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PROJECT EVALUATION SUMMARY (PES) — PART I

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1. PROJECT TITLE	2. PROJECT NUMBER	3. MISSION/AID/W OFFICE
Basic Village Education (Guatemala)	598-0551	LAC/DR

4. EVALUATION NUMBER (Enter the number maintained by the reporting unit e.g., Country or AID/W Administrative Code, Fiscal Year, Serial No. beginning with No. 1 each FY)

☒ REGULAR EVALUATION ☐ SPECIAL EVALUATION

5. KEY PROJECT IMPLEMENTATION DATES			6. ESTIMATED PROJECT FUNDING		7. PERIOD COVERED BY EVALUATION
A. First PRO-AG or Equivalent FY 73	B. Final Obligation Expected FY 78	C. Final Input Delivery FY 78	A. Total (Grant) $ 563,419	B. U.S. $ 1,666,815	From (month/yr.) August 1973 To (month/yr.) October 1978 Date of Evaluation Review

8. ACTION DECISIONS APPROVED BY MISSION OR AID/W OFFICE DIRECTOR

A. List decisions and/or unresolved issues; cite those items needing further study. (NOTE: Mission decisions which anticipate AID/W or regional office action should specify type of document, e.g., airgram, SPAR, PIO, which will present detailed request.)	B. NAME OF OFFICER RESPONSIBLE FOR ACTION	C. DATE ACTION TO BE COMPLETED
A series of seminars will be held to disseminate project findings and to examine ways the results can be incorporated into development projects in health, food and nutrition, education and other relevant sectors. The first of these workshops is scheduled for Central America February 11 - 14, 1979.	R. Martin	FY 1979

9. INVENTORY OF DOCUMENTS TO BE REVISED PER ABOVE DECISIONS

- ☐ Project Paper
- ☐ Financial Plan
- ☐ Logical Framework
- ☐ Project Agreement
- ☐ Implementation Plan e.g., CPI Network
- ☐ PIO/T
- ☐ PIO/C
- ☐ PIO/P
- ☐ Other (Specify) _____
- ☐ Other (Specify) _____

10. ALTERNATIVE DECISIONS ON FUTURE OF PROJECT

- A. ☐ Continue Project Without Change
- B. ☐ Change Project Design and/or ☐ Change Implementation Plan
- C. ☐ Discontinue Project

11. PROJECT OFFICER AND HOST COUNTRY OR OTHER RANKING PARTICIPANTS AS APPROPRIATE (Names and Titles)

12. Mission/A.I.D.W Office Director Approval

Signature: William A. Sigler

Typed Name: William A. Sigler

Date: DEC 20 1978

AID 1330-18 (3-78)

FINAL EVALUATION REPORT

BASIC VILLAGE EDUCATION PROJECT

LAC Regional Project (Guatemala)
598-0551

13. SUMMARY

The final evaluation session for this project was held in Guatemala City, Guatemala, September 18, 19, 20. Representatives of the Government of Guatemala, the contractor and subcontractors, USAID/Guatemala, and AID/W were present. No problems were encountered in effecting the evaluation; the contractor completed required actions prior to the project completion date.

The Project

The Basic Village Education Project (BVE) 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 income from basic crops.

The specific objective was "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 sought, 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 three combinations of communications media as variables (treatments), 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 to 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, two radio transmitters were built and were operated by project personnel.

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 in an area where the BVE radio signal was not received.

Project experimentation was carried out in two contrasting cultural/agricultural environments: three years with a Spanish-speaking Ladino population of small farmers in southeastern Guatemala, and two years with a Quiche-speaking Indian population of small farmers in the highlands of western Guatemala.

14. EVALUATION METHODOLOGY

The basic project evaluation was developed as a field research design with designated experimental and control conditions replicated in two distinct geographical and cultural areas. Under all conditions of treatment and control, a baseline survey was conducted before programming was begun. The programming was applied as an independent variable and post-testing was done for the measurement of impact. During the process, sub-samples were selectively studied for immediate feedback to the program.

The original design follows:

	First Year		Second Year		Third Year	
	Treat	Test	Treat	Test	Treat	Test
Oriente	---	BLS	R	AS	R	AS
	---	BLS	RM	AS	RM	AS
	---	BLS	RMA	AS	RMA	AS
	---	BLS	--- (C)	AS	--- (C)	AS

	First Year		Second Year		Third Year	
	Treat	Test	Treat	Test	Treat	Test
Occidente	---	BLS	R	AS	R	AS
	---	BLS	RM	AS	RM	AS
	---	BLS	RMA	AS	RMA	AS
	---	BLS	--- (C)	AS	--- (C)	AS

--- no experimental programming
R - radio alone
RM - radio/monitor
RMA - radio/monitor/agronomist
C - control area
BLS - baseline survey
AS - annual survey

Shortly after initiation of the Project, it became clear that there would be differences in implementation in the two different geographical and cultural areas. Greater understanding of the culture and accessibility led to the earlier development and implementation of the Project in the Ladino areas of eastern Guatemala. The lack of understanding and knowledge of the Indian highlands area (Occidente) became immediately apparent. Relatively few field investigations dealing with the major issues basic to this study had been undertaken in the Occidente. Information was lacking on such critical areas as baseline data on the use of radio, likely response to various media combinations, or potential for change. Consultants familiar with research in Guatemala, particularly with the highlands, confirmed that while a great many individual cultural studies had been undertaken there was little information available that would be of direct use for this Project.

The original evaluation design of the Project changed over the five-year time span. The reasons include pressure for services to control areas, technical problems in setting up a broadcasting station, and a decision to broaden the treatment conditions. The final design in the Oriente and Occidente follow:

	1973		1974		1975		1976		1977	
	Treat	Test	Treat	Test	Treat	Test	Treat	Test	Treat	Test
ORIENTE										
Quezada	---	BLS	R	AS	R	AS	R	AS	---	---
		BLS	RM	AS	RM	AS	RM	AS		
		BLS	RMA	AS	RMA	AS	RMA	AS		
Yupiltepeque	---	BLS	---	BLS	R	AS	R	AS	---	---
				BLS	RM	AS	RM	AS		
				BLS	RMA	AS	RMA	AS		
Ipala	---	---	---	BLS	M	AS	M	AS	---	---
Ipala Control	---	---	---	BLS	---	AS	---	AS	---	---

	1973		1974		1975		1976		1977	
	Treat	Test	Treat	Test	Treat	Test	Treat	Test	Treat	Tes
OCCIDENTE										
Momostenango	---	---	---	BLS	---	BLS	R	AS	R	AS
				BLS		BLS	RM	AS	RM	AS
				BLS		BLS	RMA	AS	RMA	AS
Chichicastenango	---	---	---	BLS	---	BLS	M	AS	M	AS
Chichicastenango Control	---	---	---	BLS	---	BLS	---	AS	---	AS

--- no experimental programming or measurement
R - radio alone
RM - radio plus monitor
RMA - radio, monitor and agronomist
M - monitor alone

BLS - Baseline Survey (re pre-treatment measurement)
AS - Annual Survey (re post-treatment measurement)

Additional details regarding the Evaluation Methodology including criteria used to select experimental areas, types of evaluation instruments used (annual surveys, time sample surveys and crop production surveys), selection and training of interviewers, data processing, methodology of analysis and methods of analysis may be found in the Final Report attached to this PES.

The findings, that is differential treatment effectiveness in the two cultures, are also contained in Chapter IX of the Final Report and the reader is urged to study that chapter carefully.

15. EXTERNAL FACTORS

See Evaluation section above.

16. INPUTS, AND 17. OUTPUTS

The reader is referred to an extensive discussion of the cost, benefits and economic returns discussion which can be found in Chapter XII of the Final Report.

Outputs may also be demonstrated by the following examples:

— Different audio materials produced by production unit	10,652
— Original graphics created by staff artists	1,580
— Copies made of original graphics	167,543
— Farmer meetings	2,218
— Crop demonstrations conducted	75
— Radio programs produced	1,281
— Rural population reached with project radio programming	50,400
— Official reports (see Final Report, Appendix B)	

18. PURPOSE

The purpose of this Project was to determine the effectiveness and relative costs of different mixes of communication media used to supplement the work of extension agents in influencing change in agricultural practices among Ladinos and Indians of rural Guatemala.

19. GOAL/SUBGOAL
Not pertinent at this time.

20. BENEFICIARIES

The primary audience of this Project was the small, often illiterate subsistence farmer in the eastern and highland regions of Guatemala. The Project sought to improve agricultural practices and incomes to benefit this target group.

21. UNPLANNED EFFECTS NOT PERTINENT

See Lessons Learned.

22. LESSONS LEARNED.

As stated above, this Project was designed and implemented as an experimental program of non-formal education to study the effectiveness of radio in combination with various communication media as means to influence small farmer practices. Consequently, lessons learned are best expressed by the evaluation findings and cost effectiveness analysis.

Details of the findings and presentation of Lessons Learned can be found in the Final Report. The reader is referred to that document, especially to Chapters III, IX and XIII. Based on that detailed presentation, many generalizations can be made regarding the impact BVE treatments had on the different target groups. Several examples follow:

a. The various BVE media combinations differed with respect to impact on behavior change in the following ways:

(1) Regardless of the economic and cultural background of the target area, the radio/monitor/agronomist media combination is effective in encouraging immediate change toward more modern agricultural behavior.

(2) The radio/monitor treatment combination also appears to be effective in encouraging change in different cultural settings.

(3) The effectiveness of the monitor alone condition seems to be dependent on the characteristics of the target group. In this BVE Project in the Oriente where the monitor alone condition was in a highly integrated village, the monitor was very successful. This success was not replicated in the Occidente. Success of the radio without personal reinforcement from the agronomist and/or monitor appears to be highly dependent on the cultural, economic and social characteristics of the target group.

(4) Radio alone was effective in inducing immediate behavior change only in the Quezada area which differed significantly from the other Oriente sub-areas in terms of economic well-being and general modernity of attitudes and from the Occidente sub-area in terms of traditional culture.

b. BVE media, including radio, served as sources of attitude change. In the Occidente areas, where the perception of risk in agricultural practices was relatively high, the radio alone or in combination with other media had a significant impact on the reduction of the farmers perception of danger in various modern practices.

c. The radio was used as a source of new agricultural information in all areas of the BVE Project. The sub-areas differed, however, with respect to the source of information used more frequently.

(1) In the Quezada (Ladino) area, the radio is by far the most frequently used source of information, while in the less developed sub-area of the Oriente, radio took second place to friends and neighbors as a direct source of new information.

(2) In the Occidente (Indian highlands) area, the preference for the monitor as a source is pronounced. In addition to acting as a prime source of information, the monitor appears to encourage direct use of the radio as a source of new agricultural information.

In conclusion, it appears that the effectiveness of the BVE media combinations varied with the level of development of and the cultural constraints placed on the target area. In highly developed areas in which farmers have had the advantage of prior educational programs and other technical assistance, the full RMA treatment combination is not necessary for maximum impact on knowledge, attitude and behavior change. In less developed areas, on the other hand, while some impact on knowledge and attitudes may be achieved by the radio alone, immediate impact on behavior change will probably not be felt without the reinforcement provided by an agronomist and/or a monitor. Thus, the cultural and other background characteristics of the target group appear to influence the group's readiness for change and thereby affect the potential impact of various media on knowledge, attitude and behavior change within the group. Implications of the Lessons Learned for other projects and for applicability to other AID sectors such as health, education, etc., and geographic regions will be the subject of post-project dissemination workshops.

The BVE Project was a highly innovative program. Its innovativeness lay in the manner in which the Project was planned, its close linkages between operation and evaluation, its approach to educational programming and its integration of the various program elements into a dynamic system responsive to the needs of the target population. Any AID Mission considering delivery of change messages to a rural population should give careful attention to the findings of the BVE Project and to the way it was organized and implemented. In the latter instance, give particular note to the field investigation and feed-back system. A paper entitled "Implications of the BVE experience and Results for Programs in other settings/sectors" should be particularly relevant to development planners and is attached to this report for reference.

Attachments: a/s (2)

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IMPLICATIONS OF THE BVE EXPERIENCE AND RESULTS FOR PROGRAMS IN OTHER SETTINGS/SECTORS

by

Howard E. Ray
Academy for Educational Development

September 1978

Guatemala

IMPLICATIONS OF THE BVE EXPERIENCE AND RESULTS FOR PROGRAMS IN OTHER SETTINGS/SECTORS

The radio, para-professionals and technicians used in varying combinations by BVE were all effective under certain conditions. Furthermore, they exhibited the potential for yielding substantial benefits at an affordable cost to both the participants and society as a whole. There would appear to be little doubt concerning the general applicability of these results to other programs of similar nature.

Basic Village Education was a highly innovative project, although it used little that was completely new. Radio, local "monitors" or "promoters" using audio/visual teaching aids, and technicians have been elements of numerous non-formal education programs. Rather, the innovativeness of BVE lay in the manner in which the Project was planned, its close linkages between operation and evaluation, its approach to educational programming and its integration of the varous programming elements into a dynamic system responsive to the needs and interests of the target population.

The Project provided a unique opportunity for drawing inferences from its programming experience and results as to their practical significance in the Guatemalan setting and their potential applicability in other settings and/or sectors. Major factors in that regard were:

* Joint participation of operations and evaluation staff in planning and design of the Project ensured that the BVE educational program would be evaluable.

* The controlled application of different media systems to matched experimental areas, and maintenance of program-free control areas — even though imperfectly executed — permitted study of change itself.

* Replication of the BVE experiment in two widely contrasting cultural environments added a critically needed dimension to projections of transferability to other settings/sectors.

* Insistence that all elements of the educational program be of a type feasible and appropriate for use in expanded programs facilitated assessment of the program with respect to its broader applicability.

* The fact that Guatemalan subsistence farmers and their families are broadly representative of peasant societies throughout the developing world greatly enhances the possibility that BVE experience and results will have applicability in other settings.

* Detailed documentation of Project planning, implementation, operation and evaluation activities provide the basis for delineation of the process (including critical path analysis) through which the Project was carried out, and the possibility for productive use of BVE experience to facilitate planning and implementation of similar programs elsewhere.

Care should be taken in the extrapolation of BVE results with respect to their potential for larger scale application in other sectors/settings, however. Those elements of BVE which are considered to be generalizable and transferable include principles, processes and, to a more limited extent, methodologies. If the BVE program, or one of its treatments, were to be replicated in another setting, modifications and adjustments to meet the needs of that specific situation would almost certainly be required.

Significant elements of the BVE educational program are presented in summary form in Part Two of the BVE Final Report, evaluation findings and their implications are discussed in Part Three, and conclusions form an economic analysis of the Project are summarized in Part Four. All have been considered in developing the list of factors identified below which, in the judgment of the writer, have significant implications for programs in other settings and/or sectors. The list is preliminary and far from exhaustive. Some items represent new findings or interpretations while others confirm lessons learned from other programs.

A. Planning and Implementation

The experimental nature of the BVE Project placed certain demands on the planning and implementation process which would not necessarily be encountered in a purely operational project. Of those aspects which would apply, however, the ones discussed below were considered to be most crucial to the success of the Project. They should be equally important to most development programs.

1. Essential pre-conditions

The potential feasibility of any project depends in large part upon the degree to which certain conditions can be satisfied. If that is not possible, the project either must be modified to permit it to function within the limitations of the situation or it should be aborted. BVE presented a typical case in that such conditions were identified and assessed during the feasibility study and implementation plan development stages. The importance of continuing this process through development of the implementation plan is emphasized. Among the pre-conditions assessed with respect to BVE were:

- existing infrastructure -- the extent to which necessary goods and services were available to support an educational program in the sector selected for the Project agriculture;
- availability to sound, relevant and practical information to feed into the educational program;
- potential availability of manpower with the various kinds of training, skills and expertise needed to staff the Project;

- interest of the host government in the Project, including its commitment to provide needed financial, staff and political support;

- expressed or latent interest of the target population in receiving the type of program anticipated.

2. Realistic objectives, goals and time frame

Both the amount and nature of available resources, and the time required for program startup (a-lowing for slippage) and operation, must be taken into account in establishing goals, objectives and durations that are realistic. The period of operation required for meeting any goal will, of course, depend upon the nature of the program and the change it seeks to induce. Periodic benchmark goals will be required for long term programs. Setting goals unrealistically high or for too rapid achievement can have very negative impact on both the target audience and political support for the program.

In the case of BVE, an 18-month program was originally envisioned. After examining its proposed content and target audience in relation to the adoption process and unpredictable nature of external factors such as weather, however, it was concluded that a longer term program would be needed to achieve its stated objectives. With that decision, it was necessary to increase the resources allocated to the Project. Had that not been possible, the only alternative would have been to establish less ambitious objectives. Although this example comes from an experimental program, the principle would apply to any program.

The above example has another important implication for development program planning. Those responsible for allocation of resources, whether national government or international asistance agency, must be prepared to make a commitment of sufficient length to permit benefits to accrue. In the case of BVE, for example, practice changes barely started during the period of the experiment. A much longer commitment would be required to realize a satisfactory return on the investment, as is pointed out in the economic analysis of the Project.

The original BVE design anticipated initiation of programming in both Oriente and Occidente in early 1974. By mid-1973, however, it was obvious that more information was needed about the Occidente region before mounting a program there, and that it would be virtually impossible to gear up rapidly enough to start the program in both regions simultaneously. Therefore, the design was modified to delay Occidente startup until early 1975.

In establishing the intermediate goals of project startup dates, the Project underestimated slippages which would occur. Program inauguration was delayed in the Oriente by three months, during which time BVE lost much credibility among local people whose expectations had been raised too soon. In the Occidente, an eight-month delay in startup strained Project support at various levels. Furthermore, it was costly in that an additional agricultural cycle had passed, and an extension was required to permit completion of the Project as planned.

Timeliness can also be critical. The Project Agreement for BVE was signed after the Government of Guatemala's 1974 budget had been formulated. Ad hoc arrangements within the Ministry of Education were therefore necessary to fund the Project during its first year of operation. Such arrangements were, as is often the case with ad hoc arrangements, not completely adequate.

3. Good baseline information

Good baseline information is indispensable to good planning and implementation. As discussed later, both selection of the most appropriate media systems to use in a non-formal education program and development of appropriate program content are dependent upon such information.

4. Specificity and detail, but with built-in flexibility

Activity calendars, PERT charts and similar planning and management tools are as relevant to obtaining effective use of resources and achievement of goals in non-formal education programs as in formal education, any other development program, or business. Equally important are clear statements of the assumptions upon which the calendars, PERT's, etc., are based. The former facilitate future planning of resource needs and orderly development of the program. The latter are needed for development of contingency plans in the event that some assumptions prove to be in error.

There is risk that the plan may become too rigid, a hazard to be avoided at all costs. Planning is a dynamic process — activity calendars and other planning tools require constant updating and adjustment to maintain the flexibility necessary to react appropriately to unanticipated developments and external forces. During the experimental period of BVE, for example, the Project was confronted with a disastrous earthquake, the petroleum crisis which resulted in fertilizer scarcity and high prices, delays such as those cited above, and various other unpredicted developments. Yet, the basic implementation plan served the Project well.

The BVE experience would indicate that development of a functional organizational structure, well-defined job descriptions and detailed budget projections -- all time phased -- are also critically important facets of the planning process.

5. Understanding and support for the project

The necessity for both technical and political support of a program at the ministerial and/or agency level is widely recognized and accepted. BVE experience highlighted the need to develop and maintain understanding and support at all levels — national, regional, local -- and the potential consequences of inadequate follow through in that regard.

Prior to initiation of educational programmin in a region, BVE met with regional and local civil authorities and relevant agencies working in the region to explain the proposed program in depth. The authorities were also contacted prior to going into the field with a specific activity such as a baseline or annual survey. In the Indian highlands (Occidente), traditional community leadership and authority institutions were also involved in the same manner. Beyond that, leaders in Indian communities were asked to help in the selection of local field personnel. After the program was underway, annual repeat visits were scheduled.

