7 pp. (English).

J-7. Ray, Howard E. June, 1975 (Rev. Oct. 1975). The Basic Village Education Project in overview. Presented at BVE Project Review, Washington, D.C. Mimeo report, 9 pp. (English). (Also, included as Appendix H to reference A-2 above).

Text of a slide presentation which gives a broad description of the BVE Project, including selection of target areas, evaluation procedures, program content development and initial field operations.

J-8. Norvell, Douglass G., and Gordon A. Straub. June, 1975. A cost analysis of a regional non-formal education system for small

Farmers in Guatemala (preliminary draft for discussion purposes only). Mimeo report, 15 pp. (English). (Also, included as Appendix F to reference A-2 above).

A preliminary analysis of first year costs of the BVE program, including: methodology, data analysis and some tentative conclusions.

J-9. Ray, Howard E. Feb., 1976. Impact of the Guatemalan earthquake on BVE and BRE programming and activities. Typed report, 15 pp. (English). (Also, included as Appendix B to reference A-3 above).

J-11 Dardón, Mario. Oct., 1976. Resultados preliminares de evaluación. Mimeo report. 10 pp. (Spanish).

An overview of media mixes as utilized by BVE, evaluation activities and summary of preliminary results.

J-12. Carrera, Jaime A. Oct., 1976. Informe de asistencia a conferencia y taller de "Non-Formal Education and the Rural Poor" realizado en Michigan State University de 26 de Septiembre al 3 de Octubre de 1976. Typed report, 7 pp. (Spanish).

Report on participation in conference at Michigan State University.

J-13. Ray, Howard E. Mar., 1977. The Basic Village Education Project — concept and operation. Mimeo report, 12 pp. (English).

An updated presentation of reference J-7 above. Prepared for AID/Washington review of BVE Project in March, 1977.

J-14. Ray, Howard E. Mar., 1977. Characteristics contributing to the successful implementation and operation for BVE that may have implications for programs in other sectors and/or other settings. Mimeo report, 2 pp. (English).

Prepared for March, 1977, AID/Washington review of BVE Project. Outlines broad characteristics of Project initiation, programming philosophy and staff development which contributed to BVE success.

J-15. Ray, Howard E. Mar., 1977. Influence of external factors on non-formal education (NFE) programs such as Basic Village Education, and on assessment of their effectiveness. Mimeo report, 6 pp. (English).

Prepared for March, 1977, AID/Washington review of BVE Project.

J-16. Ray, Howard E. June, 1977. The Basic Village Education Project, Guatemala. Typed report, 27 pp. (English).

A case study of BVE prepared for the 1977 ICET World Assembly, Lagos, Nigeria, July 30 - August 2, 1977.

Appendix E

LIST OF EVALUATION REPORTS, WORKING PAPERS, AND PROFESSIONAL PAPERS

A. LIST OF EVALUATION REPORTS

1. Procedures for Data Processing. 3 pp., September 19, 1973. Notes from discussion of data processing procedures with Ray, Rich, Anderson and Nesman on 9/18/73.

2. Evaluation of an Experiment in Non-Formal Education. 12 pp. plus 18 pp. Appendix, April, 1974. Report prepared for presentation at Annual Review in State Department.

3. Procedures for Analysis of Data. 2 pp., September, 1974. Proposed procedures and questions to guide in the analysis of the data from the field surveys.

4. The Use of Paraprofessionals in Non-formal Education. 17 pp. text plus 44 pp. appendix, February 7, 1975. A summary of general principles in the recruitment, training, supervision and evaluation of local leaders.

5. Data Processing Check on 1973 Baseline Survey (Phase I). 8 pp., February 24, 1975. Procedures and rationale for complete and final check of all data being used for computer analysis.

6. Radio Use in Occidente. 4 pp. summary plus 35 tables, February 25, 1975. A summary of radio ownership and use in the Momos area of Occidente. The 1974 Momos data is also compared to the 1973 Quezada data.

7. Field Interview Techniques. 7 pp., February 24, 1975. Suggestions for field interviewers made by Astolfo Mellado, field interviewer for Oriente 1973-74.

8. Behavioral Objectives and Time Sampling. 28 pp., February 26, 1975. A summary of the 1974 Time Sample Surveys in the Quezada area.

9. Comparison of Selected Characteristics of Farmers in Oriente and Occidente. 1 pg., February 28, 1975. A comparison of 11 items from 1974 Baseline Survey in sub-areas of Ipala (Ote.) and Momos (Occ.).

10. Ranking System. 2 pp., February 28, 1975. A proposal for a method to measure change using a scoring system for recommended practices.

11. Comparative Information From 1974 Baseline/Year-End Survey. 13 pp., April 16, 1975. A selection of 24 items to compare major areas and treatment areas in Oriente and Occidente including information on occupation, land tenure arrangements, radio use, home sanitary facilities, family size, education, selected agricultural practices and crop yields (with revisions on May 30).

12. Disease Control: Momostenango. 5 pp., April 22, 1975. A summary of responses relating to disease control for Momostenango from 1974 Baseline Survey.

13. Disease Control: Ipala. 5 pp., April 22, 1975. A summary of responses relating to disease control for Ipala from 1974 Baseline Survey.

14. Insect Control: Momostenango. 5 pp., April 23, 1975. A summary of responses relating to disease control for Momostenango from 1974 Baseline Survey.

15. Insect Control: Ipala. 5 pp., April 24, 1975. A summary of responses relating to insect control for Ipala from 1974 Baseline Survey.

16. Measurement of Change 1973-74 in Oriente I Experimental Area. 5 pp., April 28, 1975. Outlines procedure for scoring and scaling of items on 1973 and 1974 surveys so that an accurate measure of change can be obtained (see May 30 revision).

17. Disease Control: Yupi. 5 pp., May 3, 1975. A summary of responses relating to disease control for Yupi from 1974 Baseline Survey.

18. Insect Control: Yupi. 5 pp., May 3, 1975. A summary of responses relating to insect control for Yupi from 1974 Baseline Survey.

19. Insect Control: Chichi. 5 pp., May 5, 1975. A summary of responses relating to insect control for Yupi from 1974 Baseline Survey.

20. Disease Control: Chichi. 5 pp., May 5, 1975. A summary of responses relating to disease control for Chichi from 1974 Baseline Survey.

21. Oriente Evaluation Time Line. 4 pp., May 9, 1975. An outline of the research design for Oriente including major areas, treatment areas, villages and respondents for each year.

22. Occidente Evaluation Time Line. 3 pp., May 9, 1975. An outline of the research design for Occidente including major areas, treatment areas, villages and respondents for each year.

23. Revised Computer Card and Case ID Numbering System. 8 pp., May 28, 1975. A standardized system to distinguish major areas, treatment sub-areas, villages, individual cases, and survey number (revised June 6, 1975).

24. Notice of Coding Change. 1 pg., May 30, 1975. A notification of an error in treatment area coding in the 1974 Quezada Year-End Survey data.

25. Disease Control: Quezada. 5 pp., May 30, 1975. A summary of responses relating to disease control for Quezada from the 1974 Year-End Survey.

26. Insect Control: Quezada. 5 pp., May 30, 1975. A summary of responses relating to insect control for Quezada from the 1974 Year-End Survey.

27. Measurement of Change 1973-74 in Oriente I Experimental Area. 5 pp., May 30, 1975. An update on the Evaluation Report of April 28 regarding scoring and scaling of items on the 1973 and 1974 surveys so that an accurate measure of change can be obtained.

28. Evaluation Report for Annual Review. 18 pp. plus 39 pp. of background material prepared to accompany slide presentation at State Department on June 16/17, 1975.

29. Annual Review - Project Presentation: An Outline of Topics Discussed. 12 pp., June 20, 1975. Summary of topics discussed.

30. Results of the 1974 BVE Program in Jutiapa, Guatemala. 35 pp., 34 graphs, July 22, 1975. Graphs show both 1973 and 1974 levels. Items include: information sources, technical assistance, credit use and recent practice changes; land clearing and planting methods; insect, disease and weed control.

31. Characteristics of "Progressive" Farmers in Jutiapa. 1 pg., August 8, 1975. A summary of items found in correlation analysis of 1973 Baseline data.

32. Data Summary: Quezada. 76 pp., July, 1975. A complete summary of all responses by treatment sub-areas on 1974 Year-End Survey in the Quezada area.

33. Data Summary: Yupi. 76 pp., August, 1975. A complete summary of all responses by treatment sub-areas on 1974 Baseline Survey in the Yupi area.

34. Data Summary: Ipala. 76 pp., August, 1975. A complete summary of all responses by treatment sub-areas on 1974 Baseline Survey in the Ipala area.

35. Comparative Information for Occidente. 1 pg., 28 graphs, August 15, 1975. Graphs show selected items from 1974 baseline survey for treatment and control sub-areas of Momos and Chichi.

36. Average Amount of Crop Land Available for Planting in 1974. 1 pg., 1 table. August 20, 1975. A summary of total crop land available for planting.

37. Time Sample Data Processing Procedures. 2 pp., August 25, 1975. Revised procedures and checklist used with each time sample survey.

38. Judges' Rating of Questions Used in 1974 Baseline Survey. 4 pp., August 29, 1975. Check on validity and reliability of each question asked in survey.

39. Data Summary: Momos. 76 pp., August, 1975. A complete summary of all responses by treatment sub-areas on 1974 Baseline Survey in the Momos area.

40. Evaluation Component: List of Fall Jobs, October 1, 1975 to December 31, 1975. 2 pp., September 5, 1975. Itemized list of jobs to be done.