Subsequent events proved that even the above system was not enough. Due to lack of adequate understanding and communication between BVE and one group of communities in the Occidente, the Project was nearly rejected in its entirety after it had apparently been accepted and was well underway. The effort put forth to resolve that problem resulted in the kind of mutual understanding required, and support that was stronger than ever before.

The lesson to be learned from the above experiences is that initial contact and pre-programmed follow-up are not necessarily enough to maintain support. This can result only from continuing effective two-way communication between the project and both the authorities and the people.

6. Intersectoral coordination

The BVE Project was typical of non-formal education programs in general in that it neither generated the technical information included in its messages nor was able to provide the goods and services necessary to permit people to apply what they learned. Coordination and collaboration with other sectors, principally the agricultural sector, was therefore essential.

Neither the Ministry of Agriculture nor the Ministry of Health (with whom BVE also collaborated) was a signatory to the BVE Project Agreement. Yet, both ministries provided technical assistance and limited personnel to the Project. Well-defined mechanisms were developed, particularly with Agriculture, to facilitate continuing interaction, coordination and collaboration. Over time, such arrangements became semi-institutionalized.

The BVE experience showed that, although a formal agreement or working relationship may be desirable, effective coordination can be achieved without the benefit of same, provided that arrangements can be developed that are mutually advantageous to all concerned. When moving into a long term program, it would appear desirable to work toward more institutionalized arrangements as rapidly as practical, however.

7. Adherence to the plan

The effort put into development of a strong and viable plan will be largely negated if that plan is not followed in the implementation and operation stages. If circumstances dictate the need to deviate from the

plan, that deviation should result from the conscious to do so, and documentation as to the reason. Only through such an approach can planning be the dynamic process described earlier. Basic Village Education presented a special case in that any deviation represented a potential threat to the validity of experimental results obtained. However, its benefits to the educational program, quite apart from the demands of the experiment, became increasingly obvious as the Project progressed.

8. Adjustments to external factors

The necessity for flexibility in planning and implementation has been alluded to earlier. In order to respond quickly and appropriately to an unespected development, the first requirement is to maintain a sensitivity to the situation that insures its early detection. Other requirements include a reasonable degree of independence in budget management within the program, and an educational system capable of modifying planned content on short notice to meet unanticipated needs.

The BVE educational system exhibited the capacity for early detection and quick and appropriate reaction. The Project was less successful, particularly in the early stages, in gaining sufficient flexibility in management of the Ministry of Education component of the budget. That problem was partially overcome through judicious use of the flexibility built into the U. S. technical assistance portion of the total Project budget, a feature that is considered to have significant implications for the planning and funding of technical assistance to other development projects.

B. Educational Programming Philosophy

Although sector-specific to a degree, the BVE educational programming philosophy was based on principles that should be much more broadly applicable.

1. Sensitivity of the local scene

It is unrealistic to expect people to respond positively to an educational program unless that program is relevant to their needs and interests, and is culturally acceptable to them. In BVE, early baseline information utilized in program formulation included demographic and cultural characteristics, local resource base, existing agricultural infrastructure, and principal concerns of the people. Preliminary reconnaissance surveys, the baseline studies, and informal contacts in the areas were primary sources of such information. In the case of the Occidente, however, it was deemed necessary to arrange for an anthropologist to make a preliminary study of the region before initiating the program. Once the program was underway in a region, BVE obtained reactions of the people to the BVE program and its content, and updated its baseline information through the Project's various

feedback mechanisms, and through results from the evaluation surveys.

2. Focus on the person

Knowledge of local constraints to increa ing agricultural production, and of improved technology or other means available for alleviating such constraints was essential to development of program content. However, in developing the message to be conveyed to the target population, the focus of BVE was on the farmer rather than his farm. The objective was to help the small farmer to improve his ability to make good decisions concerning his farming enterprise.

3. The right information

Technical information proposed for use in BVE messages was assessed against four major standards: a) soundness and local adaptation; b) economic viability; c) practicality from the standpoint of the farmer; d) degree of risk to the farmer associated with its use. With the possible exception of economic viability in some instances, these criteria would appear to be equally pertinent to content of educational programs in most sectors.

C. The Educational Programming System

The greatest contribution of BVE without doubt centered around the manner in which conventional elements were forged into a dynamic and functional educational system, and the results obtained through its use. It should be emphasized that the elements of that system were not unique to the Project. Rather, the Project's innovativeness came from the way such elements were linked together and developed. Although major BVE program content was restricted to agriculture, limited BVE experience in health programming and the judgment of those closely associated with the Project would indicate that the processes and methodologies utilized should be broadly applicable to other sectors as well. Those features considered to have significant implications for other programs are discussed briefly below.

1. Message development

Agricultural technicians were responsible for developing agricultural content of the BVE educational program, and for putting it into a form that could be used by non-technical audio-visual production staff in writing scripts, creating visual aids, etc. The key steps in that process, which would appear to be applicable to other subject matter areas as well, included:

- three principal sources of information were utilized: 1) people in the target population (to understand the local situation) 2) technology and information generating institutions (to obtain the best and latest technical information); 3) agricultural service and supply institutions (to determine the availability of essential goods and services);

- all technical content developed by BVE agronomists was reviewed and approved by Ministry of Agriculture technicians before being used in the educational program;

- an overall program content sequence, synchronized with the agricultural cycle, was developed on an annual basis in collaboration with the relevant technical ministry (Agriculture). From that, detailed bi-weekly strategies were prepared which indicated the content to be included in each agricultural program on each day of programming. Such planning assured that BVE radio programs and forums would be timely and that no important topics would be inadvertantly omitted during the year. It was then a relatively simple matter to make last minute adjustments to take care of special situations with minimum disruption to the total program sequence;

- the agronomists were linked into the system to insure both feedback and "feed-forward" into the production phase. They assisted in gathering and summarizing weekly feedback from the field, and had it available for use within a matter of two or three days. To maintain effective feedforward, they met weekly with audio/visual production staff, and were always available for consultation on an individual or group basis;

- to provide a bridge between the technician and the scriptwriter, technical content was organized into major themes and a scriptwriter's guide was prepared for each.

2. Educational materials production

The BVE project developed an in-house production capacity at relatively low cost that proved to be capable of meeting the educational program's basic needs for audio and graphic materials. Experience would indicate that the following factors were critical to efficient operation and satisfactory output:

- a regular production schedule with specific staff assignments and a time cushion to allow for setbacks due to illness, equipment breakdown, etc. The Project was unable to maintain such a schedule in the early months of programming in the Oriente, and production during that period tended to move from crisis to crisis. Although all programs arrived in the field in time for use, it was often at the expense of extra trips to the field or rescheduled training and orientation.

- frequent and systematic feedback. Feedback was received from the field weekly, and was supplemented by periodic visits of production staff to the field. More directly, all audio programs and graphics were checked at the draft stage by a BVE agronomist or health advisor as appropriate to assure technical accuracy;

- adjustment of output to capacity for production. At the outset, the Project decided on an eight hour broadcast day with repeated four hour segments due to its limited capacity at that time to produce quality radio programs. (That schedule was continued because feedback from the people indicated that it was well accepted). In the case of graphics, the number of flipcharts to be used with each radio forum was also adjusted to be compatible with production capacity.

A prime objective of the Project was to maintain acceptable quality in all educational materials produced. "Acceptable" had to be defined in relative terms, however. For example, it would have been counterproductive to try to produce audio programs of a quality suitable for reception with sophisticated stereo receivers, when people in the rural areas had only small transistor radios. In the case of graphics, field evolution revealed that realism and minimum essential detail were the important requirements rather than sophisticated shading, perspective, etc. Such factors, which has implications for the kinds of facilities and staff required, should be taken into consideration in the planning and implementation of every program requiring the production of new educational materials.

Since BVE utilized in-house production, no direct inferences can be drawn with respect to out-of-house or contracted production. The Project had serious difficulty in developing and maintaining adequate graphics production capacity and quality, and it is possible that out-of-house production would have been preferable. A relevant question, however, is whether or not Ministry of Education resources and regulations would have permitted the continued use of outside artists and production facilities after technical assistance funds were exhausted.

3. Message delivery systems (media mixes)

Major conclusions from the evaluation and economic analysis of BVE as reported in the BVE final report were that:

* "All BVE media combinations had measurable impact on knowledge about, attitudes toward and/or use of modern agricultural techniques."

* "Most BVE treatments in most circumstances have the potential to yield substantial economic returns to both the farmer and society as a whole."

Thus, the radio, paraprofessionals, and technicians used in varying combinations were all effective under certain conditions. (Those conditions area identified and discussed in Chapter X of the BVE Final Report). There would appear to be little doubt concerning the general applicability of these conclusions to other programs. However, good baseline information will be essential to determining the specific media combination to use in any given situation. As in the case of educational materials production, the quality of message delivery is at least as important as the selection of media to use. In the case of radio, localizing the message and personalizing a basically impersonal medium were important factors in maintaining a radio listening audience. For monitors, training and regular backstopping with on-time delivery of needed materials were crucial. With demostration plots, the use of practices that farmers could use under their own conditions was necessary for credibility.

To summarize, collection of good baseline information should be a part of the planning process for every non-formal education program, and should be used for guidance in selecting the media systems to be employed. Once in operation, as much care should be given to maintaining quality of delivery as to quality of production.

4. Formative evaluation (feedback)

Perhaps the most innovative feature of the BVE educational programming system was its formative evaluation, or feedback, component. Various mechanisms were utilized to obtain feedback from the target population for guidance in developing and improving content, producing acceptable audio and graphic materials, and effectively disseminating information through the delivery systems. Among the lessons learned in BVE that would appear to have important implications elswhere are:

- feedback does not flow back into the program automatically; its collection, distribution and use must be organized, included in training programs, and placed on a regular schedule as tightly programmed as any other component of the educational program — it must be an integral part of that program. The feedback subsystem must include means for rapid distillation and distribution of relevant information to all sections of the program. Time is of the essence in this operation.

- a part of the responsibility of the program leadership must be to assure that feedback received is digested and utilized by all concerned.

- sharing of pertinent information with cooperating institutions is essential to obtaining maximum inter-institutional communication, interaction and coordination.

- educational materials produced by the program must be pre-tested, tested, and re-tested to assure that they are received, understood

and accepted by the target population. Although results from elswhere can provide guidance, people in each area have their own distinctive characteristics with respect to audio and visual literacy, conventions and customs that can only be determined through on-site testing.

- the use of words to accompany graphic images on flipcharts, in booklets, etc., may be desirable even where illiteracy rates are high — family literacy becomes important in this regard. The written word should be neither used indiscriminantly nor eliminated until such use has been evaluated with the target population.

- new types of messages and media should be field tested before being put into the ongoing program.

- periodic special studies are needed to determine the audience actually receiving the message, its characteristics and its distribution.

- quick and appropriate action on feedback information is necessary if the program is to maintain its credibility among the people it is seeking to reach.

- an essential ingredient for effective use of mass media such as radio is a strong and viable feedback system.

The feedback system is often one of the most talked-about and least acted-upon components of educational programs. BVE experience would indicate that such neglect seriously jeopardizes the possibility for obtaining significant program impact and, in extreme circumstances, can threaten the very existence of the program.

D. Staff Development

A BVE conclusion with far reaching implications for the implementation of media-based non-formal education programs elswhere was that personnel with basic education and writing skills can be developed into a functional educational materials production staff in a relatively short time even though they have had no previous training or experience in media use, or in the technical content of the program. In the field, local people with practical experience can develop into useful para-professionals rapidly even though they have had only minimal formal education. (These generalizations do not, of course, apply to specialized skills such as artists.)

The Project gave high priority to staff development. Its central staff was composed largely of former school teachers with little or no previous training or experience in media use, non-formal education, or agriculture. The majority were from urban areas. Nevertheless, within a period of months that staff had developed sufficient capacity to permit initiaiton of the BVE educational program, and their competence continued to grow as the Project progressed. In the field, the BVE monitors had only minimal formal education, although they were local people with an agricultural background. Within the

period of the experimental programming they progressed from conveyers of information and feedback to para-professionals able to respond to many questions of the farmers in their communities. The same component of training and development were utilized for both groups.

To get the program launched, a general training program was organized for central staff in which experts from other agencies and the private sector presented principles and practice in their respective fields. That was followed by learn-by-doing type training which gradually evolved into specific assignments and production of materials for use in the field. A similar procedure of short, intensive pre-service training was used with the monitors. In both cases, emphasis was placed on the practical application of what was learned; but the training also included orientation into the Project as a whole, so that each staff member could better understand his or her role in relation to the total job to be done.

Once the educational program was in operation, the nature of the training process changed to emphasis on reinforcement and support of the staff. In the case of audio/visual production staff, weekly meetings with the agriculture section provided continuing orientation and backstopping in the technical content of their output. Periodic trips to the field helped them to gain a better understanding of and empathy with the rural people. Monitors met weekly with the field agronomist to receive materials for the following week, and orientation into their use. They also reviewed their activities of the previous week with the agronomist. A more intensive in-service training program was organized for them annually.

The elements judged to be most important in achieving such positive results in staff development were: the continuing program of reinforcement and support; and, the emphasis on learning by doing coupled with understanding of the individual's role in relation to the entire project.

E. Evaluation in an Operational Program

Due to its experimental nature, the Basic Village Education Project had a large evaluation component. A relevant question is whether or not a purely operational project would have need for such intensive evaluation. If not, would the formative evaluation activities discussed earlier suffice, or is some intermediate level required? Also, would elimination of the project evaluation component imply that the formative evaluation system would require further strengthening in view of the extent to which evaluation data were used in developing program content and staying on course?

The BVE evaluation team considered the above questions and drew some conclusions, based on their experience with BVE, that they believe to have implications for utilization in other projects and settings (BVE Final Report, Chapter X). Among those conclusions are:

- The baseline survey may not be as necessary for measurement of pre- and-post change as it is in terms of understanding the nature of the population being studied, providing information on current practices and levels of development within the population, and giving feedback

for assistance in programming.

* The time sampling procedure provides immediate feedback in terms of program effect and, if linked with some reasonable baseline information, it could be developed as a method of ongoing evaluation. It is a procedure that could be carried on efficiently by most program staff, and could provide the kind of information needed to understand the response to the programming by the target population.

* A monitor or informant system could function quite efficiently as a feedback system to keep the program on track (and, in fact, was utilized for that purpose in BVE), but would work much less effectively as an evaluation system. This is not necessarily negative in terms of program development, however, since vigorous evaluation need not be conducted in every setting in which a project is initiated.

F. Transferability of BVE Experience and Results

Specific implications for other programs drawn from the BVE experience have been discussed in the foregoing sections. A series of more general questions concerning transferability may also be posed -- such as how BVE could be expanded into a larger program, or its relevance to sectors other than agriculture. Although some inferences can be drawn from evidence accumulated in BVE, such questions often involve so many factors that no simple response is possible. In other cases, only speculative answers based on observation and experience are possible.

1. Scale

As stated earlier, only elements judged to be suitable for incorporation into larger scale programs were utilized in the BVE educational program. The limited size of the BVE experimental treatment areas obviously made it difficult, if not impossible, to verify those judgments through the experiment. However, what evidence is available from BVE has been used in conjunction with observation and experience to suggest some hypotheses for consideration.

The optimal starting size and rate of expansion of a media-based program such as BVE will depend not only on the level of resources and personnel available, but also on the characteristics of the people and the region. As a generalization, the regional progression used in BVE would appear to have considerable merit. That is, the new program would be initiated in a region with boundaries defined by the possibility for using the same message and the same delivery systems throughout the area covered by the program. Implementation would proceed in that entire region as rapidly as resources and program capacity permitted. The process would then be repeated region by region (with a degree of overlap in starting in a new region while still expanding in the last region) until coverage was complete.

The BVE program placed strong emphasis on localization and personalization of the message, particularly as delivered by radio. In the Oriente, however, the Project was forced to shift from ah high degree of localization in the first year of operation (when reception was limited to the Quezada Valley and its immediate surroundings) to a program of much broader application when transmitter power was increased to permit reception in the new experimental area of Yupiltepeque. From a message content standpoint, the transition was made through maintaining a core content that was applicable throughout the region. It was then possible to localize through making specific and timely reference to the needs or activities of farmers in different parts of the region as appropriate.

The increased area of reception also made personalization of the radio more difficult. People living farther from the station did not feel that it was a part of their community to the extent that Quezada people did. The problem was partially overcome by placing letter drops at strategic locations in the Yupiltepeque Valley in which people could place their letters to the station, and be assured that those letters would be read and acknowledged over the air.

Thus, although, expanding the area inevitably means some loss of fine tailoring to the local scene and people, localization can still be maintained to a significant degree so long as a common set of problems, enterprises, and cultural characteristics exist throughout the program area.

The BVE experience in working in two regions also provides some guidance in the organization and possible decentralization of work as a program expands. Although operating out of a single central office, the BVE educational programming system was, in fact, regionalized to a major degree. The agriculture section responsible for technical content divided responsibility along regional lines, and a separate materials production team was organized for each region. All used a common production facility, however.

Extrapolating from that experience, it would appear logical to organize into regional units for purposes of carrying out an educational program, with overall policy direction and coordination coming through a central program administration. Production facilities should be shared to the extent possible to minimize investments in hardware and staff. However, as soon as the central production unit becomes overloaded it may be more advantageous to develop outlying units, each of which would serve one or more regions. In some cases, the most viable solution would appear to be to establish small production units in each major region of effort, and to maintain a central unit for large scale or more complex production. Whatever system is adopted, decentralization insofar as feasible would appear to be the indicated choice in order to keep the program in close touch with its target population.

The BVE system involved installation and operation of educational radio stations in order to meet requirements of the experiment. It should be recognized, however, that other alternatives exist which should also be considered in planning new programs. For example, a one hour segment of daily broadcasting time over a public or private station would provide a regular channel for dissemination of educational messages. Such an arrangement would permit the same kind of continuity achieved with the BVE stations, but without the necessity

for filling a full broadcasting day. The decision should be based on availability and cost of appropriate air time over existing transmitting stations, the level of resources available to the program for installing and operating radio stations as well as producing programs, adequacy of coverage of existing stations, and related factors.

The ratio of monitors to agronomists in BVE treatment areas was quite low, due partially to the area constraints mentioned above. It would appear from experience in the field, however, that one agronomist could conceivably work with a larger group of monitors without major loss in impact, at least where radio is also a component of the delivery system. The monitors in RM areas proved capable of conducting simple crop demonstrations; the weekly monitor orientation sessions conducted by the field agronomists proved to be an effective way to maintain contact and feedback; and the apparently low visibility of BVE agronomists in the RMA areas, eve though their work resulted in measurable impact in some areas, would indicate that the local people considered the monitor to be their major direct contact. Such possibilities should be investigated as new programs are initiated. They appear feasible from the standpoint of training, backstopping, reinforcement and supervision of the monitors; but the effect on program impact remains to be determined, and will undoubtedly vary from area to area.

The above hypotheses are suggested to provide some general guidelines for development and use of BVE-type systems on a larger scale. In a give situation, however, it is again emphasized that good baseline information must be the starting point for determination of the most appropriate media combinations and program content. They will undoubtedly change from one region to another, and the program must maintain sufficient flexibility to permit it to change in response.

2. Sector

The only direct evidence from BVE as to the relevance of its educational program to sectors other than agriculture comes from its very limited work in the field of health and nutrition — which was restricted to radio dissemination only, and was not subjected to rigorous evaluation. That evidence would suggest, however, a reasonalby high degree of transferability. In evaluation, the BVE evaluation team concluded that the instruments they utilized for agriculture could be adapted to fit a new programming content emphasis.