41. List of Cases Used More Than Once During 1975 Interviewing. 9 pp., September 9, 1975. Includes the Yield 1974 Survey, TS-8, TS-9, TS-10 and TS-11.

42. Basic Village Education: Measurement of Change by Comparing 1973 and 1974 Score Values. 15 pp., September, 1975. Shows advantage scoring methods have over percentage methods.

43. Revised Computer Card and Case ID Numbering System. 8 pp., May 28, 1975 - revised September 24, 1975. A standardized system to distinguish major areas, treatment sub-areas, villages, individual cases, and survey number.

44. Data Processing Steps for 1975 Year-End Survey. 2 pp., September 26, 1975. Procedures and checklist for year-end survey.

45. The Relation of Fertilizer Use and Corn Yields in Quezada in 1974. 3 pp., September 29, 1975. Results of the analysis on the relation of the amount of fertilizer used and corn yields in the Quezada experimental area in 1974.

46. Data Summary: Chichi. 76 pp., October, 1975. A complete summary of all responses by treatment sub-areas on 1974 Baseline Survey in the Chichi area.

47. Agricultural Practices and Corn Yields in Quezada, 1974. 4 pp., October 2, 1975. This is a report on the practices and conditions that are related to corn yields in the Quezada experimental

48. Average Amount of Crop Land Available for Planting in 1974. 3 pp., October 8, 1975. (Revision of E.R. #36). In addition to the average amount of land available, this report includes a table that contains the actual number of farms in each size category in all of the treatment sub-areas and major areas.

49. Characteristics of Farmers of the Quezada Area Who Reported High Crop Yields in 1974. 2 pp., November 25, 1975. A report on general and agricultural characteristics of farmers in the Quezada area who reported high crop yields in 1974.

50. Recommended Agricultural Practices and Number of Adopters During First Program Year of Basic Village Education Program. 1 pg., November 25, 1975. A report of the analysis of change in the use of recommended farm practices from the time of the baseline survey in the fall of 1973 to the time of the year-end survey in 1974.

51. Characteristics of Farmers That Adopted More Recommended Farm Practices During First Year of Basic Village Education Program. 2 pp., November 25, 1975. A report of the related characteristics and conditions of those farmers of the Quezada experimental area that adopted more of the recommended agricultural practices during the 1974 agricultural year.

52. Profiles of Change. 7 pp., December 30, 1975. A report on six farmers that were high change individuals during the first program year in the Quezada area.

53. Data Summary of 1973 Crop Yields Survey. 18 pp., January 16, 1976. A summary of data collected in January 1974.

54. Data Summary of 1974 Crop Yields Survey. 26 pp., January 20, 1976. A summary of data collected in January 1975.

55. Time Sample Survey - TS8--Data Summary - Oriente 1975. 21 pp., January 22, 1976. A summary of the data from the Time Sample Survey conducted during April of 1975 in the Quezada, Yupiltepeque (Yupi), and Ipala areas of Oriente.

56. Time Sample Survey - TS9--Data Summary - Oriente 1975. 17 pp., Janaury 23, 1976. A summary of the data from the Time Sample Survey conducted during May of 1975 in the Quezada, Yupiltepeque (Yupi) and Ipala areas of Oriente.

57. Time Sample Survey - TS10--Data Summary - Oriente 1975. 23 pp., January 23, 1976. A summary of the data from the Time Sample Survey conducted during June of 1975 in the Quezada, Yupiltepeque (Yupi), and Ipala areas of Oriente.

58. Time Sample Survey - TS 11--Data Summary - Oriente 1975. 24 pp., January 23, 1976. A summary of the data from the Time Sample Survey conducted during July of 1975 in the Quezada, Yupiltepeque (Yupi), and Ipala areas of Oriente.

59. Time Sample Survey - TS 12--Data Summary - Oriente 1975. 26 pp., January 23, 1976. A summary of the data from the Time Sample Survey conducted during August of 1975 in the Quezada, Yupiltepeque (Yupi), and Ipala areas of Oriente.

50. Time Sample Survey - TS 13--Data Summary - Oriente 1975. 18 pp., January 23, 1976. A summary of the data from the Time Sample Survey conducted during September of 1975 in the Quezada, Yupiltepeque (Yupi), and Ipala areas of Oriente.

61. Quezada Area: Comparison of Cropping System and Soil Preparation for 1974 and 1975. 4 pp., March 9, 1976. A preliminary report on the comparative results of the 1974 and 1975 surveys in the Quezada area.

62. Yupi Area: Comparison of Cropping System and Soil Preparation for 1974 and 1975. 4 pp., March 9, 1976. A preliminary report on the comparative results of the 1974 and 1975 surveys in the Yupi area.

63. Ipala Area: Comparison of Cropping System and Soil Preparation for 1974 and 1975. 4 pp., March 9, 1976. A preliminary report on the comparative results of the 1974 and 1975 surveys in the Ipala area.

64. Momos Area: Comparison of Cropping System and Soil Preparation for 1974 and 1975. 4 pp., March 11, 1976. A preliminary report on the comparative results of the 1974 and 1975 surveys in the Momos area.

65. Chichi Area: Comparison of Cropping System and Soil Preparation for 1974 and 1975. 4 pp., March 11, 1976. A preliminary report on the comparative results of the 1974 and 1975 surveys in the Chichi area.

66. ID and Variable Layout for Yield Survey 1975. 1 pg., March 30, 1976. Column listing for computer programming.

67. Yupi - Active and Missing Cases as of January 1, 1976. 1 pg., June 14, 1976. List of active and missing cases in Yupi.

68. Scoring Values for Selected Agricultural Practices From General Surveys 1974 and 1975 (Corrected 6/1/76). 2 pp., June 15, 1976. List of values used on the coded answers of selected agricultural practices from the 1974 and 1975 year-end surveys.

69. Quezada - Active and Missing Cases as of January 1, 1976. 1 pg., June 16, 1976. List of active and missing cases in Quezada.

70. Ipala - Active and Missing Cases as of January 1, 1976. 1 pg., June 17, 1976. List of active and missing cases in Ipala.

71. Momos - Active and Missing Cases as of January 1, 1976. 1 pg., June 24, 1976. List of active and missing cases in Momos.

72. Chichi - Active and Missing Cases as of January 1, 1976. 1 pg., June 24, 1976. List of active and missing cases in Chichi.

73. Time Sample Survey - TS-14 - Data Summary - Oriente - April 1976. 5 pp. plus 26 pp. of TS-14, June 30, 1976. A summary of the data from the Time Sample Survey conducted during April of 1976 in the Quezada, Yupiltepeque (Yupi) and Ipala areas of Oriente.

74. Time Sample Summary - TS-14 - Data Summary. 5 pp., September 20, 1976. Revised summary of the data from the Time Sample Survey conducted during April of 1976 in the Quezada, Yupiltepeque (Yupi), and Ipala areas of Oriente. (Revised E.R. 73)

75. Time Sample Survey - TS-15 - Data Summary - Oriente - May 1976. 4 pp. plus 26 pp. of TS-15, September 20, 1976. A summary of the data from the Time Sample Survey conducted during May of 1976 in the Quezada, Yupiltepeque (Yupi), and Ipala areas of Oriente.

76. Time Sample Survey - TS-14 - Data Summary - Occidente - June 1976. 5 pp. plus 26 pp. of TS-14, October 8, 1976. A summary of the data from the Time Sample Survey conducted during June of 1976 in the Momostenango and Chichicastenango areas of Occidente.

77. Time Sample Survey - TS-15 - Data Summary - Occidente - June 1976. 5 pp. plus 26 pp. of TS-15, October 11, 1976. A summary of the data from the Time Sample Survey conducted during June of 1976 in the Momostenango and Chichicastenango areas of the Occidente.

78. Momos - Active and Missing Cases as of January 1, 1976. 1 pg., October 11, 1976. Revised list of active and missing cases in Momos. (Revised E.R. 71)

79. Instructions and Sample Case for Use with 1976 Year-End Layout Sheets. 6 pp., October 26, 1976. Procedure and detailed explanation for coding data onto layout sheets.

80. Outline of Presentation at Conference on Non-Formal Education and Rural Poor. 11 pp., October 27, 1976. Summary of Presentation at Michigan State University, September 26-29, 1976.

81. Projected Analysis: Final Report. 2 pp., October 28, 1976. A summary of the involvement of Northeast Regional Data Center in the analysis of evaluation data from the AED project in Basic Village Education 1973-76-78 by Dr. Richard J. Anderson.

82. Basic Village Education - Seminar/Review. 3 pp., October 29, 1976. An outline of the topics presented in Guatemala October 18-19, 1976.

83. Time Sample Survey - TS-16 - Data Summary - Oriente - May 1976. 5 pp. plus 26 pp. of TS-16, November 30, 1976. A summary of the data from the Time Sample Survey conducted during May of 1976 in the Quezada, Yupiltepeque and Ipala areas of Oriente.

84. Time Sample Survey - TS-17 - Data Summary - Oriente - June 1976. 5 pp. plus 26 pp. of TS-17, November 30, 1976. A summary of the data from the Time Sample Survey conducted during June of 1976 in the Quezada, Yupiltepeque and Ipala areas of Oriente.

85. Time Sample Survey - TS-18 - Data Summary - Oriente - November 1976. 4 pp. plus 26 pp. of TS-18, January 20, 1977. A summary of the data from the Time Sample Survey conducted during November of 1976 in the Quezada, Yupiltepeque and Ipala areas of Oriente.

86. Basic Village Education - Discussion Questions. 2 pp., January 25, 1977. An outline of questions to be considered for annual report.

87. Time Sample Survey - TS-19 - Data Summary - Oriente - November 1976. 5 pp. plus 26 pp. of TS-19, January 27, 1977. A summary of the data from the Time Sample Survey conducted during November of 1976 in the Quezada, Yupiltepeque and Ipala areas of Oriente.

88. Data Summary - All Oriente: Factor Analysis of Practices (1975). 3 pp., March 9, 1977. January survey data for crop year 1975, factor analysis and results of the analysis.

89. Data Summary - Yupi: Mean Corn Production for 1974 and 1975. 3 pp., March 9, 1977. Yupi, Quezada and Ipala corn, bean and sorghum production for 1974 and 1975. January survey data.

90. Data Summary - Regression on Corn Yield on 18 Selected Agricultural Practices Combining Yupi and Quezada Treatment Conditions. 6 pp., March 9, 1977. The results of the analysis and a list of the agricultural practices is included in this report.

91. Differential Characteristics of High and Low Yield Farmers on Eighteen Selected Agricultural Practices. 9 pp., March 9, 1977. This report constitutes a preliminary investigation into the characteristics which tend to distinguish between high and low farmers.

92. Data Summary - Mean Corn Yields for Oriente Fall Surveys 1974, 1975 & 1976. 3 pp., March 9, 1977. Mean corn, bean and sorghum yields for Oriente fall surveys.

93. Coding Policy for the 18 Agricultural Practices: As of March 1977. 3 pp., March 9, 1977.

94. Quezada - Active and Missing Cases as of April 1, 1977. 1 pg., April 4, 1977. List of active and missing cases in Quezada.

95. Yupi - Active and Missing Cases as of April 1, 1977. 1 pg., April 4, 1977. List of active and missing cases in Yupi.

96. Ipala - Active and Missing Cases as of April 1, 1977. 1 pg., April 4, 1977. List of active and missing cases in Ipala.

97. Data Summary: Correlations Between Agricultural Practices and Crop Yields for Oriente 1974, 1975, & 1976. 7 pp., April 8, 1977.

98. Comparability of 18 Agricultural Practices with 1973 Data. 4 pp., April 8, 1977.

99. Computerized Data Storage of Oriente Annual Surveys 1974-1976. 4 pp. May 20, 1977. Contains explanation of and list of cases excluded from data tape used for cross-year analysis.

101. Master Variable List - Complete Data Content: Basic Village Education Project. 32 pp., June 27, 1977. Listing of general data content (categorized) from card 1 through 38, based primarily on the completed Oriente data.

B. LIST OF WORKING PAPERS

1. The General Characteristics of Subsistence Farmers in the Department of Jutiapa, Guatemala. Working Paper No. 1, University of South Florida, October, 1974, 93 pp. This is a descriptive report based on the data from the surveys conducted in November, 1973. It contains eight pages of summary narrative and 81 pages of tables.

2. The Agricultural Characteristics of Subsistence Farmers in the Department of Jutiapa, Guatemala. Working Paper No. 2, University of South Florida, February, 1975, 130 pp. This is a descriptive report based on the data from the baseline surveys conducted in November, 1973. It is much like Working Paper No. 1 except that it deals in agricultural characteristics instead of general characteristics. It contains 44 pages of summary narrative and 86 pages of tables.

3. Evaluation of Changes in Knowledge, Attitude and Practices Among Subsistence Farmers in the Department of Jutiapa, Guatemala: A Time Sampling Methodology. Working Paper No. 3, University of South Florida, May, 1975, 134 pp. This paper is of both descriptive and analytical nature based on the data collected in the

1974 monthly time sample surveys. It contains 19 pages of narrative and 115 pages of tables.

4. Summary of the 1974 Year-End Survey of Subsistence Farmers in the Quezada Experimental Area. Working Paper No. 4, University of South Florida, December, 1975, 91 pp. This paper is a summary of the responses of farmers from the interviews conducted in the 1974 year-end survey in the Quezada experimental area. It contains 9 pages of narrative and 76 pages of tables.

5. Summary of the 1974 Baseline Survey of Subsistence Farmers in the Yupiltepeque Experimental Area. Working Paper No. 5, University of South Florida, February, 1976, 90 pp. This paper is a summary of the responses of farmers from the interviews conducted in the 1974 baseline survey in the Yupiltepeque (Yupi) experimental area. It contains 8 pages of narrative and 76 pages of tables.

6. Summary of the 1974 Baseline Survey of Subsistence Farmers in the Ipala Experimental Area. Working Paper No. 6, University of South Florida, February, 1976, 90 pp. This paper is a summary of the responses of farmers from the interviews conducted in the 1974 baseline survey in the Ipala control area. It contains 8 pages of narrative and 76 pages of tables.

7. Summary of the 1974 Baseline Survey of Subsistence Farmers in the Momostenango Experimental Area. Working Paper No. 7, University of South Florida, March, 1976, 90 pp. This paper is a summary of the responses of farmers from the interviews conducted in the 1974 baseline survey in the Momos experimental area. It contains 8 pages of narrative and 76 pages of tables.

8. Summary of the 1974 Bseline Survey of Subsistence Farmers in the Chichicastenango Control Area. Working Paper no. 8, University of South Florida, March, 1976, 90 pp. This paper is a summary of the response of farmers from the interviews conducted in the 1974 baseline survey in the Chichi control area. It contains 8 pages of narrative and 76 pages of tables.

9. Measurement of Change: Results of 1975 Time Sample Surveys Among Subsistence Farmers in Oriente, Guatemala. Working Paper No. 9, University of South Florida, 156 pp. This paper is a summary of the findings of the results of the 1975 Time Sample Surveys conducted in Oriente, Guatemala. It contains 32 pages of narrative and 124 pages of tables.

10. Measurement of Change: Results of 1976 Time Sample Surveys Among Subsistence Farmers in Oriente, Guatemala. Working Paper No. 10, University of South Florida, 125 pages. This paper is a summary of the findings of the results of the 1976 Time Sample Surveys conducted in Oriente, Guatemala. It contains 9 pages of narrative and 116 pages of tables.

C. PROFESSIONAL PAPERS

1. Ray, H., Rich, T., Nesman, E., Dardon, M. "The Role of Modern Communication Technology in Strategies to Accelerate Rural Development", presented to the Michigan State Conference, Non-Formal Education: New Strategies for Developing an Old Resource, April, 1974.

2. Nesman, E., Rich, T., Ray, H. "Innovativeness Among Subsistence Farmers in Guatemala", presented at the 1974 meeting of the Rural Sociological Society, Montreal.

3. Nesman, E., Rich, T., "The Comparative Study of the Impact of Mass Communications on Subsistence Farmers in Guatemala" presented at the Southern Sociological Society Meeting, April, 1975, Washington, D.C.

4. Nesman, E. and Rich, T., "Field Measurement of Changes in Knowledge, Attitudes and Practices Among Small Farmers in Guatemala", presented at the Southern Sociological Society Meeting, April, 1977, Atlanta.

Appendix F

LIST OF PRACTICES COMPRISING THE TOTAL PRACTICE INDEX

Item #1	
Variable 15	How do you prepare your land for your crops?
Item #2	
Variable 26	What type of corn seed did you use this year?
Variable 29	What type of been seed did you use this year?
Variable 32	What type of sorghum seed did you use this year?
Item #3	
Variable 94	What crops do you plant in association?
Item #4	
Variable 99	Which insecticides did you use to control insects? How many?
Item #5	
Variable 102	If you fertilized your first crop at seeding, what type of fertilizer did you use?
Item #6	
Variable 114	How much chemical fertilizer did you use this year when seeding your first crop of corn planted alone?
Variable 115	How much chemical fertilizer did you use this year when seeding your first crop of corn planted alone?
Variable 116	How much chemical fertilizer did you use this year when seeding your first crop of sorghum planted alone?
Variable 117	How much chemical fertilizer did you use this year when seeding your first crop of corn associated with beans?
Variable 118	How much chemical fertilizer did you use this year when seeding your first crop of sorghum associated with beans?
Variable 119	How much chemical fertilizer did you use this year when seeding your first crop of corn associated with beans and sorghum?
Variable 120	How much chemical fertilizer did you use this year when seeding your first crop of corn associated with sorghum?

Item #7

Variable 103 — If you fertilized your first crop just before flowering what kind of fertilizer did you use?

Item #8

Variable 122 — How much chemical fertilizer did you use this year at flowering on your first crop of corn planted alone?

Variable 123 — How much chemical fertilizer did you use this year at flowering on your first crop of beans planted alone?

Variable 124 — How much chemical fertilizer did you use this year at flowering on your first crop of sorghum planted alone?

Variable 125 — How much chemical fertilizer did you use this year at flowering on your first crop of corn associated with beans?

Variable 126 — How much chemical fertilizer did you use this year at flowering on your first crop of sorghum associated with beans?

Variable 127 — How much chemical fertilizer did you use this year at flowering on your first crop of corn associated with beans and sorghum?

Variable 128 — How much chemical fertilizer did you use this year at flowering on your first crop of corn associated with sorghum?

Item #9

Variable 134 — Did you use herbicide to control weeds?

Item #10

Variable 139 — Did you use fungicides to control disease on your crops?

Item #11

Variable 142 — Do you destroy the crop residues after the last crop of the year? How?