It is hypothesized that the principles and processed from BVE which are projected to have implications for other programs would have relevance in most content areas. There is less basis, however, for projecting whether or not the specific media combinations and types of materialea tested in BVE would be most appropriate for use in other sectors.

3. Setting

The results of BVE are expected to have a high degree of relevance for

other settings, as rural families in the areas of BVE action have many characteristics in common with peasant societies throughout the world, and the experiment was replicated in two widely contrasting cultural/agricultural environments.

4. Technical assistance

Based on the Guatemalan experience of BVE, it would appear that substantive technical assistance may be required in many areas for the planning and implementation of a BVE-type program. The nature of that assistance will, of course, vary widely from country to country. In general terms, however, assistance will probably be needed in program conceptualization and systems development. Specialized assistance required both total amount and type, will depend upon the levels and kinds of trained manpower available in the country. A third area of likely need will be in development and implementation of evaluation and feedback systems for the program.

5. Leadership

Regardless of what other resources may be made available, the ultimate success or failure of any program will depend in large parte upon the leadership it receives. The assumptions made in this report concerning implications from BVE for other programs can be considered valid only to the extent that such programs can be provided with strong and enlightened leadership.

ACADEMY FOR EDUCATIONAL DEVELOPMENT
LA ACADEMIA PARA EL DESARROLLO EDUCATIVO

UNIVERSITY OF SOUTH FLORIDA
LA UNIVERSIDAD DE FLORIDA DEL SUR

THE BASIC VILLAGE EDUCATION PROJECT

(PROGRAMA DE EDUCACION BASICA RURAL)

GUATEMALA

FINAL REPORT

SEPTEMBER 1978

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

THE BASIC VILLAGE EDUCATION PROJECT

(Programa de Educacion Basica Rural)

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Summary

The Basic Village Education Project (BVE) was an experimental program of non-formal education which did not require literacy for participation. Subsistence farmers, the majority of whom are illiterate, constituted the primary audience toward which BVE directed information to help them improve their crop production.

Radio was used alone and in combination with various other communications media to study the effectiveness and relative costs of selected media mixes potentially useful in development programs. Specific combinations imposed upon experimental areas in each of two regions included: 1) educational radio programming only; 2) radio programming reinforced by farmer meetings and other interpersonal activities conducted by a BVE "monitor" — a local person; 3) radio programming, monitor activity, and limited technical assistance from an extension-type agronomist; 4) monitor activity only.

The BVE experiment was conducted in two contrasting cultural/agricultural regions of Guatemala: the Spanish-speaking Ladino Oriente (southeastern Guatemala) and the Quiché-speaking Indian Occidente (western highlands). Experimental programming was maintained for nearly three years in the Oriente, through December 1976. In the Occidente, due to a later startup, experimental programming was completed one year later after two years of operation. The program did not stop when the experiment was completed, however, as the Ministry of Education has continued to provide the same type of educational programming for the rural people in both regions.

Results of the rigorous evaluation to which the BVE educational program was subjected indicated that measurable change does indeed take place over a two-year time span, the period of the experiment. A longer period would have been highly desirable for estimation of long range benefits. Also, the relatively short time of the experiment may account for some of the variations in the results under different treatment conditions.

All BVE media combinations had measurable impact on knowledge about, attitudes toward and/or use of modern agricultural techniques. It appeared from the findings, however, that there is no single most effective media combination for all situations.

The potential effectiveness of the various media combinations varies with the level of development, the economic well-being, and the present and prior exposure to mass media and technical assistance. For an area relatively advanced in these respects (e.g., Quezada, Oriente), radio alone will be immediately used as a source of new information, much of which will be translated into positive behavior change. In contrast, the full radio-monitor-agronomist media combination is required to achieve maximum program impact on knowledge and behavior change in an area rating relatively low (e.g., Yupiltepeque, Oriente). In the traditional Occidente areas, radio is capable of introducing new agricultural ideas and reducing the fear of implementing them. However, reinforcement by agronomist and/or monitor is needed to maximize impact of radio as an information source, and to translate that information into positive behavior change within a two-year period.

It seems clear that good baseline information on the potential target

area is an essential prerequisite to choosing the best educational media.

As indicated above, a much longer experimental period would have been required for estimating long range benefits with a reasonable degree of certainty. Nevertheless, through the use of a series of assumptions and several levels of benefit projections, it was possible to make a meaningful economic analysis of the Project. That analysis indicated that most BVE treatments, under most circumstances encountered in the experiment, have the potential to yield substantial economic returns to both the farmer and society as a whole.

Under the lowest benefit projection, farmer profits would increase by two thirds over present levels; under the highest projection, their profits would about triple. Assuming the program and its benefits are maintained for twenty years, all BVE media combinations showed favorable economic rates of return except the radio-monitor-agronomist option in the Occidente under the lowest benefit projection.

Elements of the BVE educational program considered most crucial to achievement of the positive results reported above included:

- systematic, detailed, relevant planning prior to program initiation, including collection of good baseline information;
- an integrated educational programming system: message development, materials production, message delivery, feedback — the first and last merit particular mention;
- a programming philosophy focused on the farmer on his farm;
- a continuing program of staff development and reinforcement.

These same elements are considered to be those with the most significant implications for programs in other sectors and/or settings.

Some BVE statistics*:

Different audio materials produced by production unit	10,65[illegible]
Original graphics created by staff artists	1,580
Copies made of original graphics	167,543
Farmer meetings (radio forums) held by monitors	2,218
Total adult attendance at farmer meetings	23,929
Crop demonstrations conducted	75
Letters received from local people by BVE radio stations	94,403

*Life of Project statistics for Oriente plus Occidente.

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PART ONE

THE BASIC VILLAGE EDUCATION PROJECT

(BVE)

They are predominantly small subsistence farmers.

Oriente rural families are of Ladino heritage; their language is Spanish.

They are also predominantly small subsistence farmers; seasonal migration to work on coastal farms is common.

Occidente farmers are typically of Indian heritage and speak one of the Indian languages.

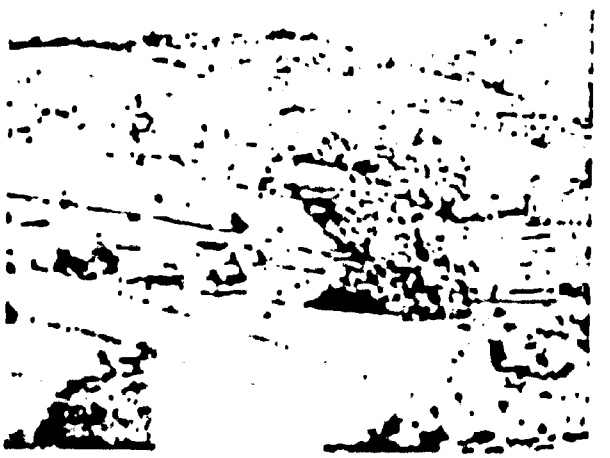


Plate 1

The rural people in INCAP experimental and control communities, Guatemala.

CHAPTER I

PROJECT DESCRIPTION

Basic Village Education (BVE) was a two-component project: 1) a carefully controlled non-formal education program not requiring literacy, which was to be subjected to analyses of costs and benefits; and 2) a rigorous evaluation of that program's impact on knowledge, attitudes and agricultural practices among its target population. Subsistence farmers, the majority of whom are illiterate and who farm small tracts of land, constituted the primary audience toward which BVE directed information to help them improve their production and income from subsistence crops.

The specific objective, as defined in the Project Implementation Plan, was "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." BVE sought, also, to develop a cadre of trained people in Guatemala capable of planning, implementing and continuing the integrated and effective use of modern communications technology in regional or national development programs.

Matched experimental and control areas were established in two contrasting cultural environments for purposes of the experiment (Figure 1). Four media mixes (communications treatments in terms of the experiment) were used to deliver the same basic message to people in different parts of the experimental area in each region. Each mix constituted a BVE message delivery system. Messages were excluded, insofar as possible, from the control areas.

The four delivery systems, selected on the basis of appropriateness, potential replicability and practical limitations, are described briefly below.

Treatment R (Radio). Educational messages were conveyed to the target population only through mass media, principally radio. To implement this treatment, BVE installed a radio transmitter in each region under investigation.

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 several 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 prepared audio and visual materials in presenting the agricultural message of the week, also featured on the radio.

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.

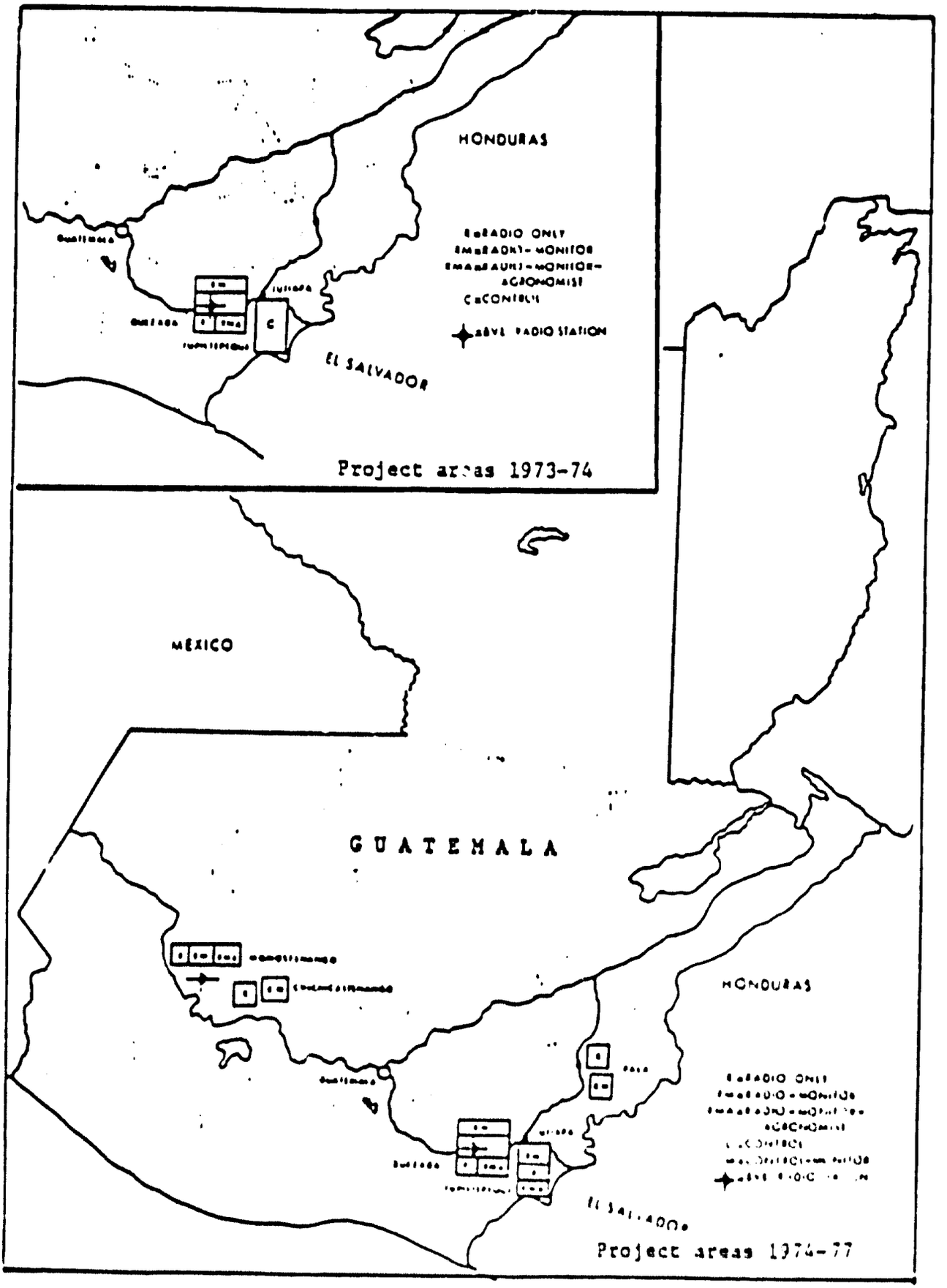


Figure 1

Basic Village Education Project experimental and control areas, 1973-1977.

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.

In practice, it proved difficult to maintain these treatments as completely independent variables. 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. Treatment R (radio alone, with no direct personal contact) unquestionably benefited from such feedback. In the other direction, difficulty in maintaining radio-free areas resulted in some contamination of the "control" and "monitor only" areas with radio.

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

Educational programming was launched in the Oriente in March 1974, and in the Occidente in September 1975. Major activities related to the BVE experiment are summarized in the chronology of events listed in Table 1 below.

Table 1

Summary chronology of the Basic Village Education experiment, Guatemala, 1971 - 1978.

Year	Event
1971	
	- Preliminary discussions between AID and Government of Guatemala
1972	
	- Project feasibility study
	- Appointment of Guatemalan Project Director by Ministry of Education
1973	
	- Arrival in Guatemala of U. S. technical assistance team
	- Development of evaluation design and Project Implementation Plan
	- Selection of 1974 experimental and control areas (Oriente)
	- Selection of Quezada as transmitter site (Oriente)
	- Establishment of BVE/Ministry of Agriculture coordination committee
	- First baseline survey (Oriente)
	- First agricultural message calendar (Oriente)
	- Selection and training of first monitors (Oriente)
	- Installation of central offices and production studios

Table 1 continued

1974

- Pre-program study of region (Occidente)
- Inauguration of Radio Quezada Educativa, TGME (Oriente)
- Initiation of time sample surveys (Oriente)
- Selection of 1975 control area (Oriente)
- Selection of experimental and control areas (Occidente)
- First baseline survey (Occidente)
- First annual follow-up survey (Oriente)
- First agricultural message calendar (Occidente)
- Selection of Momostenango as transmitter site (Occidente)
- Completion of first year programming (Oriente)

1975

- Shift of Yupiltepeque from control to experimental area (Oriente)
- Delay until September in start of educational programming (Occidente)
- Initiation of BVE cost and benefit/cost studies
- BVE an autonomous program in Ministry of Education
- Selection and training of monitors (Occidente)
- Second baseline survey (Occidente)
- Inauguration of Radio Momostenango Educativa, TGEB (Occidente)
- Initiation of time sample surveys (Occidente)
- Second annual follow-up survey (Oriente)
- Decision for one year extension in Occidente (Occidente)
- Formation of materials development and testing unit
- Completion of second year programming (Oriente)

1976

- EARTHQUAKE -- suspension of normal activities (both regions)
- Resumption of BVE programming one month later (both regions)
- First annual follow-up survey (Occidente)
- Third annual follow-up survey (Oriente)
- Increase of TGEB output to 1000 watts (Occidente)
- Completion of first year programming (Occidente)
- Completion of third and final year of programming (Oriente)

1977

- Continuation of program by Ministry of Education (Oriente)
- Second annual follow-up survey (Occidente)
- Final report on Oriente phase of BVE experiment (Oriente)
- Completion of second and final year of programming (Occidente)

1978

- Continuation of program by Ministry of Education (both regions)
- Final report on Occidente phase of BVE experiment (Occidente)
- Report on economic analyses of Project
- Report on cross-cultural comparisons
- Consolidated summary report of Project
- AID evaluation of Project (in Guatemala)
- Termination of Contract No. AID/CM/la-C-73-19
- Initiation of follow-on activities

CHAPTER II

BACKGROUND AND SETTING

The Basic Village Education Project, a controlled experiment directed specifically at the problem of finding better and cheaper ways of communicating with small farmers, was consistent with recent emphasis on the definition of viable communications strategies. It was originally conceived as a radio education program on the hypothesis that useful and relevant knowledge could be imparted at low cost to large segments of the rural population in a manner that would not require literacy. A 1972 study (Reference A-1, Appendix B) supported the feasibility of a pilot project of this nature and suggested various alternatives for further consideration.

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 socio-economic characteristics. Agreement was reached with the Guatemalan Ministry of Education in February 1973 to proceed with the Project. Detailed information on Project origins, scope, design, and implementation is included in references listed in Appendix B.

Basic Village Education results are expected to have broad applicability, as its setting has much in common with other parts of 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 representative of peasant societies throughout the world. Its diversity in people, physiography and agriculture permitted the Project to conduct the experiment in two contrasting environments as called for in the design.

A small agricultural country of nearly six million people, Guatemala ranges from the rain forests of the Peten and the rugged mountains of the Highlands to the low-lying coastal belt bordering the Pacific and the hilly dry regions of the Southeast. Its people are equally diverse. Ladinos and Indians comprise the two highly distinctive broad ethnic groups. Ladinos are generally described as Guatemalans of whatever racial origin (usually mixed Indian/Spanish or Indian) who speak Spanish, wear western dress, and do not belong to an Indian community. Indians, who constitute almost half of the country's total population, are defined by the Indian Institute of Guatemala as those who speak one of the 23 Indian languages, wear traditional Indian dress, and practice one of the many Indian mythologies.

The two regions selected for the BVE experiment included a Ladino population in southeastern Guatemala (the Oriente) and a Quiché-speaking Indian population in the western Highlands (the Occidente). Although both regions were characterized by a preponderance of small farms and a high proportion of illiterate farmers, people in the two regions differed significantly in other respects as shown in Figure 2.

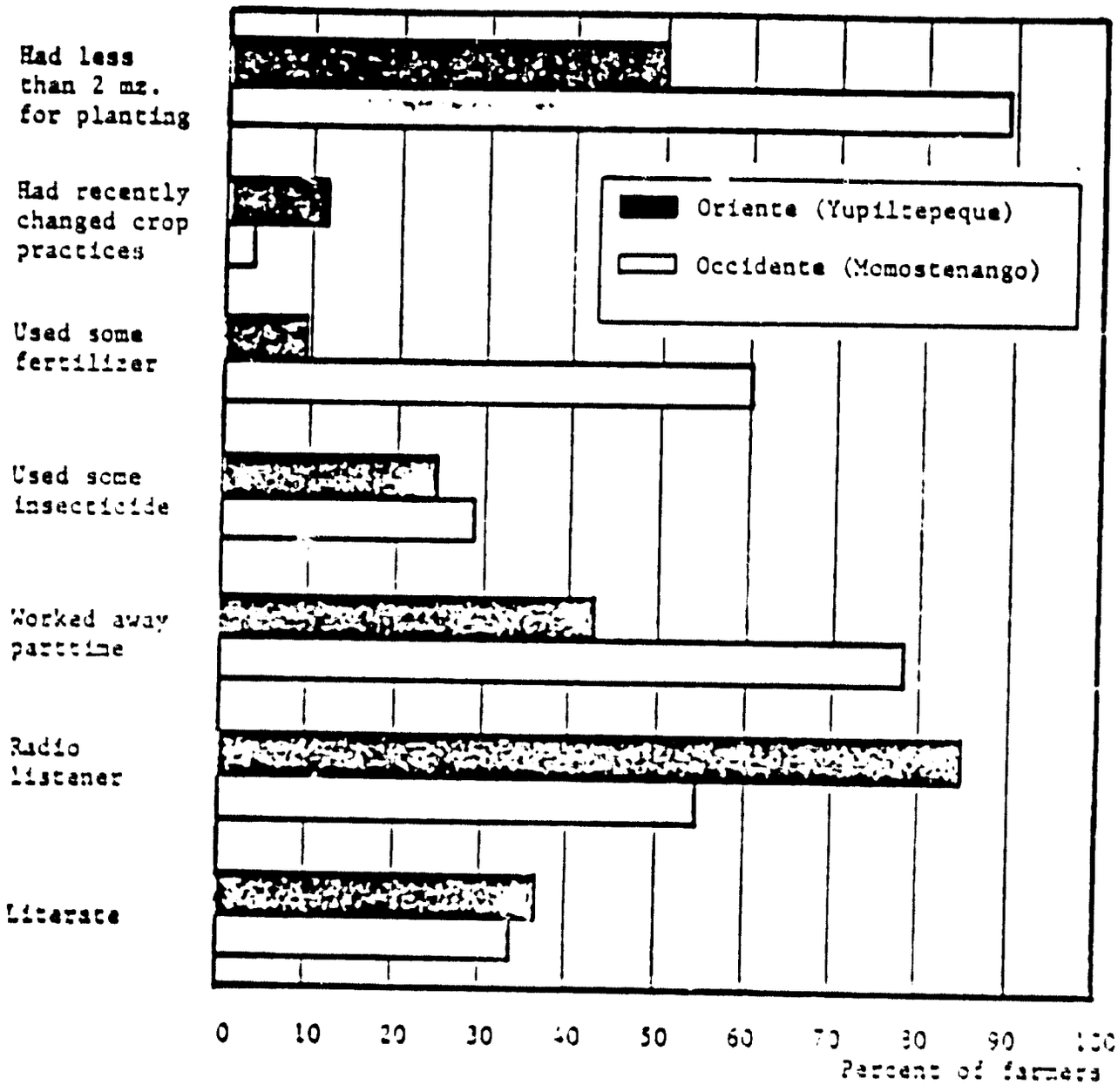


Figure 2

Pre-program comparisons of selected characteristics of farmers in Basic Village Education areas of investigation in the Oriente and Occidente regions of Guatemala. (From 1974 annual surveys.)

PART TWO

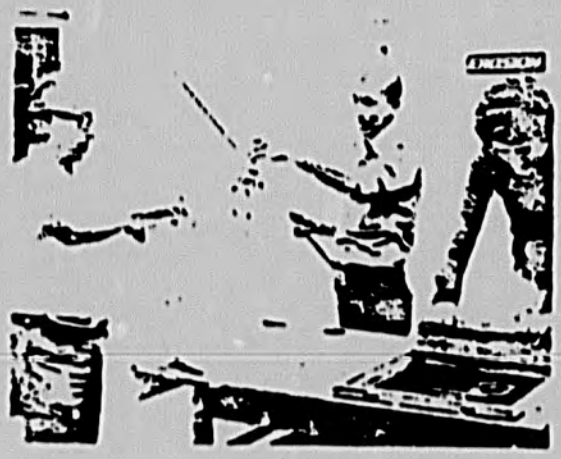
THE BVE PROJECT IN OPERATION

Oriente Region

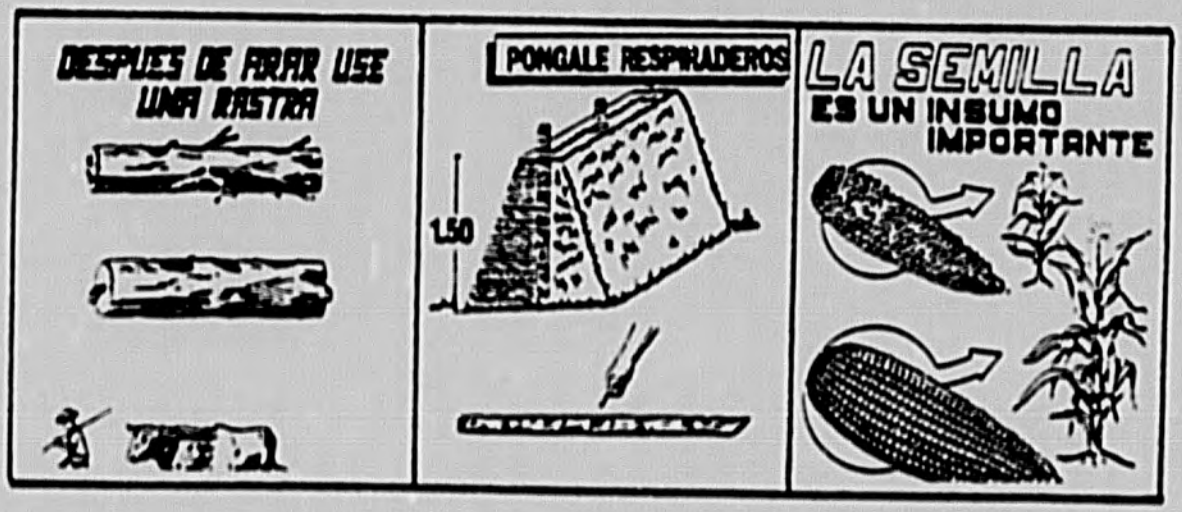
March 1974 - December 1976

Occidente Region

September 1975 - December 1977



Over 10,500 different audio programs and 165,000 copies of 1,580 different graphic materials were created and produced by BVE for use in the Oriente and Occidente.



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 quality, relevance and timeliness of its educational materials were major factors in determining BVE impact.

CHAPTER III

THE BVE EDUCATIONAL PROGRAMMING SYSTEM

Quality and relevance of its educational programming as perceived by the target population were major factors in determining BVE impact. The validity of conclusions reached from the experiment hinged in large part upon success in maintaining such quality and relevance. At the same time, BVE experimental design imposed programming constraints which were equally crucial to a sound evaluation. To satisfy both requirements, it was necessary to develop a tightly controlled programming system that was highly sensitive to the interests and reactions of local people.

The BVE educational programming system is shown schematically in Figure 3. Its four principal components — message development, educational materials production, delivery to the target population, and formative evaluation (feedback) — were not unique to the Project. The innovative manner in which they were coordinated, integrated and linked with public and private technical and service agencies was the real key to successful programming. The system proved to be functional for use with both regions and, although modified and improved with experience, was employed throughout the life of the Project. Basically, it was designed to assure that:

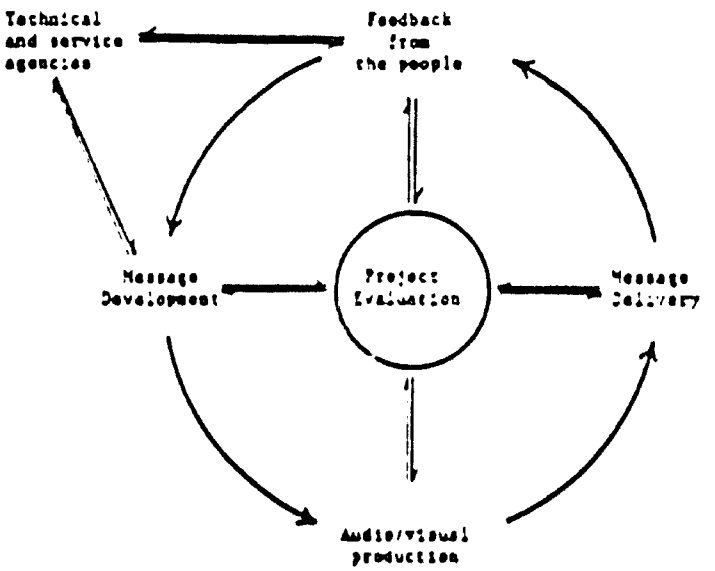


Figure 3

The BVE educational programming system.

- educational messages were localized, practical, and directed toward the interests, problems and potential opportunities of people in the rural areas;
- messages were delivered in proper sequence at the right time through appropriate media; and
- comprehensive information was obtained from the people regularly, and fed back into the system quickly to improve the program's quality and acceptability.

Although utilized most completely in agricultural programming, the BVE system also proved viable for use in other subject matter areas such as health for which limited programming was developed.

A. Message Development

As implied in Figure 3 above, the message development process involved seeking out, organizing and cross-checking information from three distinct

sources:

- the people to whom the messages would be directed;
- technology and information generating institutions;
- public and private suppliers of agricultural inputs and services.

Information from and about the people in the target populations came through Project evaluation surveys, feedback reports and frequent visits to the regions. Such information was essential to the development of messages appropriate for the local people and their situation.

The Ministry of Agriculture was the Project's primary source of technical information on crop production and marketing. Also, various Agriculture Ministry agencies were among the institutions providing goods and services to farmers. That Ministry was critically important to BVE message development and content.

To tell farmers about better practices, new seeds, fertilizer and insecticides, soil conservations measures, etc., was not enough. The BVE message also had to give them reliable information about where and how they could get inputs, credit and other services needed to permit them to take advantage of what they had learned through Basic Village Education. Hence, BVE agronomists maintained close contact with all major suppliers of such goods and services.

Four basic documents were developed for use in production of program materials for each region: annual message calendar, book of technical contents, scriptwriter's guide, and bi-weekly message strategy. The first three were developed by the BVE agricultural section, and the fourth by that group in collaboration with the production unit.

A message calendar was prepared annually for each region in collaboration with regional staff of the Ministry of Agriculture. It indicated the approximate times at which major agricultural themes should be included in the educational program. As shown in Figure 4, each message calendar was organized into some twenty themes.

Oriente and Occidente technical content books and scriptwriter's guides comprised the basic package of technical agricultural information. Content was organized into sections corresponding to the themes in the message calendar. The scriptwriter's guide accompanying each theme identified relevant behavioral objectives and key points or ideas included in the content text. Ministry of Agriculture technicians reviewed and approved all technical content texts before they were used in BVE programming.

First developed in 1973-74 and revised annually thereafter, the above documents are expected to provide the foundation for "post-experiment" BVE programming by the Ministry of Education in each region.

The fourth document, a bi-weekly plan of education messages developed from the annual calendar, provided a bridge between message development and educational materials production. Known as the message strategy, it indicated specific agricultural content for each program each day. Strategies were prepared and distributed to production staff two to three months in advance.

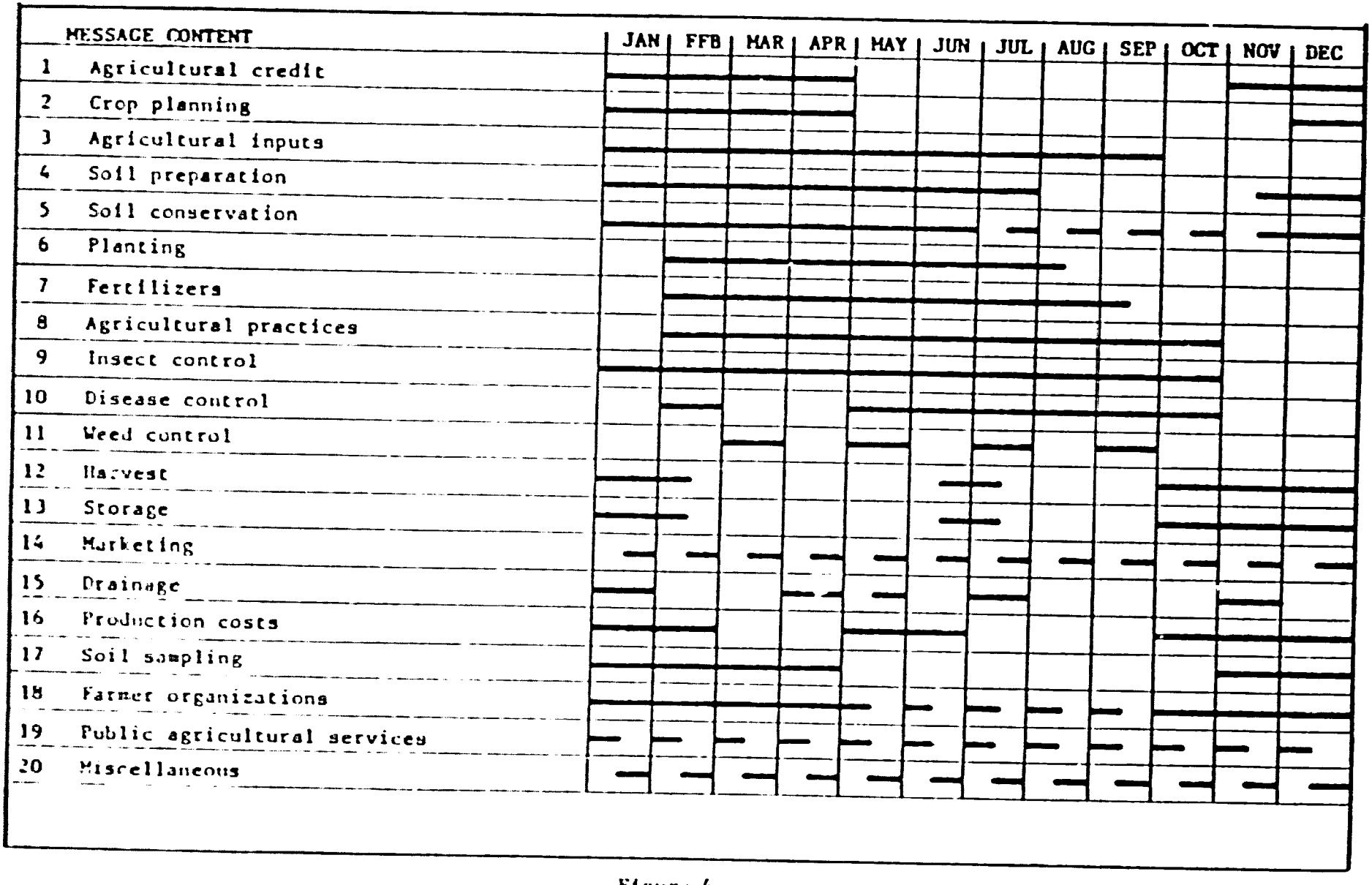


Figure 4

The Basic Village Education annual calendar of agricultural messages for 1976 programming in the Occidente region of Guatemala.

B. Educational Materials Production

The production component of the BVE system included planning, original production, and reproduction in required quantities of materials to be used in the educational program. During its 1974-1977 educational programming period, the BVE Project produced 10,652 separate audio materials and more than 167,000 copies of 1580 original graphics for regularly scheduled use (Tables 2 and 3). In addition, audio and graphic materials of various types and quantities were produced for field testing and evaluation, or in response to requests from other programs.

Table 2

Summary of graphic materials produced for Basic Village Education programming, January 1974 - December 1977.

Description	Region of use	Number produced	
		Originals	Copies
Radio forum materials:			
Flipcharts	Oriente	492	2,929
	Occidente	305	4,564
Handouts	Oriente	437	86,425
	Occidente	342	68,750
Stand-alone graphics:			
Posters	Both	2	475
Handouts	Both	2	4,400
	Total	1,580	167,543

In keeping with its mandate to develop a low cost non-formal education program, the Project established a modest audio/visual production facility tailored to its specific needs. The objective was to select the least expensive equipment available consistent with compatibility and adequate performance. Installation of a photo silkscreen unit in early 1976 represented a major improvement in the original facility. Until that time, essentially all reproduction of graphic materials had been done by hand or mimeograph. The silkscreen unit not only increased total capacity, but also provided much-needed flexibility to the graphic arts production process.

All sections of the Project were involved at some stage of planning for production, the transitional step between message development and original production. The scriptwriter's guide and message strategy were major vehicles used in making the transition. Weekly agronomist-scriptwriter-artist orientation meetings, supplemented by frequent consultations and periodic field trips, constituted the final step in production planning.

Scripts for audio materials for both Oriente and Occidente were written

Table 3

Summary of audio materials produced for Basic Village Education programming, January 1974 - December 1977.

Description	Region of use	Language	Number produced
Recorded radio programs:			
Revista Agrícola	Oriente	Spanish	740
Historias Verdaderas	Oriente	Spanish	449
Conversemos	Oriente	Spanish	250
Buenas Noticias	Oriente	Spanish	145
Hombre, Guitarra y Luciérnaga	Oriente	Spanish	250
El Hogar que Soñamos	Oriente	Spanish	334
La Vida es Así	Oriente	Spanish	105
El Sembrador	Occidente	Spanish	541
Aj'ticonel	Occidente	Quiché	533
Salud y Progreso	Occidente	Quiché	495
Mayalandia	Both	Spanish	405
La Magia de la Música	Oriente	Spanish	38
Escuela del Aire	Oriente	Spanish	30
Programas Especiales	Oriente	Spanish	50
Cassettes plus radio programs:			
Radio foro	Oriente	Spanish	136
Radio foro	Occidente	Spanish	85
Radio foro	Occidente	Quiché	86
Spot announcements:			
Cuñas Agrícolas	Oriente	Spanish	4,174
Cuñas Agrícolas	Occidente	Spanish	1,638
Ninety-minute tapes:			
Música	Both	--	169
	Total		10,652

in Spanish. Those containing agricultural or health information were checked for accuracy of technical content by an agronomist or the health advisor as appropriate before final revision and typing. For programs to be produced in Quiché, the scripts were then translated. Both Spanish and Quiché programs were recorded in the BVE sound studios. All audio materials were originally recorded and edited on reel tapes, and later transferred to cassettes with sufficient copies to meet field and archive needs. All production quotas were met during the life of the Project, although equipment maintenance was an increasingly serious problem from 1975 onward.

The basic format for agricultural audio programs was maintained throughout the experiment, although 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.

Production of graphic materials followed a similar procedure. Development and use of graphics progressed more slowly at the outset, however, due to limited facilities, startup pressures, and a graphic arts staff inexperienced in creating materials for use with rural adults. Both the quality and volume of graphic materials production increased significantly during the latter stages of the experiment. Factors which contributed to that improvement (in addition to the silkscreen already cited) included: results of the materials development and testing program (section III D3) which provided guidelines for the artists; a portfolio of model drawings prepared by the graphic arts specialist which permitted staff artists to copy human and animal poses to obtain more realistic figures; and the stimulation, instruction and direct assistance provided by graphic arts technicians available to the Project.

C. Message Delivery to the Target Population

The four communications treatments utilized in the BVE experiment consisted of three types of media (mass, local interpersonal contact, technical agronomic assistance) employed in different combinations. The same combinations were used in both Oriente and Occidente, and were applied similarly in the two regions. The message was constant across all media within a region, and a given medium was utilized in the same way in all treatments of which it was a component.

1. Mass media (radio)

Radio was a component of three of the four BVE communications treatments: R (radio only), RM (radio plus monitor), and RMA (radio plus monitor and agronomist). The experimental design called for exclusion of radio reception in areas designated for the M treatment (monitor only) and the control.

Two 1000-watt radio transmitters, one each for Oriente and Occidente,

were installed by the Project to: 1) assure adequate reception of BVE messages in all parts of the designated experimental areas; and 2) provide the means to exclude reception of BVE radio from areas for which the experimental design so indicated. The BVE stations operated on mid-band frequencies in direct competition with several other strong stations in each region.

The transmitters were operated initially at low power to exclude reception from control and "monitor only" areas. In the Oriente, Radio Quezada Educativa (TGME) maintained an output of approximately 125 watts through 1974. Output was boosted to 500 watts in early 1975 to obtain acceptable reception in the new Oriente experimental area of Yupiltepeque, and to 1000 watts in late 1976 upon completion of the experiment. Radio Momostenango Educative (TGEB), the Occidente station, functioned at 250 watts until late 1976 when output was increased to 1000 watts due to the series of factors discussed in Chapter VI.

Both stations were on the air daily, Monday through Saturday, on an eight hour split schedule (0500 to 0900 and 1600 to 2000 hours). They 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 stations were off the air on Sundays.

A mix of pre-recorded and live programming, about one fifth of which was about agriculture, was used to attract and maintain listening audiences. Programs on agriculture, health, national culture, and special music were produced and recorded in Project studios. Live programs of community interest — musical variety shows, announcements and reports of local events, responses to letters received, etc. — helped to provide a link between the local people and the often impersonal voice of the radio. This identification of local people with the radio was undoubtedly a significant factor in maintaining large listening audiences throughout the period of the experiment (see Section III D6).

2. Local interpersonal contact (monitor)

The monitor, who provided interpersonal contact between BVE and the rural people, was also a component of three communications treatments: M (monitor only), RM (monitor plus radio), and RMA (monitor plus radio plus agronomist). He was a local person employed by the Project to work directly with farmers in his own and a few nearby communities as a motivator and two-way channel of communication between the farmers and the Project. Although agriculturally oriented, the monitors were not technicians. They were approaching a para-professional level by the end of the experiment, however.