Item #12

Variable 151 — Where do you store your corn until it is sold or used by you and your family?

Variable 152 — Where do you store your beans until it is sold or used by you and your family?

Variable 153 Where do you store your sorghum until it is sold or used by you and your family?

Item #13

Variable 169 Did you borrow money for your crops this year? Where?

APPENDIX G

TABLES RELATED TO THE ANALYSIS OF THE 13 ITEMS IN THE TOTAL PRACTICE INDEX

This appendix contains all of the tables relevant to the individual analyses of the 13 practice items in the total practice index (see Chapter III, Part C). Four tables are presented for each item (except item #13, since there was essentially no variation in this variable) as follows: a) Table 1 presents counts of the number of farmers who changed from 1974 to 1976, and notes the direction of these changes; b) Table 2 presents a comparison of 1974 and 1976 mean practice levels, and significance tests of the differences between these means; c) Table 3 presents the results of an analysis related to differential treatment effectiveness between 1974 and 1976; and d) Table 4 presents the results of the analysis of differential treatment effectiveness when like treatments were combined by geographical areas.

Item #1 - Table 1. Measurement of individual practice scores from 1974 to 1976 by number of individuals who changed.

Sub-Area	Positive Change	No Change	Negative Change	Total
QR	43	47	11	101
QRM	36	48	18	102
QRMA	41	43	17	101
YR	30	72	9	111
YRM	32	63	8	103
YRMA	47	46	13	106
IM	15	73	4	92
IC	12	86	6	104
Total	256	478	86	820

Variable #15 - How do you prepare your land for crops?

Item #1 - Table 2. Comparison of individual practice scores, 1974 and 1976 by mean score: change within treatment condition across years.

Sub-Area	N	1974 mean	1976 mean	t*	Sign.**
QR	101	3.96	4.48	4.66	<.001
QRM	102	4.05	4.32	2.87	=.005
QRMA	101	3.90	4.26	3.01	=.003
YR	111	3.44	3.76	3.48	=.001
YRM	103	3.20	3.57	4.23	<.001
YRMA	106	3.64	4.18	5.01	<.001
IM	92	3.12	3.23	1.83	NS
IC	104	3.13	3.17	1.09	NS

* t - tests for paired comparisons

** significance tests are based on 2-tail probabilities of t

Item #1 - Table 3. Differential treatment effectiveness as measured by change from 1974 to 1976.

a. Analysis of variance on change in individual practice scores

Source	df	Sum of squares	Mean squares	F ratio	F prob.
Between treatments	7	20.8400	2.9771	3.342	<.002
Within treatments	812	723.4478	0.8909		
Total	819	744.2876			

b. Rank order of treatments by change

Sub-Area	N	Mean change	Standard deviation
YRMA	106	.5377	1.1056
QR	101	.5149	1.1101
YRM	103	.3689	0.8855
QRMA	101	.3564	1.1881
YR	111	.3153	0.9533
QRM	102	.2745	0.9663
IM	92	.1196	0.6262
IC	104	.0481	0.4489

c. Summary of subsequent tests between treatment conditions*

Sub-area	QR	QRM	QRMA	YR	YRM	YRMA	IM	IC
QR								
QRM	No							
QRMA	No	No						
YR	No	No	No					
YRM	No	No	No	No				
YRMA	No	Yes	Yes	Yes	No			
IM	Yes	No	No	No	No	Yes		
IC	Yes	No	Yes	Yes	Yes	Yes	No	

* Subsequent tests were made using Fisher's Least Significant Difference Test (see Keppel, G. Design and Analysis: A Researcher's Handbook. New Jersey: Prentice-Hall, Inc., 1973). Yes indicates that there was a significant difference between groups, and No indicates that there was no reliable difference between groups.

Item #1 - Table 4. Differential treatment effectiveness when treatment areas are combined.

a. Analysis of variance on change in individual practice scores (1974-1976)

Source	df	Sum of squares	Mean squares	F ratio	F prob
Between treatments	4	16.5776	4.1444	4.642	=.001
Within treatments	815	727.7034	0.8929		
Total	819	744.2810			

b. Rank order of treatments by change

Sub-Area	N	Mean change	Standard deviation
RMA	207	.4493	1.1474
R	212	.4104	1.0333
RM	205	.3220	0.9255
M	92	.1196	0.6262
C	104	.0481	0.4489

Item #2 - Table 1. Measurement of individual practice scores from 1974 to 1976 by number of individuals who changed.

Sub-Area	Positive change	No change	Negative change	Total
QR	67	27	7	101
QRM	65	32	5	102
QRMA	63	33	5	101
YR	72	34	5	111
YRM	69	31	3	103
YRMA	61	42	3	106
IM	29	57	6	92
IC	82	18	4	104
Total	508	274	38	820

Variables #26, 29 and 32. What type of (corn/bean/sorghum) seed did you use this year? (sum & average)

Item #2 - Table 2: Comparison of individual practice scores, 1974 and 1976 by mean score: change within treatment condition across years.

Sub-Area	N	1974 mean	1976 mean	t*	Sign.**
QR	101	2.60	3.15	8.60	<.001
QRM	102	2.50	3.09	8.17	<.001
QRMA	101	2.64	3.15	8.50	<.001
YR	111	2.46	3.05	9.39	<.001
YRM	103	2.39	3.06	8.91	<.001
YRMA	106	2.49	3.05	8.50	<.001
IM	92	2.79	3.00	3.28	=.001
IC	104	2.80	2.96	2.36	=.02

* t - tests for paired comparisons

** significance tests are based on 2-tail probabilities of t

Item #2 - Table 3. Differential treatment effectiveness as measured by change from 1974 to 1976.

a. Analysis of variance on change in individual practice scores

Source	df	Sum of squares	Mean squares	F ratio	F prob.
Between treatments	7	24.0362	3.4337	7.756	<.001
Within treatments	812	359.4988	0.4427		
Total	819	383.5349			

b. Rank order of treatments by change

Sub-area	N	Mean change	Standard deviation
YRM	103	.6343	0.7224
QRM	102	.5915	0.7311
YR	111	.5811	0.6521
YRMA	106	.5660	0.6857
QR	101	.5413	0.6322
QRMA	101	.5132	0.6063
IM	92	.2029	0.5929
IC	104	.1571	0.6786

c. Summary of subsequent tests between treatment conditions

Sub-area	QR	QRM	QRMA	YR	YRM	YRMA	IM	IC
QR								
QRM	No							
QRMA	No	No						
YR	No	No	No					
YRM	No	No	No	No				
YRMA	No	No	No	No	No			
IM	Yes	Yes	Yes	Yes	Yes	Yes		
IC	Yes	Yes	Yes	Yes	Yes	Yes	No	

Item #2 - Table 4. Differential treatment effectiveness when treatment areas are combined.

a. Analysis of variance on change in individual practice scores (1974-1976)

Source	df	Sum of squares	Mean squares	F ratio	F prob.
Between treatments	4	23.7135	5.9284	13.428	<.001
Within treatments	815	359.8162	0.4415		
Total	819	383.5295			

b. Rank order of treatments by change

Sub-area	N	Mean change	Standard deviation
RM	205	.6130	0.7252
R	212	.5621	0.6415
RMA	207	.5403	0.6472
M	92	.2029	0.5929
C	104	.1571	0.6786

Item #3 - Table 1. Measurement of individual practice scores from 1974 to 1976 by number of individuals who changed.

Sub-Area	Positive change	No change	Negative change	Total
QR	29	61	11	101
QRM	33	53	16	102
QRMA	24	68	9	101
YR	18	78	15	111
YRM	17	79	7	103
YRMA	31	53	22	106
IM	29	49	14	92
IC	21	45	38	104
Total	202	486	132	820

Variable #94 - What crops do you plant in association?

Item #3 - Table 2. Comparison of individual practice scores, 1974 and 1976 by mean score: change within treatment condition across years

Sub-Area	N	1974 mean	1976 mean	t*	Sign.**
QR	92	2.13	2.65	3.03	=.003
QRM	86	2.34	2.81	2.32	<.025
QRMA	92	2.40	2.77	2.18	<.05
YR	110	2.37	2.42	.35	NS
YRM	100	2.06	2.28	1.74	NS
YRMA	104	2.56	2.63	.45	NS
IM	91	2.69	3.13	2.13	<.05
IC	104	3.40	2.83	-2.8	=.006

* t - tests for paired comparisons

** significance tests are based on 2-tail probabilities of t

Item #3 - Table 3. Differential treatment effectiveness as measured by change from 1974 to 1976.

a. Analysis of variance on change in individual practice scores

Source	df	Sum of squares	Mean squares	F ratio	F prob.
Between treatments	7	90.5889	12.9413	4.378	<.001
Within treatments	771	2278.9644	2.9559		
Total	778	2369.5532			

b. Rank order of treatments by change

Sub-Area	N	Mean change	Standard deviation
QR	92	.5217	1.6540
QRM	86	.4767	1.9080
IM	91	.4396	1.9732
QRMA	92	.3696	1.6288
YRM	100	.2200	1.2679
YRMA	104	.0769	1.7387
YR	110	.0455	1.3706
IC	104	-.5769	2.0980

c. Summary of subsequent tests between treatment conditions

Sub-area	QR	QRM	QRMA	YR	YRM	YRMA	IM	IC
QR								
QRM	No							
QRMA	No	No						
YR	Yes	No	No					
YRM	No	No	No	No				
YRMA	No	No	No	No	No			
IM	No	No	No	No	No	No		
IC	Yes	Yes	Yes	Yes	Yes	Yes	Yes	

Item #3-Table 4. Differential treatment effectiveness when treatment areas are combined.

a. Analysis of variance on change in individual practice scores (1974-1976)

Source	df	Sum of squares	Mean squares	F ratio	F prob.
Between treatments	4	71.9957	17.9989	6.064	<.001
Within treatments	774	2297.5066	2.9684		
Total	778	2369.5022			

b. Rank order of treatments by change

Sub-Area	N	Mean change	Standard deviation
M	91	.4396	1.9732
RM	186	.3387	1.5967
R	202	.2624	1.5211
RMA	196	.2143	1.6901
C	104	-.5769	2.0980

Item #4-Table 1. Measurement of individual practice scores from 1974 to 1976 by number of individuals who changed.