The area and number of farm families served by each monitor varied with community size and accessibility, and with natural geographic or social limits. As shown in Table 4, a fulltime monitor was responsible for an area of three to six communities and 150 to 250 rural families.

The monitor visited each of his assigned communities weekly. During the day, he visited with farmers about their agricultural activities, and

Table 4

Communities and rural families served by BVE monitors, and summary of farmer participation in Basic Village Education radio forum meetings, Oriente and Occidente regions of Guatemala, March 1974 - December 1977.

Area/treatment	Period of operation	No. of communities	Approx. no. of families	No. of meetings	Adult participation	
					Total	Avg. per meeting
Oriente:						
Quezada RM	1974-76[1]	5	150	426	6,108	14.3
Quezada RMA	1974-76[1]	5	240	508	4,796	9.4
Yupiltepeque RM	1975-76[2]	4	160	243	2,011	8.3
Yupiltepeque RMA	1975-76[2]	4	250	255	2,547	10.0
Ipala M[3]	1975-76[2]	1	110	61	1,044	17.1
Total for region				1,493	16,506	11.1
Occidente:						
Momostenango RM	1975-77[4]	3	156	316	3,232	10.2
Momostenango RMA	1975-77[4]	6[5]	158	321	2,952	9.2
Chichicastenango M[6]	1975-77[4]	1	100	88	1,239	14.1
Total for region				725	7,423	10.2

[1] Radio forums initiated March 25, 1974.
[2] Radio forums initiated March 1, 1975.
[3] The Yupiltepeque RM monitor was also responsible for Ipala M.
[4] Radio forums initiated October 13, 1975.
[5] More than one community represented in some radio forum meetings.
[6] The monitor for Chichicastenango M worked on a parttime basis.

invited them to attend a radio forum meeting in the late afternoon at a prearranged time and place. When farmers had assembled, the monitor used a pre-recorded cassette tape and a flipchart series in presenting the agricultural message of the week. He encouraged discussion and questions both during and after the presentation. Those questions 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 held regularly throughout the agricultural year. They were suspended only during the December-February period of minimal agricultrual activity to provide time for monitor vacations, the annual monitor in-service training course, and various other preparatory activities. In addition to that intensive annual training, monitors received specific orientation weekly in the content and use of materials for the forums of the week to follow.

During the life of the experiment, BVE monitors conducted more than

2200 radio forum meetings with an average attendance of 11.1 and 10.2 adults in the Oriente and Occidente, respectively (Table 4). Although the number of farmers at a meeting typically represented a relatively low percentage of total potential audience, intra-community diffusion appeared to be an important factor in spreading the information presented.

3. Technical agronomic assistance (agronomist)

Limited technical agronomic assistance to farmers was provided in only the most intensive communications treatment, RMA, which also included mass media (radio) and local interpersonal contact (monitor). A farm family to agronomist ratio of about 900:1 was projected in the original project design. In practice, however, it was somewhat lower as shown in Table 5.

Table 5

Numbers of communities and rural families in each Basic Village Education treatment area served by a BVE field agronomist (Treatment RMA only).

Area	No. of communities	Total no. of families	Percent of agronomist's time spent in area[1]	No. of families for fulltime equivalence
Oriente:				
Quezada	5	240	40	600
Yupiltepeque	4	250	40	625
Occidente:				
Momostenango	6	158	50	316

[1] Due to the limited size of RMA treatment areas, BVE field agronomists worked only parttime in each, and were assigned other Project activities for the remainder of their time.

The extension-type BVE field agronomist responsible for providing technical assistance to RMA farmers attended radio forums periodically with the monitors and accompanied them on farm visits. He involved the monitors in planning and conducting crop demonstrations, and generally reinforced them in their work. A major function of the field agronomist was to identify and/or diagnose agricultural problems of the farmers in the area.

The field agronomist also had a number of other functions that were essential to the success of the educational program, but that could not be identified so clearly by farmers in the area as direct assistance to them. He served as instructor in the intensive pre- and in-service training courses for monitors, and conducted the weekly monitor orientation sessions. He worked with monitors throughout the year to improve the quality of their

feedback information, and himself served as a major feedback agent. The field agronomist served as the Project's principal contact with other agricultural agencies and programs in the region, channeled local farm news to the BVE radio station, participated in development of the annual message calendar and, as time permitted, wrote texts for selected themes included in the book of technical contents discussed earlier in this chapter.

Crop demonstrations were still another responsibility of the BVE field agronomist. Such demonstrations were established annually in both regions to: 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 basic crops. In RMA areas, the field agronomist was responsible for planning and conducting demonstrations in collaboration with the monitor. For RM areas in which he could not work directly, the field agronomist trained the monitor to conduct simple demonstrations by himself. No demonstrations were carried out in the "radio only" or "monitor only" areas.

Table 6

Summary of crop demonstrations conducted by the Basic Village Education Project, Guatemala, 1974 - 1977.

Area	Treatment	Year	Number of locations	
			Single crop	Interplanted
Oriente:				
Quezada	RM	1974	5	4
		1975	2	2
		1976	0	2
	RMA	1974	9	5
		1975	4	4
		1976	0	3
Yupiltepeque	RM	1975	1	0
		1976	2	0
	RMA	1975	3	3
		1976	0	2
	Total for region		26	25
Occidente:				
Momostenango	RM	1976	0	0
		1977	4	0
	RMA	1976	8	0
		1977	10	0
	Total for region		24	0

The demonstrations were established on fields of farmer cooperators who performed all field operations in return for receiving the production from the plots. The field agronomist (monitor in RM) supervised work on the plot at all critical stages. In 1974, the Project supplied all necessary inputs — seed, fertilizer, insecticide, etc. They were donated by public and/or private organizations thereafter.

In addition to recording and publicizing production obtained from the crop demonstrations, the agronomist and/or monitor held periodic meetings with local farmers at the demonstration plot sites. More than 1000 farmers attended such field meetings in the Oriente during the 1974-1976 period. In the Occidente, approximately 325 farmers attended 54 field meetings during the 1976-1977 period.

Crop demonstration plot designs and associated agricultural practices were modified as the program progressed. Yields varied between locations and years, but in general supported the use of improved practices to increase production and profits from basic crops. As shown in Table 6, seventy-five crop demonstrations were conducted during the course of the BVE experiment (51 in the Oriente and 24 in the Occidente).

D. Formative Evaluation (Feedback)

The BVE educational program could be effective only to the extent it was sensitive and responsive to the constantly changing needs of its target audience. Quality of program content and delivery had to be measured in terms of relevance and acceptability as perceived by the audience. Therefore, the Project gave high priority to development and utilization of a dynamic information feedback system. The various formative or operational evaluation activities which comprised the BVE feedback system are summarized below.

1. Monitor and agronomist feedback reports

Several mechanisms were used to obtain information from the monitors weekly concerning their activities and what was happening in their areas. Simple written reports provided basic information such as attendance at radio forum meetings. That information was supplemented with commentaries recorded on cassette tapes by the monitors, recordings made of meeting discussions, and weekly oral reports to the BVE field agronomist. Through such means, information was obtained from the monitors about:

- radio forum meetings and attendance;
- questions and problems of local farmers;
- current interests and concerns of the people;
- acceptance and/or criticism of BVE educational programming;
- crop and climatic conditions.

Comprehensive weekly reports were also submitted by the field agronomists which encompassed:

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

By the middle of the week following their submission, both monitor and agronomist reports had been summarized and distributed to Project staff. Although BVE programs were mapped out on an annual basis, frequent adjustments and modifications in specific themes were made during the year in response to feedback reports from the field.

2. Consumer cassette pilot study

A study was conducted in four Oriente communities in mid-1974 to evaluate the effectiveness of pre-recorded messages delivered by a community volunteer to rural subsistence families, using a cassette tape recorder provided by the Project. The study was directed toward the entire rural family. The tapes, four of which were produced and used in the study, included messages on agriculture, health and nutrition, household hints, and entertaining fables from local folklore.

Results of the study were highly positive. During its one-week stay in the community, each taped program was played 80 to 90 times on the average. Credibility and relevance were high as indicated by listener action stimulated by the messages. Although unfamiliar with the tape recorders, villagers quickly learned to operate and care for them. All recorders were recovered in good condition at the end of the study.

3. Program materials development and testing

Although a major priority of the Project, early progress in field evaluation of new and innovative program materials was disappointing. The pretesting of selected programs with a small panel of farmers in a community just outside the Oriente experimental zone prior to initiation of regular programming in 1974 proved instructive, but could not be continued at that time due to personnel constraints. The problem was finally alleviated in late 1975 with the formation of a small program materials testing unit, which continued to function through 1976.

Although planned materials development and testing activities were interrupted at an early stage by the Guatemalan earthquake, the unit substantially achieved its purpose. Major outputs included:

- seven posters and sixteen flyers for distribution in the earthquake disaster zone;

- eight special posters and handouts for use in radio forum meetings;

- two poster/handout combinations for mass distribution;

- four picture booklets with simple texts (historietas) designed for multiple uses, one of which was also produced in a photographic (photonovel) version.

Field evaluations were made in both Oriente and Occidente of the above plus selected materials produced for regular program use. A few of the findings were:

- caricatures, although usually understood, were not liked by audiences in either region;

- silhouettes were rejected in both regions even though correctly interpreted;

- people in both regions liked the historietas and wanted more; they (including those who were illiterate) preferred to have some text accompany the pictures;

- abstract drawings and some visual devices were not understood, although arrows and circles were usually interpreted correctly;

- drawings should be large and simple, with minimum detail;

- accuracy and realism were important factors in the success of any drawing;

- more similarities than differences were found between people in the two regions in their comprehension and acceptance of materials under test.

Results obtained by the unit were fed back into the production stream and used to improve the quality of graphic materials used in regular BVE programming.

4. Letters received

Nearly 95,000 letters were received at the two BVE radio stations during the life of the experiment (Table 7). Although far from a represen-

Table 7

Summary of letters received by Basic Village Education radio stations, Guatemala, March 1974 - December 1977.

Region	Station call letters	Period covered	Letters received	
			Total	Avg. mo.
Oriente	TGME	4/74 - 12/76	70,072	2,121
Occidente	TGEB	9/75 - 12/77	24,336	975

tative sample of adult subsistence farmers, they provided an additional source of valuable feedback to the Project — general audience reaction to specific radio programs, delineation of the approximate geographic distribution of the listening audience, and local news and agricultural questions which could be included in live programming segments.

5. Radio listenership surveys

General radio audience surveys were conducted periodically to determine who listened to BVE radio, and what they thought about its programs. In order to obtain a cross section of local opinion and practice, those interviewed included men, women and older youth of varying backgrounds. (These surveys of overall audience should not be confused with the Project evaluation surveys of a carefully selected representative sample of subsistence farmers.)

In general terms, the people in both regions expressed greatest preference for the key agricultural programs. In the Occidente, agricultural programs in the Quiché language were most popular of all. Listeners in both regions often cited relevant or good agricultural advice as a major reason for tuning into BVE radio.

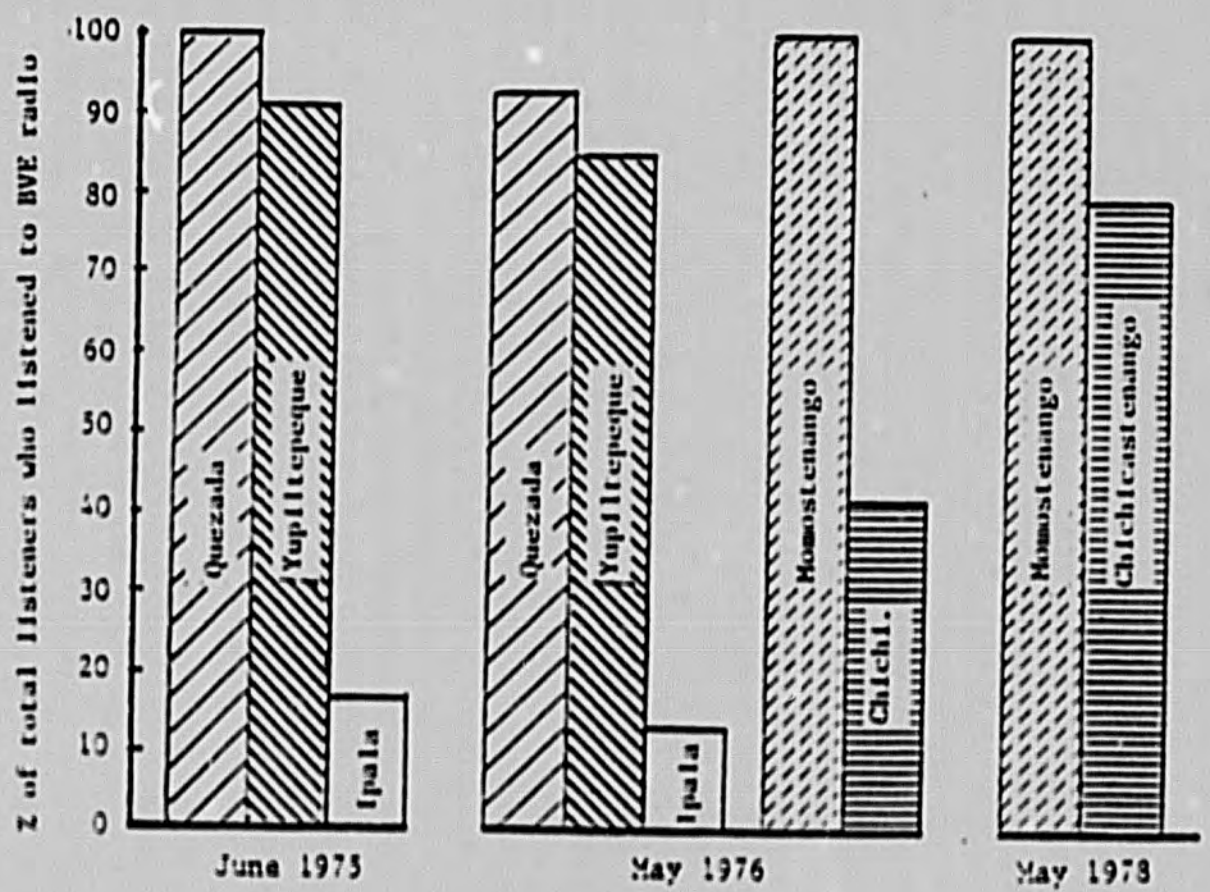


Figure 5

Level of listenership by area to Basic Village Education radio stations in the Oriente and Occidente regions of Guatemala as indicated by general audience surveys, 1975 - 1978.

Both radio stations attracted large listening audiences in the experimental areas throughout the period of educational programming as shown in Figure 5. These surveys also indicated a sizeable number of listeners in Chichicastenango where the Occidente control and "monitor only" areas were located. As had been the case in the Oriente control area, however, most Chichicastenango listeners reported hearing BVE radio only occasionally.

6. Signal penetration tests

Measurements of the strength of the signal from each of the two BVE stations were made periodically to determine boundaries and quality of reception. In general terms, penetration of the TGME signal in the Oriente followed design specifications closely. In the Occidente, there was some spillover of the radio signal into the control and "monitor only" areas.

Approximately three Oriente departments with a total rural population approaching 550,000 people were within the radius of TGME reception when broadcasting at 500 watts, according to estimates derived from a 1976 test. Later that same year, a test in the Occidente indicated that TGEB, then operating at 1000 watts, could be heard in three complete departments of the Occidente and in parts of several others having a total rural population estimated at about 900,000 people.

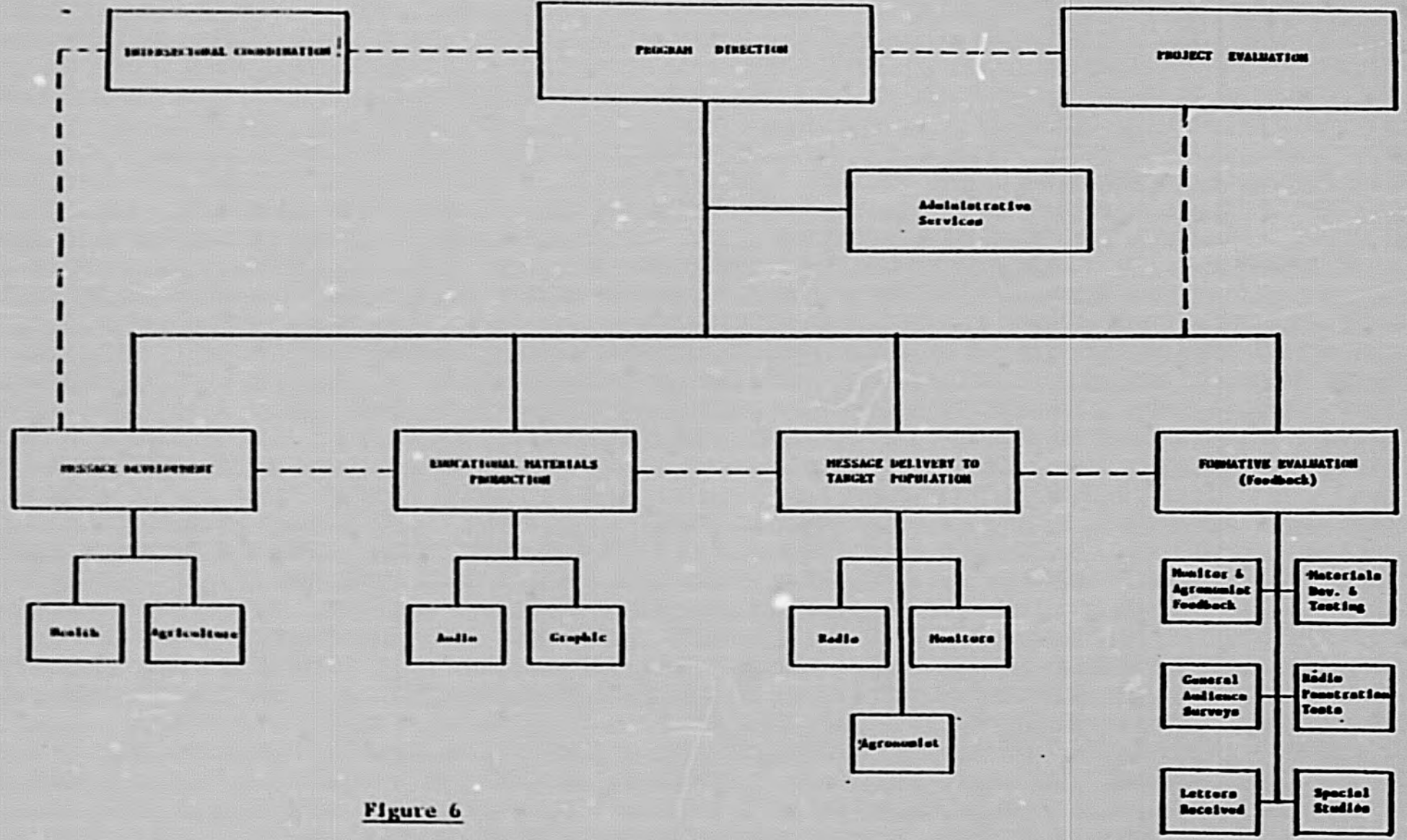


Figure 6

Functional organization of Basic Village Education Project.

CHAPTER IV

HUMAN RESOURCES

The Government of Guatemala, principally through the Ministry of Education, provided most of the operating personnel required for BVE's educational program. More than 50 Ministry of Education staff were in service in the Project during its period of full operation in both regions. The Ministries of Agriculture and Health provided three and one technicians, respectively, to BVE even though neither was a signatory to the agreement under which the Project functioned. Appendix A includes a list of all Government of Guatemala personnel assigned to BVE during the life of the experiment.

Until mid-1975 when some administrative channels were modified, the Project functioned under the Adult Literacy Directorate of the Ministry of Education. From that time onward, the Guatemalan BVE Project Director reported directly to the office of the Minister.

Technical program assistance and essentially all evaluation personnel were made available by the Academy for Educational Development in accordance with its contract with the Agency for International Development. Technical assistance was directed toward project planning, development and implementation of the programming system, message content development, improvement of educational materials, and formative and summative evaluation. The contractor backstopped the Project in Washington with a Project coordinator and support staff. Personnel provided to BVE by the contractor are shown in Appendix A.

The internal functional organization of BVE is illustrated in Figure 6. The contractor provided a program leader for the life of the Project who functioned as direct counterpart to the Guatemalan Project Director and, until 1977, as the contractor's senior representative in the country. A senior administrative officer was also provided during the first two years of field operations until most procurement had been completed and the Project was in full operation. He was replaced at that time with a local hire administrative assistant. The administrative services unit was staffed by the Ministry of Education with the exception of a bilingual secretary supplied by the contractor to handle special contract and foreign technician work.

The BVE educational program was subjected to an independent evaluation made by a University of South Florida team under terms of a subcontract with the Academy for Educational Development. As suggested by Figure 6, however, there was close communication and collaboration between field program staff and the evaluation team throughout the experiment. The contractor, under the field operations component of the Project, provided an evaluation field supervisor for each region to carry out the various surveys and other summative evaluation activities under the direction of the evaluation team. In addition, more than 40 temporary interviewers were engaged by the contractor at various times for the various field surveys conducted as part of the Project evaluation.

Message development was the primary responsibility of the BVE agricultural section (Section III A). The unit consisted basically of a section

coordinator and a technician for each region. All were Guatemalan agronomists provided by the contractor except for one agronomist assigned to the Project for two years by the Ministry of Agriculture. The contractor also provided a foreign agricultural advisor to the section for more than a year (1974-75).

Some limited programming was also developed in the health and nutrition area. Technical expertise was provided by a physician assigned to the Project on a halftime basis by the Ministry of Health.

With the exception of technical assistance and some temporary personnel early in the Project, the production unit was staffed completely by the Ministry of Education. A team of producers, scriptwriters, actors, announcers, and sound technicians was developed for audio production for each region. The Occidente team also included translators who doubled as writers and actors. In the graphic arts section, assignments were also divided by region, with an artist responsible for each. Reproduction of audio and graphic materials was a common operation serving both regions.

Two foreign technicians were provided by the contractor to assist in establishment of the production unit in late 1973 and early 1974. One functioned primarily in the area of radio programming, while the other was broader-based with particular expertise in cassette technology. The Plan called for replacing the latter with a graphic arts specialist in mid-1974. Due to recruiting problems, however, the position remained vacant until late 1975. When filled, primary emphasis was placed on development and testing of new materials as described below, although attention was also given to upgrading the quality of materials produced for the ongoing program.

The contractor provided a radio hardware engineer to supervise installation of the two BVE radio transmitters, one each in Oriente and Occidente. He then continued throughou the Project as a consultant available on call. Various radio maintenance technicians of Rockwell International were also engaged by the contractor for emergency situations. Operating and service personnel for the two stations were provided by the Ministry of Education with the exception of a few positions for Radio Quezada in the Oriente which were funded under the contract until mid-1975.

The Ministry of Education employed the fulltime monitors required for both regions, while the contract supplied one parttime monitor for the "monitor only" treatment in the Occidente. The two evaluation field supervisors cited above assisted with monitor training and supervision in their respective regions, as did the agricultural specialist.

The field agronomists, although organizationally under supervision by Project technical supervisors, in fact functioned more as a part of the agricultural section. The Oriente field agronomist position was funded under the contract through the first full year of programming. Thereafter, both Oriente and Occidente field agronomists were provided to BVE by the Ministry of Agriculture.

Although a discrete division of the educational program in functional terms, the activities encompassed under formative evaluation were handled in three principal ways. Feedback of various kinds, including letters received, was channeled through the normal lines of communications and super-

vision. Studies such as general audience surveys and radio penetration tests were planned and supervised by the contractor-supplied evaluation supervisors, utilizing appropriate members of the operating staff. Development and testing of new materials (especially graphics) were carried out by a special unit established for that purpose.

The materials development and testing unit (see Section III D3), funded wholly under the contract, functioned during the period October 1975 to December 1976. Local hire staff for the unit, not all of whom were in place during the entire period, included one artist, one evaluator, and two field testing agents (one fulltime and the other parttime). Supervision, guidance and major production of original art by the unit were provided by foreign technical assistance which included one senior artist for the entire period, a senior graphic arts specialist during the first half of 1976, and a senior A/V specialist during the second half of that year. The last-named was employed under a cooperative arrangement with the BRE Project (see Chapter XIV), and worked only parttime with this BVE unit.

The BVE Project was served well by adhering to the principle that operating staff should be provided by the host government. The resulting educational program was much better adapted to the Guatemalan culture and environment than could have been the case otherwise. Technical assistance was needed, however, to help in the conceptualization and development of systems for effective utilization of modern communications technology. In retrospect, the overall level and kinds of technical assistance utilized appear to have been reasonably well balanced with need, but some modifications in timing and mix could perhaps have strengthened the program further. For example, more emphasis on the graphic arts in late 1973 and early 1974, coupled with earlier installation of the materials development and testing unit would have been advantageous.

Development of graphic materials and integration of audio and graphic programming suffered from a lack of continuity in technical assistance as well as from changes in the position of production unit head. One long term (two to three years) senior audio/visual technician supplemented with short term specialists in audio and graphic arts would have added only marginally to total Project costs, but could have probably resulted in providing more effective assistance. Additional training funds to permit sending selected local staff for specific training would have also been helpful.

Although the Project evaluation was carried out efficiently and effectively, senior evaluation staff were headquartered at the University of South Florida and could be in Guatemala only periodically. Both field and evaluation staff felt the need to have a member of that team available fulltime in Guatemala to help interpret evaluation results more adequately as they may have been affected by factors external to the Project, and to interact with field staff regarding implications of results being obtained.

It would have been helpful to have an input during the planning phase from the economist responsible for an economic analysis of the Project. Also, the total input into such analyses should perhaps have been somewhat greater.

To summarize, technical assistance provided to the Project appears to have been reasonably adequate, but could have been strengthened by the types

Clockwise (from upper left):

Interviewer training
Monitor training
Scriptwriter training
Artist training
Weekly orientation

Plate 3

Staff training and development were given high priority throughout the life of the Basic Village Education Project.

of changes noted above.

A. Staff Development

Development of both technical and organizational capabilities required for a multi-faceted program such as BVE received major attention from the Project's inception until its completion. 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, specific job training with strong emphasis on the practical, linked with orientation into the Project as a whole. That 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 had moved into operation, new staff members were customarily assigned to work temporarily with an experienced member in a "learn by doing" situation before receiving their permanent assignments.

The linguistic and cultural characteristics of the Occidente Indian population imposed some additional demands on staff assigned to that phase of the program. The same media could be used successfully in both regions, but more was required for the Occidente programs than literal translations into Quiché of material prepared by a Spanish-speaking agronomist or scriptwriter. That material also had to be presented in a form that was culturally acceptable and understandable to people in the target communities. That task required translators, announcers, actors, etc., familiar with both the language and the culture of Momostenango. Likewise, the interviewers used in the baseline and other surveys had to be completely fluent in both Spanish and the Quiché of that area. Bilingual staff for both kinds of assignments were of Indian extraction and native to that part of Guatemala.

Progress achieved in staff development was indicated by the fact that, with the exception of summative and special materials testing activities, national staff were operating the BVE educational programming system virtually unassisted in the latter stages of the experiment. Such progress obviously had positive implications with respect to the potential replicability in other countries of BVE-type non-formal education programs.

CHAPTER V

INTERSECTORAL COORDINATION

The Basic Village Education Project developed and maintained close working relationships with several ministries and agencies, the foremost of which was the Ministry of Agriculture (see Chapters III and IV). Other key institutions in this regard included the Ministries of Health and Communications, and other divisions of the Ministry of Education.

A standing BVE-Agriculture coordination committee, established at the national level in mid-1973 and active throughout the experiment, proved to be a key element in achieving needed collaboration and coordination with that Ministry. Similar, although somewhat less formal, linkages were developed in the field between BVE and regional Agriculture staff. Such relationships were semi-institutionalized in May 1975 with the signing of a letter of understanding between BVE and Agriculture.

In early 1974, BVE solicited the collaboration of the Ministry of Health in developing radio programs related to health and nutrition. In response, Health not only provided technical information, but also assigned a parttime technical advisor to the Project as cited in the previous chapter.

Early coordination was required with the Ministry of Communications which has jurisdiction over regulation of radio communications in Guatemala. Through such effort, approval for installation of the BVE radio transmitters was obtained, and frequencies and call letters were assigned to the BVE stations.

The census constituted a major source of information used at the outset of the Project in selection of areas and the sample of farmers to be interviewed. The Directorate of Census and Statistics made unpublished data from the April 1973 census available to the Project for that purpose.

An AID-supported experimental program in elementary education, PEMEP, collaborated closely with BVE from the outset, principally in the Oriente. The transmitter and tower for TGME, the BVE Oriente radio station, were installed on the grounds of a PEMEP pilot school. Two PEMEP technicians were made available to assist in BVE's preparatory activities. Elementary schools in the Quezada Valley cooperated closely with BVE throughout the experiment. In 1974, the Project collaborated with PEMEP on an experimental program of primary school extension in that valley which utilized TGME for an "Escuela del Aire".

The BVE response to National Emergency Committee requests during the immediate postearthquake period in early 1976 is cited elsewhere (Chapter VII).

In addition to specific linkages such as those described above, senior Project staff served on numerous intersectoral commissions, committees, and workgroups.

CHAPTER VI

CROSS-CULTURAL CONSIDERATIONS

The BVE experiment was conducted in two contrasting cultural/agricultural environments as described in Part One. The same overall experimental design and communications media treatments were applied throughout. However, the manner of operation and the educational program had to be adapted to the culture and conditions peculiar to rural people in each of the two regions.

Although pointed out as appropriate elsewhere in this report, a brief highlighting of cross-cultural considerations is merited due to their critical importance to the success of the BVE (or any other) educational program. Some are well-recognized and straightforward. Others, although more obscure, were of equal or greater importance to achieving impact with BVE.

The language of the Ladino population in the Oriente is Spanish. Thus, while it was necessary to adjust for the style of speaking and colloquialisms of the region, the predominantly Ladino BVE staff had relatively few language problems in developing the educational program for the Oriente. In contrast, the predominant language of the indigenous population in the part of the Occidente region selected for the experiment is Quiché. None of the BVE agronomists or original technical production staff were Quiché-speakers. New staff, bilingual in Quiché and Spanish, had to be recruited and trained to prepare educational materials in that language. Technical content still had to be checked in Spanish before translation. Thus, it was necessary to surmount a language barrier within the Project as well as in the field with respect to the Occidente educational program.

The Occidente region represented a more difficult and complex environment in which to operate than the Oriente. As stated in the Project Implementation Plan (p. 4), "The Mayan communities are highly idiosyncratic. . . in terms of language, culture and custom; and only limited information is available concerning the modernization process in the region." Following the recommendation of a panel of anthropologists and sociologists, the Project arranged for a preliminary investigation of the region to be made under the leadership of an anthropologist having long experience in the Quiché-speaking area. Results of that study provided the basis for selection of experimental and control areas, and for the later development of a relevant and culturally acceptable educational program. In contrast, the Project was able to enter into the Oriente region directly to select areas, conduct studies and launch the educational program.

Several examples of contrasts between the two regions are described briefly below to illustrate the manner in which the Project had to adjust to local culture and conditions.

The Project was careful to obtain clearance at all levels of government before entering a region to conduct studies or to start educational programming. Thereafter, local authorities were kept informed about the progress of the Project. Once that had been done, Project staff entered Oriente communities freely and, with one or two exceptions, without difficulty. In the Occidente, however, it was necessary for Project staff other

than those native to the area to use local guides, translators and informants whenever they entered the experimental or control areas — whether it be to prepare for evaluation interviews, inspect crop demonstrations or observe Project field staff in action.

Although monitor selection criteria were essentially the same for both regions — except for the additional language requirement in the Occidente — selection procedures varied significantly. In the Oriente, names of qualified people were solicited from a wide range of local and regional governmental and non-governmental institutions. Those names went through a conventional screening process, culminating in personal interviews with those who appeared most promising, and final selection.

In the Occidente, the monitor positions were first discussed in preliminary meetings in Momostenango with the secretary to the Indian mayor's office, alcaldes auxiliares (assistant mayors) and respected Elders from the areas. Then, the alcaldes auxiliares and Elders were asked to consider the qualifications needed, and to prepare a list of candidates from their communities who, in their opinion, met the qualifications and were capable of performing the work required of a BVE monitor. Later, Project representatives met again with the same group to discuss the monitor treatment in detail and to receive the names of the candidates. After making preliminary selections from that list, the Project representatives visited the candidates personally in their respective communities, questioned other community members about their candidates, and stood ready to receive the names of other candidates. Final selections (with two alternates for each area) were named and approved that evening.

The key agricultural radio programs for each region were similar in format, and both contained radio novel segments with continuing characters. Those in the Oriente program included entire families with women and children playing prominent parts. In order to comply with local tradition and custom and gain acceptance in the Occidente, however, the principal characters were men -- the sowers.

The foregoing examples serve to illustrate that the indigenous communities of the Occidente, in addition to being more isolated physically than the Ladino communities of the Oriente, are more traditional in outlook and behavior, and tend to be less receptive initially to outsiders. To function effectively with the rural people of the Occidente, it is necessary to adhere closely to the lines of authority, both governmental and traditional. In other words, the people will accept people and/or programs from the outside only after they have been "legitimized" in accordance with local tradition. The process must be continuing as long as the program is in operation. Failure to adhere to these principles can result in complete rejection -- and that nearly occurred with BVE in one instance. If these principles are followed, however, the people are receptive and eager for assistance.

Rural communities in the Oriente tend to have a less rigid social structure, and to accept information and programs more readily. Problems of entry and initial acceptance are more easily surmounted. In both regions, however, continued impact depends on the relevance, sensitivity to local need, and soundness of the educational program in the experience of BVE.

CHAPTER VII

FACTORS AFFECTING PERFORMANCE

The BVE experiment was, in overall terms, implemented and carried out according to plan. A number of in-course adjustments were necessary, however, in response to unanticipated factors and forces beyond the control of Project staff.

The Project could, of course, neither generate new agricultural technology nor control such things as weather and prices. Yet, such factors had a direct bearing on BVE program content, farmer response, and interpretation of results With respect to technology, early indications that the agricultural information base was reasonably adequate proved to be overly optimistic. Consequently, the BVE input required to develop appropriate localized resource material was significantly greater than had been anticipated. Rainfall fluctuated widely during the years of the experiment. It was excellent in 1973, the Oriente baseline year, and deficient in varying degrees during subsequent years when the experiment was in progress.

The first year of BVE programming in the Oriente, 1974, was also the year of the energy crisis. Fertilizers were in short supply, and their prices skyrocketed. Although that situation had improved by 1976, it remained much less favorable than in 1973.

Access of small farmers to credit from official agencies was a problem in both regions, although most acute in the Occidente. Steps taken by the Ministry of Agriculture to increase its capacity to service small farmers' credit applications improved the situation significantly in the BVE areas. Nonetheless, credit availability continued to be a problem.

Seasonal migration was another rather serious factor, particularly in the Occidente where a large percentage of the farmers go to the coastal areas annually to work on large farms. Radio forum attendance decreased sharply and interviewing schedules were seriously disrupted during the peak migration months.

Ministry of Education budgetary support was at lower than anticipated levels early in the Project, due in part to timing of the Project Agreement in late 1973. The situation slowly improved, but received a setback of several months duration in early 1976 as the result of the earthquake. Contract costs were greater than anticipated due to such shortfalls, with the consequence that some planned materials development work and other activities had to be scaled down. Greater than anticipated contributions from the Ministries of Agriculture and Health only partially compensated for the Ministry of Education difficulties in this regard.

Educational programming, scheduled for initiation in the Oriente in January 1974, was delayed until late March due to delays in delivery to

Guatemala of the radio transmitter, tower and A/V equipment. As a result, the 1974 BVE educational program did not represent a complete agricultural year. Even so, valuable information and experience were gained during that year, and some impact was possible.

A more serious delay in educational programming startup — from January to September — was encountered in the Occidente in 1975 due to problems in radio transmitter site selection and equipment installation, and to Ministry of Education delays in appointment of staff required to operate the Occidente program. Implications for the experiment of that delay led to the decision for a one-year extension of experimental programming in that region.

In practice, it proved to be technically impossible to maintain a completely radio-free area for purposes of the Occidente phase of the experiment. The transmitter output required to assure adequate reception in all parts of the experimental area resulted in at least fair reception in the Chichicastenango control and "monitor only" areas; and a number of people in those areas reported listening occasionally to TGEB, Radio Momostenango Educativa. This factor, coupled with the growing reluctance of farmers in the Chichicastenango areas to submit to interviews without some visible benefit to themselves, and the pressures on the closely related BRE (see Chapter XIV) to reach people in the earthquake-affected zone, led to the decision to increase TGEB output. Power was accordingly increased to 1000 watts in late September 1976, and maintained at that level through the remainder of the experiment.

Quality of reception in Chichicastenango improved with the increase in transmitter output, and the general audience also increased somewhat according to listener surveys. According to those same surveys, however, most Chichicastenango listeners heard TGEB only occasionally. Thus, although there was definite contamination, it did not appear serious from the standpoint of the experiment. This conclusion has been substantiated by results of surveys of the target audience conducted by the Project evaluation team.

Technical problems with the two BVE radio transmission stations resulted in several temporary disruptions or delays. Because of a manufacturing defect in its transmitter, a scheduled power boost of TGME in the Oriente was delayed by two months at the beginning of 1975. Transmitter problems also caused two brief disruptions — in September 1975 and February 1976 — in TGEB programming in the Occidente. More seriously, a prolonged interruption of TGEB transmission (two months) was encountered in early 1977 when a routine overhaul of its diesel-electric system became more complex and time-consuming than expected. Although serious at the moment, none of these disruptions had identifiable long term effects on results of the BVE experiment in the judgment of Project field staff. They did, of course, have cost implications and short term program effects.

Both audio and graphic educational materials were utilized in the BVE program throughout the life of the experiment. Due to the pressures

of producing programs for radio transmission, greatest emphasis was placed initially on development of expertise and improved quality of audio materials. The intention was to upgrade graphic materials in similar fashion, beginning no later than the end of 1974. That effort was delayed, and of somewhat smaller scope than planned, however, for a number of reasons. Recruiting difficulties resulted in delay in replacing the A/V specialist who terminated in August 1974; and, the increased level of contractor costs required to compensate for less than expected Ministry of Education contributions left fewer resources available for use in development of new materials. After the work did get underway, it was disrupted by the earthquake as described elsewhere, and available resources were further reduced by failure of attempts made to achieve greater efficiencies of operation through temporarily combining the BVE and BRE audio/visual production units.

The above-cited problems notwithstanding, a materials development and testing unit was established in late 1975, which functioned through 1976. Completely funded under the contract, it included both Guatemalan staff and foreign technicians. Its accomplishments are described in Section III D3.