Sub-Area	Positive change	No change	Negative change	Total
QR	41	39	21	101
QRM	27	53	22	102
QRMA	29	53	19	101
YR	24	79	8	111
YRM	14	73	16	103
YRMA	23	65	18	106
IM	17	66	9	92
IC	15	83	6	104
Total	190	511	119	820

Variable #99 - Which insecticides did you use to control insects? How many?

Item #4 - Table 2. Comparison of individual practice scores, 1974 and 1976 by mean score: change within treatment condition across years.

Sub-Area	N	1974 mean	1976 mean	t*	Sign.**
QR	101	2.27	2.76	2.48	=.015
QRM	102	2.24	2.35	.66	NS
QRMA	101	1.83	2.11	1.66	NS
YR	111	1.36	1.72	3.13	=.002
YRM	102	1.49	1.43	-.47	NS
YRMA	106	1.83	1.98	1.07	NS
IM	92	1.35	1.63	2.07	<.05
IC	104	1.23	1.44	2.15	<.05

* t - test for paired comparisons

** significance tests are based on 2-tail probabilities of t

Item #4 - Table 3. Differential treatment effectiveness as measured by change from 1974 to 1976.

a. Analysis of variance on change in individual practice scores

Source	df	Sum of squares	Mean squares	F ratio	F prob.
Between treatments	7	19.9556	2.8508	1.273	NS
Within treatments	811	1816.8892	2.2403		
Total	818	1836.8447			

b. Rank order of treatments by change

Sub-Area	N	Mean change	Standard deviation
QR	101	.4950	2.0081
YR	111	.3604	1.2120
IM	92	.2826	1.3120
QRMA	101	.2772	1.6740
IC	104	.2115	1.0017
YRMA	106	.1509	1.4527
QRM	102	.1176	1.7982
YRM	102	-.0588	1.2729

Item #4 - Table 4. Differential treatment effectiveness when treatment areas are combined.

a. Analysis of variance on change in individual practice scores (1974-1976)

Source	df	Sum of squares	Mean squares	F ratio	F prob.
Between treatments	4	16.5833	4.1458	1.854	NS
Within treatments	814	1820.2127	2.2361		
Total	818	1836.7959			

b. Rank order of treatments by change

Sub-Area	N	Mean change	Standard deviation
R	212	.4245	1.6375
M	92	.2826	1.3120
RMA	207	.2126	1.5620
C	104	.2115	1.0017
RM	204	.0294	1.5565

Item #5 - Table 1. Measurement of individual practice scores from 1974 to 1976 by number of individuals who changed.

Sub-Area	Positive change	No change	Negative change	Total
QR	52	32	17	101
QRM	55	32	15	102
QRMA	54	37	10	101
YR	64	43	4	111
YRM	39	59	5	103
YRMA	59	42	5	106
IM	39	45	8	92
IC	46	58	0	104
Total	408	348	64	820

Variable #102 - Type of fertilizer at seeding.

Item #5 - Table 2: Comparison of individual practice scores, 1974 and 1976 by mean score: change within treatment condition across years.

Sub-Area	N	1974 mean	1976 mean	t*	Sign.**
QR	101	2.30	3.43	5.69	<.001
QRM	101	1.97	3.04	5.98	<.001
QRMA	101	1.85	3.02	7.20	<.001
YR	111	1.18	2.29	9.84	<.001
YRM	102	1.14	1.89	6.24	<.001
YRMA	106	1.38	2.58	9.10	<.001
IM	92	1.53	2.48	5.13	<.001
IC	104	1.09	2.16	8.28	<.001

* *t* - tests for paired comparisons

** significance tests are based on 2-tail probabilities of *t*

Item #5 - Table 3. Differential treatment effectiveness as measured by change from 1974 to 1976.

a. Analysis of variance on change in individual practice scores

Source	df	Sum of squares	Mean squares	F ratio	F prob.
Between treatments	7	14.6748	2.0964	0.871	NS
Within treatments	810	1950.5088	2.4080		
Total	817	1965.1836			

b. Rank order of treatments by change

Sub-Area	N	Mean change	Standard deviation
YRMA	106	1.1981	1.3552
QRMA	101	1.1683	1.6314
QR	101	1.1287	1.9933
YR	111	1.1081	1.1859
IC	104	1.0769	1.3270
QRM	101	1.0693	1.7959
IM	92	0.9457	1.7689
YRM	102	0.7549	1.2222

Item #5 - Table 4: Differential treatment effectiveness when treatment areas are combined.

a. Analysis of variance on change in individual practice scores (1974-1976)

Source	df	Sum of squares	Mean squares	F ratio	F prob.
Between treatments	4	9.5903	2.3976	0.997	NS
Within treatments	813	1955.5419	2.4053		
Total	817	1965.1321			

b. Rank order of treatments by change

Sub-Area	N	Mean change	Standard deviation
RMA	207	1.1836	1.4927
R	212	1.1179	1.6175
C	104	1.0769	1.3270
M	92	.9547	1.7689
RM	203	.9113	1.5389

Item #6 - Table 1. Measurement of individual practice scores from 1974 to 1976 by number of individuals who changed.

Sub-Area	Positive change	No change	Negative change	Total
QR	46	29	26	101
QRM	38	50	14	102
QRMA	39	54	8	101
YR	20	88	3	111
YRM	14	83	6	103
YRMA	43	60	3	106
IM	36	48	8	92
IC	15	88	1	104
Total	251	500	69	820

Variables #114-120 - Amount of fertilizer at seeding. (Sum practices #114-120, and average)

Item #6 - Table 2. Comparison of individual practice scores, 1974 and 1976 by mean score: change within treatment condition across years.

Sub-Area	N	1974 mean	1976 mean	t*	Sign.**
QR	101	2.09	3.28	4.20	<.001
QRM	102	1.61	2.57	4.45	<.001
QRMA	101	1.41	1.98	2.55	<.05
YR	111	1.13	2.11	5.23	<.001
YRM	103	1.07	1.24	2.24	<.05
YRMA	106	1.19	1.74	6.19	<.001
IM	92	1.28	1.93	4.44	<.001
IC	104	1.03	1.34	3.52	=.001

* t - tests for paired comparisons

** significance tests are based on 2-tail probabilities of t

Item #6 - Table 3. Differential treatment effectiveness as measured by change from 1974 to 1976.

a. Analysis of variance on change in individual practice scores

Source	df	Sum of squares	Mean squares	F ratio	F prob.
Between treatments	7	22.2383	3.1769	2.659	=.01
Within treatments	812	970.2002	1.1948		
Total	819	992.4382			

b. Rank order of treatments by change

Sub-Area	N	Mean change	Standard deviation
IM	92	.6493	1.4025
QRMA	101	.5990	1.1800
YRMA	106	.5527	0.9190
QRM	102	.4616	1.1930
QR	101	.4323	1.4789
IC	104	.3125	0.9063
YR	111	.2252	0.7333
YRM	103	.1650	0.7480

c. Summary of subsequent tests between treatment conditions

Sub-area	QR	QRM	QRMA	YR	YRM	YRMA	IM	IC
QR								
QRM	No							
QRMA	No	No						
YR	No	No	Yes					
YRM	No	Yes	Yes	No				
YRMA	No	No	No	Yes	Yes			
IM	No	No	No	Yes	Yes	No		
IC	No	No	No	No	No	No	Yes	

Item #6 - Table 4. Differential treatment effectiveness when treatment areas are combined.

a. Analysis of variance on change in individual practice scores (1974-1976)

Source	df	Sum of squares	Mean squares	F ratio	F prob.
Between treatments	4	15.3516	3.8379	3.201	<.05
Within treatments	815	977.0760	1.1989		
Total	819	992.4275			

b. Rank order of treatments by change

Sub-Area	N	Mean change	Standard deviation
M	92	.6493	1.4025
RMA	207	.5753	1.0521
R	212	.3239	1.1522
RM	205	.3126	1.0032
C	104	.3125	0.9063

Item #7 - Table 1. Measurement of individual practice scores from 1974 to 1976 by number of individuals who changed.