Guatemala suffered a devastating earthquake on February 4, 1976, which seriously affected the entire nation. Although the BVE areas were not within the widespread destruction zone, normal Project activities were suspended during the month-long emergency period immediately following the disaster. The direct BVE response to that emergency included:

- immediate linkup of the BVE radio stations into the national emergency broadcasting network, with suspension for 22 days of all regularly scheduled Project programming;

- diversion of all BVE production resources to the development of special programs and materials requested by the National Emergency Committee;

- a study, by BVE agronomists in conjunction with the Ministry of Agriculture, of potential effects of the earthquake on 1976 agricultural activity and production;

- several radio forum-type meetings for people in the affected areas;

- diversion of Project personnel and vehicles for emergency relief work in affected disaster areas;

- purchase of food, tents and other relief materials for affected Project personnel out of donations received from contractor staff both in Guatemala and the United States.

- production of posters and handouts, and several series of short radio announcements and programs in three languages;

From the standpoint of the experiment, the disaster occurred at a time when agricultural activities were at a low ebb. Consequences of the break in educational programming were held to a minimum through rescheduling and modification of previously planned programs. Development and testing of new materials received a serious setback, but later got back nearly on schedule; and strains on resources and staff prevented the scheduled incorporation of the consumer cassette (Section III D2) into the ongoing educational program.

PART THREE

BVE PROJECT EVALUATION

Interviewers received intensive training before going into field.

More than 1,500 different farmers were interviewed.

Completed questionnaires were checked in the field.

Questionnaires were later rechecked twice in the office.

Data were transferred to code sheets for computer analysis.

Plate 1

More than 15,000 individual interviews were conducted with Oriente and Occidente farmers to obtain data for the BUZ evaluation.

CHAPTER VIII

EVALUATION DESIGN AND METHOD OF ANALYSIS

The Basic Village Education Project (BVE) was designed to test the effectiveness of several different media combinations in producing changes in knowledge and behavior in a population of subsistence farmers. The longitudinal, cross-cultural experiment was initiated in 1973 and carried out in two diverse cultural and geographical regions of Guatemala. A detailed report of procedures and findings from eastern Guatemala (Spanish-speaking) and from western Guatemala (Quiche-speaking) was presented in previous reports. The present report deals with an overview of the evaluation process and findings, with emphasis on implications, particularly from the cross-cultural perspective.

A. Background

In 1973, in the early planning for the BVE Project, it was concluded that Guatemala provided an excellent setting in which to conduct this experiment. Several factors made the setting ideal for the development and implementation of the present Project. First, Guatemala had a large population of farmers working under conditions typical of a subsistence economy and thus provided a basis for generalization to other developing nations. Second, there was an interest in, and concern for, implementing this kind of research in Guatemala. For the purpose of the present report, a third factor was the most critical. In Guatemala, because of its geography and its cultural conditions, two quite different population groups - the Spanish-speaking Ladinos and the Quiche-speaking Mayans - could be included in a cross-cultural study within the country itself. This permitted the field operation team to experience and understand the difficulties in reaching two different cultural groups with the same kinds of message systems (treatments) and also allowed the evaluation group to provide a cross-cultural comparison of findings.

B. The Basic Evaluation Design

The Project was developed as a field research design, with designated experimental and control conditions replicated in two different geographical and cultural areas. Under all conditions of treatment and control a baseline survey was conducted before programming was begun. The programming was applied as an independent variable, and post-testing was done for the measurement of impact. During the process, sub-samples were selectively studied for immediate feedback to the program. The original design is shown in Figure 7.

	First Year		Second Year		Third Year	
	Treat	Test	Treat	Test	Treat	Test
Oriente	---	BLS	R	AS	R	AS
	---	BLS	RM	AS	RM	AS
	---	BLS	RMA	AS	RMA	AS
	---	BLS	--- (C)	AS	--- (C)	AS
Occidente	---	BLS	R	AS	R	AS
	---	BLS	RM	AS	RM	AS
	---	BLS	RMA	AS	RMA	AS
	---	BLS	--- (C)	AS	--- (C)	AS

--- no experimental programming
R radio alone
RM radio/monitor
RMA radio/monitor/agronomist
C control area
BLS baseline survey
AS annual survey

Figure 7. Original BVE design.

The treatment conditions (the independent variable) were described earlier in the field report and consisted of a radio(R) condition, a radio and monitor (RM) condition, a radio/monitor/agronomist (RMA) condition, and a monitor (M) alone condition without radio. A matched control (C) area which did not have access to the BVE programming was also included in each of the cultural areas.

C. Some Cross-Cultural Concerns

Shortly after initiation of the Project in Guatemala, it became clear that there would be differences in implementation in the two different geographical and cultural areas. Greater understanding of the culture and accessibility led to the earlier development and implementation of the Project in the Ladino areas of eastern Guatemala. The lack of understanding and knowledge of the Indian highlands area became immediately apparent. Relatively few field investigations dealing with the major issues basic to this study had been undertaken in the Occidente. Information was lacking on such critical areas as baseline data on the use of radio, likely response to various media combinations, or potential for change. Consultants familiar with research in Guatemala, particularly with the highlands, confirmed that while a great many individual cultural studies had been undertaken there was little information available that would be of direct use for the present Project.

Dr. Robert Carmack, of the State University of New York at Albany, New York, was asked to undertake a preliminary study in the Occidente to help initiate the Project. This delayed implementation in the highlands but provided information critical to the development and operation of the Project. An indepth field study led to the selection of Momostenango(Momos) and Chichicastenango(Chichi) as appropriate areas for investigation.

It is important to note that the Project plan was replicated in the areas of Occidente and Oriente and that the same questionnaire was utilized. The same experimental design and the same treatments were imposed, using identical media systems. Later in this report, some of the between-culture differences found and some of the possibilities for modification of the design will be discussed.

D. The Final Design

In addition to the implementing delay in Occidente, other aspects of the original design of the Project changed over the five-year time span. The reasons for these changes have been documented in other reports and include pressure for services to control areas, technical problems in setting up a broadcasting station, and a decision to broaden the treatment conditions. Figure 8 shows the final design in Oriente and Occidente. The initial pro-

	1973		1974		1975		1976		1977	
	Treat	Test	Treat	Test	Treat	Test	Treat	Test	Treat	Test
ORIENTE										
Quesada	—	BLS BLS BLS	R RM RMA	AS AS AS	R RM RMA	AS AS AS	R RM RMA	AS AS AS	—	—
Tupiltepeque	—	BLS	—	BLS BLS BLS	R RM RMA	AS AS AS	R RM RMA	AS AS AS	—	—
Ipala	—	—	—	BLS	M	AS	M	AS	—	—
Ipala Control	—	—	—	BLS	—	AS	—	AS	—	—
OCCIDENTE										
Momostenango	—	—	—	BLS BLS BLS	—	BLS BLS BLS	R RM RMA	AS AS AS	R RM RMA	AS AS AS
Chichicastenango	—	—	—	BLS	—	BLS	M	AS	M	AS
Chichicastenango Control	—	—	—	BLS	—	BLS	—	AS	—	AS

— no experimental programming or measurement
R radio alone
RM radio plus monitor
RMA radio, monitor and agronomist
M monitor alone

BLS Baseline Survey (to pre-treatment measurement)
AS Annual Survey (to post-treatment measurements)

Figure 8. Final BVE Evaluation Design

gramming in the Project began in Quezada; then a year later programming was begun in the Yupiltepeque(Yupi) and Ipala areas of Oriente. Simultaneously, the baseline survey in the Occidente areas was conducted. Because of the delays mentioned earlier, however, programming in Occidente did not begin until 1976, after a second baseline survey had been conducted. The Yupi and Ipala sub-areas of Oriente and the Occidente sub-areas received two complete years of educational programming while the Quezada treatment areas received three years.

E. Selection of Experimental Areas

The general geographic and cultural areas selected for the Project met the criteria for a subsistence peasant population typical of that found in perhaps two-thirds of the world. As indicated before, two diverse areas were selected in the Occidente and Oriente to provide a measure of impact in two different cultural and geographical settings. After these areas were selected, through the use of available census and village data, a random sampling of subjects was drawn. All subjects in the study were farmers, with 12 manzanas or less total available land, similar agricultural practices, and little formal education. The basic criteria for selection of areas are listed below:

Criteria for Selection of Villages

1. Small farms 0.5 to 12 manzanas
2. Similar agricultural practices
3. Illiteracy (50% or more)
4. Communication 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 from a 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 villages 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 the final selection neared all of the political leaders and those representing the agricultural and educational agencies were involved so that full understanding of and cooperation with the Project would be possible.

F. The Questionnaire

Three types of evaluation instruments were utilized: annual surveys, time sample surveys, and crop production surveys. The annual survey is a 261-item questionnaire developed after thorough review of Project goals and extensive field testing. It includes items on personal information, housing, health, nutrition, information sources, mobility, crop production, land holdings, planting and cropping systems, fertilizer use, control of weeds, insect and plant diseases, crop storage and marketing technical systems, and credit. The annual survey was administered first as a baseline survey and then at the end of each program year as the post-treatment survey.

The time sample surveys were administered to a randomly drawn sample of 25 farmers in each of the experimental and control areas. The surveys were conducted approximately six times during the programming year to determine the farmers' immediate receptiveness to selected agricultural practices being presented through the treatment conditions. Measurements were made to determine the level of knowledge, attitude, and practice in relation to the programming. Particular attention was given to reported sources of new information to see whether they were learning through the BVE system. The interviews were conducted in a relaxed home atmosphere.

The crop-survey interviews were conducted at the end of the year after harvest as a way of studying final production and yield figures and of providing a comparison with fall crop estimates. A sample of the farmers was studied as in the time sample procedure.

G. Selection and Training of Interviewers

Lists were drawn of applicants for interviewers, and selection was based on personalities, experience with rural populations, and response to training. Intensive training included group building exercises, role-playing, and field testing of the actual interview instrument. Throughout the Project the same interviewers were used wherever possible in order to maintain earlier established rapport.

Field supervision was provided after training and during the conduct of the baseline and annual surveys with reviews of all questionnaires. Any problems were discussed with the supervisor, and in-field corrections were made when necessary. On items where there was some question of appropriate coding, the group would role-play and then check each other to establish reliability.

Over 11,000 annual surveys were carried out in the field and the breakdown is shown in Table 8. In addition, over 3600 time sample interviews and 650 crop survey interviews were conducted.

Table 8. Number of Farmers Interviewed in the BVE Annual Surveys*

	1973	1974	1975	1976	1977
Oriente					
Quezada	357	340	325	307	0
Yupiltepeque	132	372	346	321	0
Ipala	0	240	208	196	0
Oriente Total	489	952	879	824	0
Occidente					
Momostenango	0	400	364	355	348
Chichicastenango	0	208	206	198	195
Occidente Total	0	608	570	553	543
Total Sample Size	489	1560	1449	1377	543

*Since measurement of behavior change requires both an initial and an end-point measure for each farmer, only those cases with data from each survey are used in the change analysis. The final sample size in Oriente, for analysis purposes, is 820 and in Occidente is 543.

H. Data Processing

The interviews were conducted in the field, cross-checked on a daily basis, and then transferred to layout sheets, which were sent to Tampa for analysis. Before being sent out, the layout sheets were cross-checked for accuracy against the initial questionnaire. The data were keypunched from layout sheets to a temporary storage medium so that final checks could be made. After all apparent errors were corrected the data was transferred to a catalogued tape in the Central Florida Regional Data Center tape library.

I. The Methodology of Analysis

In order to reach the stated Project objective of determining effectiveness of different mixes of communication media in influencing change in agricultural practices and production among the Ladinos and Indians of rural Guatemala, measurements were made of:

1. overall BVE program impact;
2. differential communication treatment effectiveness;
3. utilization of different information sources;
4. impact on knowledge, attitudes, and practices;
5. different cultural and geographic variables in relation to program impact;
6. background characteristics and their relationship to program effectiveness.

The following general hypotheses concerning the outcomes of these measures have guided the analysis:

Hypothesis 1. The Basic Village Education Program (BVE) will have a positive effect on change toward more modern behavior over time. More specifically, each of the BVE treatment areas will experience more change in behavior than the control area.

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 proportional 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 hypothesized 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 represents an incorporation of the above two conditions into a single treatment saturation level. Consequently, it is hypothesized that this treatment will show significant increases in change over the control and over both the monitor alone and radio alone conditions.

4. Radio/Monitor/Agronomist - 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.

While the above are the main formal hypotheses which guided the design and analyses of the BVE experiment, two other informal hypotheses have also guided the research:

Hypothesis 3. The same general order of treatment effectiveness is hypothesized for both cultures: however, the magnitude of the differences between the mass/personal media combinations (i.e. RMA and RM) and the mass media alone is expected to be greater in the more traditional Occidente area.

Hypothesis 4. Greater positive behavior change is expected in the Oriente region because of its prior exposure to educational programs.

1. The primary measure of change: the 13-item practice index

In order to test the differential impact of the various BVE treatment conditions, a comprehensive measure of the amount of "change" occurring during the BVE program period was needed. Since the content of the educational program was primarily agricultural, it was necessary to construct an index which would reflect the farmer's general "modernity" of agricultural practice and would be capable of distinguishing between farmers using less desirable methods of agriculture and those using the technologically more advanced methods recommended by the BVE program.

In 1974 work began on the construction of the total practice index. The goal was to develop a measure with two basic characteristics: 1) the index needed to be generally representative of the farmer's level of agricultural "modernity" so that changes in the index score would reflect changes in the farmer's overall agricultural behavior and not merely changes on the practices included in the index; and 2) the index needed to include practices receiving a good deal of attention in the BVE programming so that positive changes would reflect program impact. In other words, the index needed to be at once a valid estimate of the farmer's general level of agricultural technology and a valid measure of his responsiveness to BVE programming. To this end, a panel of field agronomists was asked to select from among the many agricultural items in the BVE instruments those which would best reflect the individual farmer's modernity of agriculture practice. Program personnel were then consulted to be sure that selected items were those receiving the most attention in the BVE educational programming. The same panel of judges ranked possible responses to each item in order of level of agricultural practice - ranging from the most traditional methods to application of modern technology.

Once chosen, the items were checked for sufficient variability in farmers' responses and were subjected to simple tests for internal consistency. It should be noted, however, that an item's inclusion in the index was decided on a prior grounds - not on the basis of statistical tests. Had any of the selected items proved to be inconsistent with the total index score the field staff would have been consulted again before the item was eliminated from the index. Confidence in the validity of the index, therefore stems mainly from the method of its construction; however, statistical evidence of internal consistency and validity, while not the main basis of selection, does exist and has strengthened confidence that the index does meet the criteria listed above.

The initial process resulted in the selection of 18 questionnaire items. Since that time, several revisions have been made - both in the items used and the method of calculating the total index score. With each revision the same procedure of consultation with the field and program staff was followed.

The final index (utilized in the analyses presented in this and the Final Occidente Report) consists of 32 different agricultural practices which have

been aggregated into 13 items. Each practice represents a separate programming package with specific content that was introduced to farmers in each of the different treatment areas. Table 9 describes the 13 practice items, and Appendix D may be consulted for the scoring procedure used for each individual questionnaire item included in the index. The reader familiar with the Oriente Region Report will note that while the 13 items used for the Oriente analyses remain, several of the items are calculated differently. These revisions were necessitated by the different cropping practices in the two cultures and were made prior to the analyses presented in the Occidente Final Report.

Figure 9 shows the distribution of farmers' scores on the total practice index prior to the start of BVE programming. As can be seen from the figure, the Oriente distribution is generally lower than the Occidente, but is also less peaked and more highly skewed. The average pre-treatment score for Oriente is 24.6 on the 65 point scale while that for Occidente is 28.8.

In summary, the 13-item practice scale was developed to provide an overall measurement of responsiveness to the programming that was directed towards specific agricultural practices. By including 32 different and individual items of practice, the scale is comprehensive and clearly targeted to those practices related to modernity or change and also to those practices that were highlighted in the programming activities in the different treatment conditions.

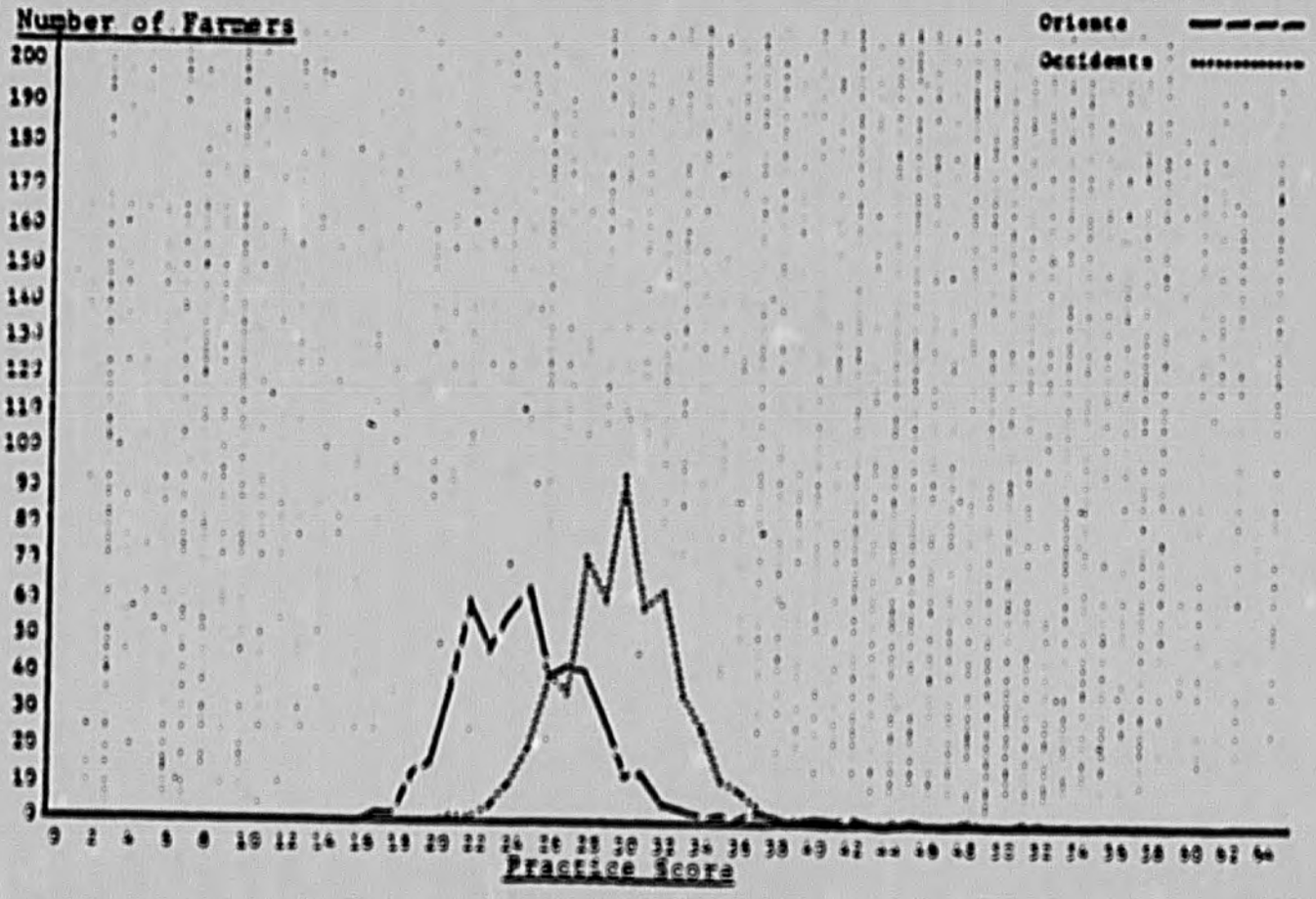


Figure 9. Comparison of pre-BVE practice scores in Oriente and Occidente.