Sub-Area	Positive change	No change	Negative change	Total
QR	36	52	13	101
QRM	40	49	13	102
QRMA	45	51	5	101
YR	40	68	3	111
YRM	36	64	3	103
YRMA	66	38	2	106
IM	48	38	6	92
IC	47	57	0	104
Total	358	417	45	820

Variable #103 - Type of fertilizer at flowering

Item #7 - Table 2. Comparison of individual practice scores, 1974 and 1976 by mean score: change within treatment condition across years

Sub-Area	N	1974 mean	1976 mean	t*	Sign.**
QR	101	2.02	2.62	3.92	<.001
QRM	101	1.70	2.44	4.14	<.001
QRMA	101	1.46	2.43	6.26	<.001
YR	111	1.29	2.55	6.84	<.001
YRM	102	1.25	2.49	6.56	<.001
YRMA	106	1.51	3.66	11.62	<.001
IM	92	1.66	2.74	6.99	<.001
IC	104	1.02	1.96	8.92	<.001

* t - tests for paired comparisons

** significance tests are based on 2-tail probabilities of t

Item #7 - Table 3. Differential treatment effectiveness as measured by change from 1974 to 1976.

a. Analysis of variance on change in individual practice scores

Source	df	Sum of squares	Mean squares	F ratio	F prob.
Between treatments	7	164.1499	23.4500	8.313	<.001
Within treatments	810	2284.8547	2.8208		
Total	817	2449.0046			

b. Rank order of treatments by change

Sub-Area	N	Mean change	Standard deviation
YRMA	106	2.1509	1.9063
YR	111	1.2613	1.9433
YRM	102	1.2451	1.9162
IM	92	1.0761	1.4768
QRMA	101	.9703	1.5586
IC	104	.9423	1.0778
QRM	101	.7327	1.7770
QR	101	.6040	1.5497

c. Summary of subsequent tests between treatment conditions

Sub-area	QR	QRM	QRMA	YR	YRM	YRMA	IM	IC
QR								
QRM	No							
QRMA	No	No						
YR	Yes	Yes	No					
YRM	Yes	Yes	No	No				
YRMA	Yes	Yes	Yes	Yes	Yes			
IM	Yes	No	No	No	No	Yes		
IC	No	No	No	No	No	Yes	Yes	

Item #7 - Table 4. Differential treatment effectiveness when treatment areas are combined.

a. Analysis of variance on change in individual practice scores (1974-1976)

Source	df	Sum of squares	Mean squares	F ratio	F prob.
Between treatments	4	55.8841	13.9710	4.746	<.001
Within treatments	813	2393.0746	2.9435		
Total	817	2448.9585			

b. Rank order of treatments by change

Sub-Area	N	Mean change	Standard deviation
RMA	207	1.5749	1.8389
M	92	1.0761	1.4768
RM	203	.9901	1.8615
R	212	.9481	1.7931
C	104	.9423	1.0778

Item #8 - Table 1. Measurement of individual practice scores from 1974 to 1976 by number of individuals who changed.

Sub-Area	Positive change	No change	Negative change	Total
QR	61	5	35	101
QRM	63	10	29	102
QRMA	54	3	44	101
YR	71	5	35	111
YRM	46	3	54	103
YRMA	84	1	21	106
IM	49	3	40	92
IC	27	6	71	104
Total	455	36	329	820

Variables # 122-128 - Amount of fertilizer at flowering (Sum practices 122-128, and average).

Item #8 - Table 2. Comparison of individual practice scores, 1974 and 1976 by mean score: change within treatment condition across years

Sub-Area	N	1974 mean	1976 mean	t*	Sign**
QR	101	1.86	2.30	2.94	=.004
QRM	102	1.48	1.95	3.91	<.001
QRMA	101	1.44	2.04	5.10	<.001
YR	111	1.06	1.28	3.24	=.002
YRM	103	1.09	1.90	3.42	=.001
YRMA	106	1.25	3.16	8.98	<.001
IM	92	1.43	2.54	3.83	<.001
IC	104	1.02	.70	-2.70	=.008

* t - tests for paired comparisons

** significance tests are based on 2-tail probabilities of t

Item #8 - Table 3. Differential treatment effectiveness as measured by change from 1974 to 1976.

a. Analysis of variance on change in individual practice scores

Source	df	Sum of squares	Mean squares	F ratio	F prob.
Between treatments	7	289.0898	41.2985	8.067	<.001
Within treatments	812	4156.8789	5.1193		
Total	819	4445.9687			

b. Rank order of treatments by change

Sub-Area	N	Mean change	Standard deviation
YRMA	106	1.9104	2.1896
QR	101	1.1840	2.8351
IM	92	1.1078	2.7728
YR	111	.9835	1.9811
QRM	102	.9616	2.1820
YRM	103	.8131	2.4100
QRMA	101	.5627	2.2195
IC	104	-.3221	1.2166

c. Summary of Subsequent Tests between Treatment Conditions

Sub-area	QR	QRM	QRMA	YR	YRM	YRMA	IM	IC
QR								
QRM	No							
QRMA	Yes	No						
YR	No	No	No					
YRM	No	No	No	No				
YRMA	Yes	Yes	Yes	Yes	Yes			
IM	No	No	No	No	No	Yes		
IC	Yes	Yes	Yes	Yes	Yes	Yes	Yes	

Item #8 - Table 4. Differential treatment effectiveness when treatment areas are combined.

a. Analysis of variance on change in individual practice scores (1974-1976)

Source	df	Sum of squares	Mean squares	F ratio	F prob.
Between treatments	4	191.8981	47.9745	9.191	<.001
Within treatments	815	4254.0046	5.2196		
Total	819	4445.9023			

b. Rank order of treatments by change

Sub-Area	N	Mean change	Standard deviation
RMA	207	1.2528	2.3002
M	92	1.1078	2.7728
R	212	1.0790	2.4219
RM	205	.8870	2.2949
C	104	-.3221	1.2166

Item #9 - Table 1, Measurement of individual practice scores from 1974 to 1976 by number of individuals who changed.

Sub-Area	Positive change	No change	Negative change	Total
QR	22	29	50	101
QRM	18	41	43	102
QRMA	28	36	37	101
YR	34	44	33	111
YRM	32	42	29	103
YRMA	30	44	32	106
IM	46	27	19	92
IC	41	41	22	104
Total	251	304	265	820

Variable #134 - Did you use herbicide to control weeds?

Item #9 - Table 2. Comparison of individual practice scores, 1974 and 1976 by mean score: change within treatment condition across years.

Sub-Area	N	1974 mean	1976 mean	t*	Sign**
QR	101	1.92	1.64	-2.27	=.025
QRM	102	1.88	1.63	-2.94	=.004
QRMA	101	1.86	1.80	-.46	NS
YR	111	1.68	1.70	.16	NS
YRM	102	1.76	1.77	.09	NS
YRMA	106	1.77	1.84	.61	NS
IM	92	2.13	2.93	4.20	<.001
IC	104	2.63	3.32	3.48	=.001

* t - tests for paired comparisons

** significance tests are based on 2-tail probabilities of t

Item #9 - Table 3. Differential treatment effectiveness as measured by change from 1974 to 1976.

a. Analysis of variance on change in individual practice scores

Source	df	Sum of squares	Mean squares	F ratio	F prob.
Between treatments	7	112.2277	16.0325	8.578	<.001
Within treatments	811	1515.7527	1.8690		
Total	818	1627.9805			

b. Rank order of treatments by change

Sub-Area	N	Mean change	Standard deviation
IM	92	.8043	1.8352
IC	104	.6827	2.0013
YRMA	106	.0660	1.1150
YR	111	.0180	1.1676
YRM	102	.0098	1.1035
QRMA	101	-.0594	1.2870
QRM	102	-.2549	.8753
QR	101	-.2772	1.2257

c. Summary of subsequent tests between treatment conditions

Sub-area	QR	QRM	QRMA	YR	YRM	YRMA	IM	IC
QR								
QRM	No							
QRMA	No	No						
YR	No	No	No					
YRM	No	No	No	No				
YRMA	No	No	No	No	No			
IM	Yes	Yes	Yes	Yes	Yes	Yes		
IC	Yes	Yes	Yes	Yes	Yes	Yes	No	

Item #9 - Table 4. Differential treatment effectiveness when treatment areas are combined.

a. Analysis of variance on change in individual practice scores (1974-1976)

Source	df	Sum of squares	Mean squares	F ratio	F prob.
Between treatments	4	103.2306	25.8076	13.778	<.001
Within treatments	814	1524.7325	1.8731		
Total	818	1627.9629			

b. Rank order of treatments by change

Sub-Area	N	Mean change	Standard deviation
M	92	.8043	1.8352
C	104	.6827	2.0013
RMA	207	.0048	1.2007
RM	204	-.1225	1.0023
R	212	-.1226	1.2019

Item #10 - Table 1. Measurement of individual practice scores from 1974 to 1976 by number of individuals who changed.

Sub-Area	Positive change	No change	Negative change	Total
QR	11	39	51	101
QRM	15	41	46	102
QRMA	27	42	32	101
YR	18	63	30	111
YRM	28	44	31	103
YRMA	34	41	31	106
IM	17	39	36	92
IC	13	44	47	104
Total	163	353	304	820

Variable #139 - Did you use fungicides to control disease on your crops?

Item #10 - Table 2. Comparison of individual practice scores, 1974 and 1976 by mean score: change within treatment condition across years.

Sub-Area	N	1974 mean	1976 mean	t*	Sign**
QR	99	2.04	1.44	-5.00	<.001
QRM	101	1.92	1.50	-3.71	<.001
QRMA	101	1.95	1.88	-.54	NS
YR	109	1.55	1.41	-1.38	NS
YRM	101	1.80	1.79	-.09	NS
YRMA	106	1.79	1.83	.31	NS
IM	92	1.71	1.43	-2.31	<.025
IC	104	1.70	1.27	-3.79	<.001

* t - tests for paired comparisons

** significance tests are based on 2-tail probabilities of t

Item #10 - Table 3. Differential treatment effectiveness as measured by change from 1974 to 1976.

a. Analysis of variance on change in individual practice scores

Source	df	Sum of squares	Mean squares	F ratio	F prob.
Between treatments	7	37.5713	5.3673	3.856	<.001
Within treatments	805	1120.5566	1.3920		
Total	812	1158.1279			

b. Rank order of treatments by change

Sub-Area	N	Mean change	Standard deviation
YRMA	106	.0377	1.2719
YRM	101	-.0099	1.1704
QRMA	101	-.0693	1.2904
YR	109	-.1376	1.0582
IM	92	-.2717	1.1300
QRM	101	-.4257	1.1519
IC	104	-.4327	1.1639
QR	99	-.5960	1.1860

c. Summary of subsequent tests between treatment conditions

Sub-area	QR	QRM	QRMA	YR	YRM	YRMA	IM	IC
QR								
QRM	No							
QRMA	Yes	Yes						
YR	Yes	No	No					
YRM	Yes	Yes	No	No				
YRMA	Yes	Yes	No	No	No			
IM	No	No	No	No	No	No		
IC	No	No	Yes	Yes	Yes	Yes	No	

Item #10 - Table 4. Differential treatment effectiveness when treatment areas are combined.

a. Analysis of variance on change in individual practice scores (1974-1976)

Source	df	Sum of squares	Mean squares	F ratio	F.prob.
Between treatments	4	17.3471	4.3368	3.072	<.05
Within treatments	808	1140.7657	1.4118		
Total	812	1158.1128			

b. Rank order of treatments by change

Sub-Area	N	Mean change	Standard deviation
RMA	207	-.0145	1.2789
RM	202	-.2178	1.1769
M	92	-.2717	1.1300
R	208	-.3558	1.1414
C	104	-.4327	1.1639

Item #11 - Table 1. Measurement of individual practice scores from 1974 to 1976 by number of individuals who changed.

Sub-Area	Positive change	No change	Negative change	Total
QR	44	33	24	101
QRM	55	23	24	102
QRMA	57	18	26	101
YR	56	27	28	111
YRM	47	25	31	103
YRMA	49	25	32	106
IM	48	24	20	92
IC	61	35	8	104
Total	417	210	193	820

Variable #142 - Do you destroy crop residues after the last crop of the year?

Item #11 - Table 2. Comparison of individual practice scores, 1974 and 1976 by mean score: change within treatment condition across years.

Sub-Area	N	1974 mean	1976 mean	t*	Sign**
QR	101	1.92	2.49	3.11	=.002
QRM	102	1.90	2.75	4.55	.001
QRMA	101	2.11	2.67	3.05	=.003
YR	111	2.05	2.69	3.64	.001
YRM	102	1.99	2.46	2.66	=.009
YRMA	106	1.94	2.42	2.87	=.005
IM	91	1.73	2.38	3.29	=.001
IC	104	1.41	2.57	7.09	.001

* t - tests for paired comparisons

** significance tests are based on 2-tail probabilities of t

Item #11 - Table 3. Differential treatment effectiveness as measured by change from 1974 to 1976.

a. Analysis of variance on change in individual practice scores

Source	df	Sum of squares	Mean squares	F ratio	F prob.
Between treatments	7	38.3474	5.4782	1.673	NS
Within treatments	810	2651.8484	3.2739		
Total	817	2690.1958			

b. Rank order of treatments by change

Sub-Area	N	Mean change	Standard deviation
IC	104	1.1538	1.6592
QRM	102	.8529	1.8953
IM	91	.6593	1.9103
YR	111	.6396	1.8527
QR	101	.5644	1.8244
QRMA	101	.5644	1.8570
YRMA	106	.4717	1.6915
YRM	102	.4706	1.7839

Item #11 - Table 4. Differential treatment effectiveness when treatment areas are combined.

a. Analysis of variance on change in individual practice scores (1974-1976)

Source	df	Sum of squares	Mean squares	F ratio	F prob.
Between treatments	4	30.1480	7.5370	2.304	NS
Within treatments	813	2659.9907	3.2718		
Total	817	2690.1387			

b. Rank order of treatments by change

Sub-Area	N	Mean change	Standard deviation
C	104	1.1538	1.6591
RM	204	.6618	1.8458
M	91	.6593	1.9103
R	212	.6038	1.8353
RMA	207	.5169	1.7704

Item #12 - Table 1. Measurement of individual practice scores from 1974 to 1976 by number of individuals who changed.

Sub-Area	Positive change	No change	Negative change	Total
QR	21	48	32	101
QRM	31	33	38	102
QRMA	22	43	36	101
YR	27	58	26	111
YRM	18	51	34	103
YRMA	16	66	24	106
IM	37	21	34	92
IC	16	48	40	104
Total	188	368	264	820

Variables #151-153 - Where do you store (corn/beans/sorghum) until used by you and your family?

Item #12 - Table 2. Comparison of individual practice scores, 1974 and 1976 by mean score: change within treatment condition across years.

Sub-Area	N	1974 mean	1976 mean	t*	Sign**
QR	101	4.20	4.10	-.99	NS
QRM	102	4.18	4.16	-.14	NS
QRMA	101	4.16	4.03	-1.45	NS
YR	111	4.03	4.08	.61	NS
YRM	103	3.96	3.77	-2.15	<.05
YRMA	106	3.88	3.80	-.82	NS
JM	92	4.55	4.57	.18	NS
IC	104	4.39	3.95	-3.32	≐.001

* t - tests for paired comparisons

** significance tests are based on 2-tail probabilities of t

Item #12 - Table 3. Differential treatment effectiveness as measured by change from 1974 to 1976.

a. Analysis of variance on change in individual practice scores

Source	df	Sum of squares	Mean squares	F ratio	F prob.
Between treatments	7	16.6886	2.3841	2.418	<.05
Within treatments	812	800.7087	.9861		
Total	819	817.3972			

b. Rank order of treatments by change

Sub-Area	N	Mean change	Standard deviation
YR	111	.0541	.9264
IM	92	.0145	.7578
QRM	102	-.0147	1.0478
YRMA	106	-.0755	.9487
QR	101	-.0990	1.0072
QRMA	101	-.1320	.9130
YRM	103	-.1958	.9234
IC	104	-.4263	1.3104

c. Summary of subsequent tests between treatment conditions

Sub-area	QR	QRM	QRMA	YR	YRM	YRMA	IM	IC
QR								
QRM	No							
QRMA	No	No						
YR	No	No	No					
YRM	No	No	No	No				
YRMA	No	No	No	No	No			
IM	No	No	No	No	No	No		
IC	Yes	Yes	Yes	Yes	No	Yes	Yes	

Item #12 - Table 4. Differential treatment effectiveness when treatment areas are combined.

a. Analysis of variance on change in individual practice scores (1974-1976)

Source	df	Sum of squares	Mean squares	F ratio	F prob.
Between treatments	4	13.6038	3.4009	3.448	<.01
Within treatments	815	803.7906	.9862		
Total	819	817.3943			

b. Rank order of treatments by change

Sub-Area	N	Mean change	Standard deviation
M	92	.0145	.7578
R	212	-.0189	.9665
RMA	207	-.1031	.9296
RM	205	-.1057	.9890
C	104	-.4263	1.3104

Item #13 - Table 1. Measurement of individual practice scores from 1974 to 1976 by number of individuals who changed.

Sub-Area	Positive change	No change	Negative change	Total
QR	0	101	0	101
QRM	0	102	0	102
QRMA	0	101	0	101
YR	0	111	0	111
YRM	0	103	0	103
YRMA	1	105	0	106
IM	0	92	0	92
IC	0	103	1	104
Total	1	818	1	820

Variable #169 - Did you borrow money for your crops? Where?

APPENDIX H

CORRELATIONS BETWEEN POPULATION CHARACTERISTICS AND PRACTICE LEVELS AND CHANGE SCORES

Questions related to:		Correlation with: Practice level	Change score
General Characteristics			
#236	Besides tortillas, beans and coffee, how often do you eat incaparina?	.16***	.00
#237	Do you own your house	.03	-.02
#252	How old are you (actual age)?	-.02	-.07*
#254	How many children do you have?	.12***	.00
Mobility			
#223	How often do you visit (closest municipality) to visit or buy?	.18***	.06*
#224	How often do you visit (closest department capital) to visit or buy?	.28***	.17***
#225	How often do you visit Guatemala?	.22***	.09**
#226	When are you accustomed to go to the coast and work?	-.06*	-.08*
Group Membership			
# 14	Do you make the decisions about planting, fertilizing, cultivating, and harvesting of your crops?	NA	NA
#221	Do you belong to any organized group? (Cooperative, farmers' group, etc.)	.29***	.11***

NOTE: NA=A correlation could not be computed because of the scaling of this question.

Questions related to:		Correlation with: Practice level	Change score
Land Ownership			
#182	How many cuerdas or manzanas do you have to plant this year that you own?	.37***	.13***
#183	How many cuerdas or manzanas do you have to plant this year that are rented?	-.14***	.00
#184	How many cuerdas or manzanas do you have to plant this year that are communal?	.04	-.03
#185	How many cuerdas or manzanas do you have to plant this year that you sharecrop?	.09**	.08*
#186	How many cuerdas or manzanas do you have to plant this year that you have through other arrangements?	-.04	-.02
#189	What do you think you can do to improve these parcels?	-.01	.01
Animal Ownership			
#190	Do you have any horses?	.32***	.12***
#194	Do you have any oxen?	.33***	.14***
Crop Sales			
#145	How much of your corn harvest did you sell (will you sell) this year?	.26***	.18***
#146	How much of your bean harvest did you sell (will you sell) this year?	.19***	.20***
Risk			
# 37	Do you think there is any danger planting new seed?	NA	NA

Questions related to:		Correlation with: Practice level	Change score
Source of Information			
#109	Where did this idea come from?	NA	NA
#172	Have you changed your manner of planting in the last few years?	NA	NA
#173	Who advised you to make these changes?	NA	NA
#175	Did you speak personally with him (them)?	NA	NA
#178	Do you consider it important that an agronomist visit your community? From which institution?	NA	NA
#202	Where do you obtain good advice for your ag. work? From the radio?	NA	NA
#203	Where do you obtain good advice for your ag. work? From newspaper or magazine?	NA	NA
#205	Where do you obtain good advice for your ag. work? From an agronomist?	NA	NA
Level of Aspiration			
#201	Is it possible that a young man can advance himself as a farmer?	NA	NA
#258	Until what grade do you think your children should attend school?	.24***	.12***
Radio Listenership			
#210	Are you accustomed to listening to the radio? Whose is it?	.25***	.11***
#211	How many hours a day do you listen to radio?	.23**	.08*
#22[illegible]	What kind of program do you like the best?	NA	NA

Questions related to:		Correlation with: Practice level	Change score
Literacy			
#209	Are you accustomed to sending and receiving letters? How often?	.26***	.14***
#255	Do you know how to read and write?	.21***	.08*
#256	Did you attend school? Until which grade?	.16***	.07*
#261	How many people in your home know how to read and write?	.33***	.11***

* $p < .05$
** $p < .01$
*** $p < .001$

APPENDIX I

1976 TIME SAMPLE/ANNUAL SURVEY RELIABILITY

A fundamental requirement of any measurement system is that of reliability. In general terms, the concept of reliability refers to the consistency or repeatability of measurement (stability and dependability are two other common synonyms for reliability).

Guion states that "an inescapable fact about any set of measures is that they vary."[1/] While this fact can pose some rather perplexing problems in the case of physical measurement (e.g. two people independently using the same yardstick to measure an object and coming up with different results), these kinds of problems tend to increase as the measuring instruments become less refined--as is the case with the majority of attitudinal and/or behavioral measuring instruments.

Given the nature of the reliability problem, this appendix will present data bearing on the reliability between the 1976 time sample surveys and the 1976 annual survey. The issue is basically this: "Are a farmer's responses to questions on the time samples consistent with his responses to identical questions on the annual survey?" It should be apparent to the reader that this type of consistency is essential when trying to make inferences about responses to questions on either the time samples or the annual surveys. If responses to identical questions are not identical (or at least proportionate), then it is impossible to know which response is the "correct" response, or if either response is the "correct" response (the term "correct" is used here loosely).

Because of the differing nature of the time sample and annual survey interview, perfect agreement between responses is not expected. Time samples are conducted in different settings, by different interviewers, and at different times of the year than the annual surveys In addition, some of the time sample surveys may have been conducted before farmers had the opportunity (or need) to utilize certain practices. Because of these factors, a farmer's replies to particular questions was expected to vary somewhat from one interview to the next. It was expected, however, that responses to identical questions on both time samples and the annual survey would be reasonably consistent with each other.

Measures of Reliability

The most typical "index" of reliability is the correlation coefficient. In general, the correlation coefficient is a measure of association or correspondence between measures. It can have values ranging

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1/ Guion, R.M. Personnel Testing, (New York: McGraw-Hill Book Co., 1965:27).

from +1 to -1, which are indicative of perfect positive and perfect negative relationships respectively. In most cases the observed association (reliability) between measures will be something less than perfect (±1), and will generally be positive.

As a simple illustration of the concept of reliability, suppose that an individual were to measure three different objects of various lengths (e.g. 2 inches, 4 inches, 6 inches) on two different occasions. The correlation computed between the two sets of measures would provide an indication of the degree to which the measures are reliable. In the simplest case, where the exact same values were obtained both times the objects were measured, a perfect positive (i.e. +1) correlation would be obtained. If the two sets of measurements were not identical, then the degree to which the second set of measures deviated or varied from the first set would be reflected in the form of a lower correlation between measures. It is important to note, however, that the correlation coefficient is in reality a measure of proportional correspondence and not necessarily "exact" correspondence. In the example presented above there was a perfect 1 to 1 proportional correspondence obtained. On the other hand, if there was a perfect proportional correspondence other than 1 to 1 (e.g. first measurements = 2 inches, 4 inches, 6 inches; second measurements = 2.1 inches, 4.2 inches, 6.3 inches), this would have also resulted in a perfect positive correlation (i.e. +1) between measures. This fact, however, does not generally pose much of a problem insofar as the concept of reliability (i.e. consistency in measurement) is concerned. In addition, the correlation between a given measure and each of two other measures which are highly reliable will not yield significantly different results.

The reliability of the time sample and annual survey interviews was investigated by looking at the degree of correspondence between farmers' responses to identical items in the two surveys. Also of interest was whether or not the average level of practice was different in the two interviews (i.e. were responses identical or proportionate).

Method

Seven questions were included in the 1976 time sample surveys which were identical to questions asked during the annual survey interviews. Of these seven, three questions were not included in the reliability analysis due to suspected discrepancies between the way in which the questions were asked in the time sample interview and in the annual survey interview. The remaining four items (land preparation method, type of fertilizer at seeding, corn storage method, and credit use) were tested for:

1. Association between individual farmer's 1975 practice level recalled during the 1976 time sample interview and his level as reported in the 1975 annual survey interview.

2. Association between farmer's 1976 practice level reported in the 1976 time sample interview and that reported on the 1976 annual survey.

3. Difference in average level of practice (for all farmers) reported for 1975 in 1976 time sample and that reported on 1975 annual survey (i.e. recall of 1975 practice levels).

4. Difference in average level of practice reported for 1976 in 1976 time samples and 1976 annual survey.

Pearson product-moment correlations (r) were used to determine the degree of association (#1 and #2 above) between farmer's responses and Student's t statistic was used in analyzing the significance of the observed differences between average practice levels (#3 and #4 above).

Findings

All four of the practices showed general consistency between farmers responses on the two interviews in both years (#1 and #2 above). Correlations ranged from .28 to .74 for 1976 responses, and from .43 to .77 for 1975 responses.

On three out of four of the practices (type of fertilizer at seeding, corn storage, and credit use) the average response in the annual survey in 1976 was significantly higher than that on the time sample survey.

In general, average responses to 1975 recall questions on the 1976 time sample surveys were not significantly different from responses on the 1976 annual survey. However, corn storage responses were found to be generally higher on the annual survey than on the time samples, and land preparation responses were higher on the time samples versus annual survey.

In conclusion, responses made by farmers on the time sample and annual survey instruments appear to be reliable in that they were consistent. In addition, it appears that farmers tend generally to report higher levels of practice in the annual survey than in the time sample survey when asked about this year's (1976) practice, but not when asked to recall what they did last year.

Table 36. Time sample/annual survey reliability

	Time sample		Annual survey					
	Mean	Std. dev.	Mean	Std. dev.	t*	Sig.**	r	Sig.***
Practice #1 (Land preparation)								
1975	4.00	1.053	3.85	0.837	2.40	=.02	.57	=.001
1976	4.02	1.036	4.05	0.944	-0.50	NS	.62	=.001
Practice #2 (Type of fertilizer at seeding)								
1975	1.93	1.545	1.76	1.477	1.42	NS	.43	=.001
1976	2.00	1.525	2.55	1.388	-4.37	<.001	.28	=.001
Practice #3 (Corn storage)								
1975	4.40	0.550	4.88	0.632	-12.96	<.001	.65	=.001
1976	4.40	0.556	4.94	0.437	-12.13	<.001	.30	=.001
Practice #4 (Credit use)								
1975	1.12	0.322	1.12	0.328	-0.33	NS	.77	=.001
1976	1.09	0.280	1.13	0.335	-2.57	=.01	.74	=.001

*t-tests for paired comparisons. Negative t values indicate that the average score for the annual survey was higher than that for time sample survey. Positive numbers indicate that the time sample average is higher.

**Significance tests for t are based on 2-tail probabilities.

***Significance tests for r are based on 1-tail probabilities.

APPENDIX J

TIME SAMPLE REPRESENTATIVENESS

In order to ensure that generalizations drawn from responses to questions on the time sample surveys are applicable to the entire BVE population, it is important to know whether or not the small group of farmers involved in each time sample are representative of all BVE farmers.

It was suspected early in the evaluation process that the sub-sample of farmers interviewed in the time samples (although randomly selected) might be biased in favor of certain change oriented characteristics. For example, some time sample interviews were conducted during the time of year when many farmers work on the coast, and therefore would not be available for participation in the surveys. If farmers who work on the coast do so because they cannot support themselves and their families by farming alone, then those farmers who remained at home could very well have been the better and/or more change oriented farmers. If this were the case, then the relationships found in the time samples might be applicable to only those farmers with certain characteristics, and generalizing to the entire population of farmers would be tenuous.

Method

Tests for the existence of sample biases in the time sample surveys were made in the following manner. Farmers interviewed in each time sample were compared against those who were not interviewed in that survey on 37 background characteristics. The probability that farmers interviewed were different from those not interviewed (with respect to each background variable) was assessed using the chi-square statistic.

Findings

The results of the chi-square analyses indicated that the respondents in each of the time samples were not significantly different from the population as a whole on the characteristics investigated. That is, individuals interviewed in the time samples were representative (not different from) other members of the total BVE population.