Table 9. List of items comprising the practice level index.*

Item #	Variable #(s)	
1	15	How did you prepare your land for your 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 did 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	114-121	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	122-129	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	Did you destroy crop residues after the last crop of the year?
12	151-153,156	Where did you store (corn/beans/sorghum/horsebeans) 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?

*The items listed here are identical to those used for the analysis reported in the Oriente Final Report with one exception. Horsebeans, a fairly common Occidente crop, were added to the composite items 6, 8 and 12 in order to compensate for the fact that sorghum is not grown in the Occidente. The practices included in the practice index were chosen on the basis of program emphasis and expected change. Inclusion of a given practice was, therefore, decided on purely a prior grounds and not on the grounds of empirical relationships (i.e., item analysis or other empirical procedures were not used to eliminate practices which turned out to be negatively related to the index or other component items).

2. Methods of analysis

The main method of analysis used to test for differential treatment effects and for cultural variations in amount of change in agricultural practice was an analysis of variance in which the farmers "change score" (i.e., the difference between his pre-treatment total practice score and his score after the final year of experimental programming) was the dependent variable; treatment condition and culture were the independent variables: and pre-BVE practice score was a covariate. By such means the effects of treatment and culture on change are assessed independently of each other and of the differences in between-treatment and between-culture practice levels which existed prior to BVE programming.

Controlling for effect of initial practice score on amount of change became necessary when the preliminary Occidente analysis revealed inequities in the treatment conditions with respect to starting point and also a significant and robust negative correlation between initial BVE score and amount of change. Change scores were therefore adjusted for starting point by use of the BVE practice score as a covariate in the analysis of the Occidente data. The Oriente data has been reanalyzed in this manner, and the results for both cultures presented in this report are based on these adjusted change scores. For the main analysis of the effects of culture and treatment on change, scores are adjusted for the total sample differences in starting point so that the cross-cultural comparisons of change scores are not contaminated by baseline differences.

In order to answer the question concerning the differences in the effect of the various treatments in the two cultures (see hypothesis 4) subsequent analysis were made within each culture. These subsequent analyses included treatment as the only dependent variable. Paired comparisons of each specific treatment to every other within the culture were then made, using t-tests. For these within-treatment subsequent tests, the independent variable was adjusted for its relationship to starting point within the culture in question.

While the above main analysis and subsequent tests form the backbone of the method used to access BVE effectiveness, many supplementary techniques have also been used for elaboration. Findings from some of these analyses will be included in this report and the techniques will be briefly described along with the findings where relevant.

In summary, the major components of the BVE evaluation design are as follows:

1. Two different cultural and geographic settings, the Oriente and the Occidente;
2. Five communication treatment conditions, as the major independent variables
   --a radio condition

--a radio/monitor condition;
--a radio/monitor/agronomist condition;
--a monitor alone condition;
--a control condition;

3. The measurement of change in agricultural practice as the major dependent variable reflecting impact of the different communication treatments;
4. An examination of background characteristics, reception of new knowledge, and change in attitudes as a means of elaborating on the behavior change analysis.

J. The Focus of the Current Report

The interim findings of the BVE Project have been sent to appropriate agencies and the Guatemalan program office in the form of computer printouts, 19 working papers, over 100 special topic evaluation reports, four interim reports, and a number of presentations and professional papers.

Detailed descriptions of the Oriente and the Occidente findings were presented in two separate reports. The current report contains the first cross-cultural comparison of the findings from the two areas.

For the purpose of this report a specific portion of the BVE design has been utilized (See Figure 10). As mentioned previously, the programming in

1974		1975		1976		1977	
Totonicapan (N = 320)							
R	Baseline Survey	BVE Programming	Annual Survey	BVE Programming	Annual Survey	BVE Programming Continues - No University of South Florida evaluation	
RM	Baseline Survey	BVE Programming	Annual Survey	BVE Programming	Annual Survey		
RMA	Baseline Survey	BVE Programming **(6 Time Samples)	Annual Survey	BVE Programming (6 Time Samples)	Annual Survey		
Izala (N = 196)							
M	Baseline Survey	Monitor	Annual Survey	Monitor	Annual Survey	BVE Programming Continues - No USF evaluation	
C	Baseline Survey	No Programming (6 Time Samples)	Annual Survey	No Programming (6 Time Samples)	Annual Survey		
Momostenango (N = 368)							
R	Baseline Survey I	No Programming	Baseline Survey II*	BVE Programming	Annual Survey	BVE Programming	Annual Survey
RM	Baseline Survey I	No Programming	Baseline Survey II*	BVE Programming	Annual Survey	BVE Programming	Annual Survey
RMA	Baseline Survey I	No Programming	Baseline Survey II*	BVE Programming (6 Time Samples)	Annual Survey	BVE Programming (6 Time Samples)	Annual Survey
Chichicastenango (N = 173)							
M	Baseline Survey I	No Programming	Baseline Survey II*	Monitor	Annual Survey	Monitor	Annual Survey
C	Baseline Survey I	No Programming	Baseline Survey II*	No Programming (6 Time Samples)	Annual Survey	No Programming (6 Time Samples)	Annual Survey

*Uses as baseline survey for cross-cultural analysis.
**A series of six time samples was conducted during each year of programming.

Figure 10. Revised Design for Cross Cultural Analysis.

the Quezada region began a year earlier than that in the Yupi and Ipala areas. The baseline survey (or pre-treatment test) in Quezada was revised extensively prior to its administration in the other areas of Oriente and in Occidente. For this reason comparable data from the actual Quezada baseline survey is not available, and the 1974 survey does not provide accurate baseline data since it followed a partial year of BVE programming. The Yupi area provided two years of clean programming and evaluation without the potential contamination by some of the trial and error at the start of programming in Quezada. For this reason, and because they are most comparable in terms of duration, the Yupi area of Oriente and the Occidente area are focussed on for cross-cultural comparisons.

In this report, therefore, Yupi and Ipala will be used as the Oriente sample for all comparisons with Occidente, and references to Quezada will only be made to modify or elaborate on the Oriente findings. For the remainder of this report, unless specific mention is made of Quezada, all references to Oriente will be to Yupi and Ipala alone.

The chapters that follow contain the findings and implications of the analyses described above. Chapter IX includes the cross-cultural comparison of evaluation findings from the two areas and a reanalysis and reinterpretation of some of the previous findings in the light of the cross-cultural comparisons. The final chapter will be devoted to an extensive summary and discussion of implications of the Project outcomes.

CHAPTER IX

FINDINGS: DIFFERENTIAL TREATMENT EFFECTIVENESS IN TWO CULTURES

This chapter focuses on the comparative effects of the different RVE communication treatments in the cultural and geographic areas of Oriente and Occidente. In order to fully understand the cross-cultural differences it is first necessary to have a clear grasp of the similarities and differences in the social, economic, attitudinal and behavioral characteristics of the various sub-areas included in the RVE Project. The best indicator of program impact is the change registered in the level of agricultural practice. In addition, a more complete picture of Project effectiveness can be obtained by examining other factors such as change in attitudes toward agricultural practices, and the acceptance of RVE media as sources of new agricultural information.

The chapter is divided into three major sections. The first describes in detail the baseline differences among the different cultural and geographic areas in terms of background characteristics and agricultural practices. The second section presents findings concerning the impact of the various RVE treatments on: 1) change in agricultural behavior (by means of the total practice index); 2) perception of risk in several agricultural practices; and 3) use of various media as sources of new agricultural information. In the final section, farmers who made relatively large changes in their agricultural behavior are compared to those who did not in terms of a number of standard background characteristics.

The findings presented here are the result of five years of data analysis. A few of the statistical tables have been included in this presentation, but the main points are summarized in the narrative. For the reader interested in the technical aspects of data analysis, additional tables have been included in Appendix D and supplementary evaluation reports are available.

A. A Look at Two Cultures - Baseline Similarities and Differences

The existence and availability of two different geographic and cultural settings in this Project provided the possibility of a cross-cultural analysis of findings. It was assumed that there would be both differences and similarities between the Spanish-speaking Ladinos and the Quiche-speaking Indian populations. In this section some of these assumptions are critically reviewed on the basis of findings from the baseline studies. It is important to know as much as possible concerning the usual behavior of these two groups in order to understand the implications for change and to further assist in interpretation of the data obtained in this study.

The findings reported in this section are based primarily on the results of a discriminant analysis which identifies a combination of characteristics that maximally distinguishes between farmers in the two cultural areas (see Tables 19 and 20, Appendix D).

Two separate analyses were performed. The first distinguishes between the two cultures on the basis of background characteristics (including total practice score). The second distinguishes between the two areas in terms of agricultural practices--specifically the 13 items included in the index. For both analyses, data are drawn from the baseline survey in each area.[1] For the purpose of these analyses, all non-continuous variables (i.e. those for which responses fall into discrete categories - such as "thatch," "tile," and "metal" for type of roof) were dichotomized either into categories falling roughly above and below the median response for the entire sample or, where appropriate, into conceptually meaning groups (i.e. literate and illiterate). As mentioned previously, major cross-cultural comparisons are made on the basis of the Yupi and Ipala vs. the Momos and Chichi sub-areas.

In the first part of this section a narrative summary of the univariate differences between the two cultures with respect to 1) economic variables; 2) modern attitude variables; 3) educational variables; and 4) other background characteristics is presented. This is followed by a description of the best package of discriminating characteristics. In the second part of the section, the univariate differences between cultures on each of the 13 practice items are discussed along with a discussion of the package of items on which the cultures differed most prior to BVE programming.

1. General life-style characteristics

a. Economic indicator variables: agriculture.

i. Land size: The farmers in Oriente have larger farms, with about 3.14 mz. of land available to them for planting as compared to 1.67 mz. available to the farmer in the Occidente. The Ladino farmer also has a greater number of parcels of land.

ii. Land tenure arrangements: There is more land ownership in Occidente. There is more land rented in Oriente. Land tenure arrangement clearly distinguishes between the two groups since the Ladino farmer owns about half his land compared to almost 100% ownership found in the Indian highlands. Rental of land is frequently reported in the Oriente but almost never in the Occidente.

iii. Animal ownership: There are more animals on the farms in Occidente On the average both groups own one or more animals on their farms, but in the highlands a significantly greater number of animals is owned.

iv. Total revenue from corn and bean crop: There is greater crop revenue in Oriente. Total revenue is obviously related to availability of land. With this in mind we note that the total revenue of the Ladino farmer is calculated at $378 per year compared to the $158 found in the Occidente. Production of corn appears to be about the same for both groups, but bean production is sharply lower in the Occidente.

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[1] Family literacy was not included on the baseline questionnaire. This variable is therefore drawn from the end-point data. Since reported individual literacy has changed very little during the three year period of BVE programming, the end-point data is assumed to be fairly representative of the baseline level of family literacy in the sample.

b. Economic indicator variables: level of living.

i. House type: There is more ownership and better quality of housing in Occidente. The Occidente farmer has better housing, determined by roof and walls, than the Ladino farmer. Occidente farmers are more likely to have a tile or metal roof and to have adobe, wood or brick walls. While both groups generally own their own houses, home ownership is significantly higher in the Occidente.

ii. Lighting, water and toilet facilities: Cooking and lighting facilities are better in Oriente. Water and toilet facilities are better in Occidente. In the Occidente, the farmer is somewhat more likely to use wood or candles for cooking and lighting, but has more modern water supplies and are slightly but significantly more likely to have toilet facilities.

iii. Radio ownership: Radio listenership is higher in Oriente. About half the farmers (49%) in the Oriente report having a radio, while slightly fewer (44%) in Occidente report radio ownership. A larger difference is noted, however, in radio listenership, with Oriente farmers reporting about 81% listenership as compared to 48% in the Occidente.

iv. Diet: Different diet patterns clearly emerge in the two cultures. In the Occidente a significantly greater number report inclusion in the weekly diet of bread, lard, plantains, and rice, while an even greater proportion include vegetables and meat. In the Ladino areas more cheese is eaten, and they are more likely to include milk in their weekly diet. In terms of dietary supplements, in the highlands incaparina is used by considerably more people.

2. Modern attitude variables

a. Risk perception. Since many of the agricultural practices that are discussed later are related to adoption of new practices, some general notion of the level of risk perceived by the subjects seems useful. A number of questions were included which deal with general questions of risk in areas such as use of new types of seed, insecticide, fertilizer, herbicide, and fungicide.

The farmers in the Occidente see greater risk in the use of new seed, insecticide, herbicide and fungicide They report about the same level of risk for fertilizer as that found in the Ladino area. This risk perception clearly would need to be accounted for in new programming and in understanding potential barriers to the adoption process.

The farmers in the Occidente see greater risk in the use of new seed, insecticide, herbicide and fungicide. They report about the same level of risk for fertilizer as that found in the Ladino area. This risk perception clearly would need to be accounted for in new programming and in understanding potential barriers to the adoption process.

b. Attitude toward money. Both groups perceive money as highly important with slightly more emphasis placed on money by the Occidente farmer. An interesting difference between the two cultures emerges in relation to the relative importance of money over friends. In the Oriente about 20% feel that money is more important than friends as opposed to 68% in the Occidente.

c. Educational aspirations. While a significant difference is found between the two cultures in terms of aspirations for children's education, with the Oriente farmers desiring slightly more education, both groups are interested in their children obtaining over four years of schooling. In the Oriente they are much more likely to perceive the financial gain from education than in the Occidente.

3. Educational variables

a. Formal schooling. The farmers in Oriente have completed slightly more years of school. The Ladino farmer reports about .65 years of formal schooling as compared to .45 in the highlands.

b. Literacy. There is no significant difference between the two groups in terms of literacy. About 35% of the farmers in Oriente, and 30% in the Occidente, report being literate.

c. Family literacy. Farmers in the Oriente report having more literate family members than do Occidente farmers. The number of children reported is about the same in the two cultures. Farmers in each area report having about 3.5 children. In the Oriente, however, 1.77 members are reported as literate compared to .75 in the Occidente, a highly significant difference in level of family literacy.

4. Other background characteristics

a. Age. There is no significant difference in age in the two groups with a mean age of about 40 in both groups.

b. Mobility. There are more visits to local towns in Occidente; there are more visits to larger cities in Oriente. Some difference in frequency of visits to the nearest municipality was found with Occidente farmers reporting slightly, but significantly, higher number of visits; however, in the Occidente they report fewer visits to the department capital or to Guatemala City.

c. Other work. Farmers in the Occidente are more likely to be found in some kind of skilled work--as teachers, merchants, automobile drivers--than in the Oriente.

d. Chances for advancement as a farmer. Farmers in the Oriente are more optimistic about advancement as a farmer than in the Occidente. But the figures are not that disparate in that 93% of the farmers think one can advance as a farmer in the Oriente as compared to only 85% in the Occidente.

e. Group membership. A small percentage (about 11% in the Oriente and 7% in the Occidente) of the farmers report belonging to any kind of organized group. While this difference is significant, the overall level is quite low for both groups.

f. Attitude towards seeking agricultural advice. In response to a general question about agriculture and information it appears that the Oriente farmer is much more likely to seek advice on agricultural matters

as compared to the Occidente farmer. Both groups feel that meeting with friends and neighbors about agricultural matters is important, but a much higher percentage of Oriente farmers report this activity.

5. Agricultural practices

In the previous paragraphs of this chapter, an overview was presented, highlighting some of the major background similarities and differences found between the two cultural groups in the experiment. In looking at the background variables a picture of cultural differences clearly emerges with some statistical basis for evaluating these differences. The next step in this comparison focuses on the farmers in the Oriente and Occidente in terms of the major agricultural practices and their differences and similarities. The remarks that follow are based on Table 20 in Appendix D. These individual practices are also discussed later as part of the 13-item practice index which measures cultural differences as well as treatment effectiveness. At this point, however, looking at the level of individual practices in terms of background characteristics and reflecting upon points of needed emphasis in programming for the two different target populations is important.

The individual practice items for comparison are as follows:

a. Land preparation method. Plowing is more common in Oriente. In both the Oriente and Occidente (based on the mean score obtained), cleaning fields with machete and hoe is the usual way of preparing land. The Oriente farmers, however, achieve significantly higher scores on this practice indicating that plowing is more commonly practiced in Oriente than in Occidente.

b. Type of seed. While farmers in both cultures tend to use native seed, better seed is used in Occidente, and the farmers there have higher mean scores on the seed type practice. This suggests that Occidente farmers are using selected native seeds or improved or hybrid seed more often than are the Oriente farmers.

c. Planting in association. A better planting combination is used in Occidente. A significant difference is found on this item with the farmers in the Occidente reporting planting and association at a much higher level than farmers in the Oriente. Since the average for Occidente farmers is already above four on a scale of five, little improvement can be expected in this item.

d. The use of insecticides to control insects. No significant difference is found between the two areas. Both are operating at a relatively low level which is somewhere between "don't know what insecticides are," and use of one insecticide. There is clearly room in both cultures, for programming impact in this area.

e. The type of fertilizer used at seeding. Occidente farmers use a better type of fertilizer at seeding. A significant difference was found between the two groups with the Occidente farmers functioning at a higher level. Farmers in both cultures are at relatively low practice levels so improvement is possible.

f. The amount of fertilizer at seeding. A very low level of practice by both groups is found, with no significant between-group differences. To the extent that the amount of fertilizer is critical in farm practice, this should be a very important target for the programming.

g. Type of fertilizer at flowering. Occidente farmers use a better type of fertilizer at flowering. A significant difference between the two areas, in favor of a considerably higher level of practice in the Occidente, is reported.

h. The amount of fertilizer at flowering. Occidente farmers use more fertilizer at flowering. A significant difference is found in favor of Occidente. On all of the fertilizer items except for amount at seeding, Occidente farmers appear to be more sohpisticated or more modern in their practice.

i. Herbicide use. Oriente farmers use more herbicides. In the use of herbicides for weed control a significant difference was found with a somewhat higher level of practice found in the Oriente.

j. Fungicide use. Similarly low levels of practice were found in both cultural areas.

k. Destruction of crop residue. Occidente farmers destroy crop residues more often. A significant difference was found, with a much higher practice level in the Occidente than in the Oriente. This suggests that for the Occidente this item might not be a very effective target for programming since they are already functioning at a high level.

l. The method of crop storage. Oriente farmers use better methods of crop storage. Oriente is close to the top score and Occidente is at a very low level with a significant difference between the two.

m. Credit use. No significant difference was found between the two areas. Relatively little use of credit was reported in either area.

The existence of two quite diverse cultures is seen in the above discussion. On almost every item of comparison a significant difference is found. While the magnitude of differences may not be striking in all cases, the differences were found consistently throughout all the variables, clearly pointing to the need for careful consideration of the possible effects of different cultural inputs on differential response to the treatment combinations included in the BVE Project.

6. A note on some within-Oriente differences

As noted previously, the main cross-cultural comparisons of findings have to be based on the Yupi and Ipala vs. Momos and Chichi sub-areas because of the lack of comparability of the Quezada area in terms of program duration and available baseline data. It is important to note, however, that the treatment sub-areas of Yupi are not representative of those in Quezada in terms of the background characteristics just discussed in the cross-cultural comparison. In fact, the Yupi and Quezada sub-areas of Oriente differ almost as drastically from each other as do the two cultural areas (see Table 21, Appendix D).

Farmers in Quezada are generally wealthier (i.e.,have more land available to them for planting, own more and rent less of their available land, plant and produce more corn and beans and sell more of their bean crop, and own more animals); live in better circumstances (i.e., have houses with better roofs and walls, are more likely to have toilet facilities, are more likely to own and listen to a radio, have more varied diets—are more likely to include bread, lard, rice, vegetables, meat, cheese, milk and incaparina in their weekly diets); have more modern attitudes (are less likely to see risk in use of new seed, fertilizer, herbicide, and fungicide, use more credit and are more likely to see money as important); are more mobile (are more likely to visit nearest municipality, and/or department capital at least once a year); are more group oriented (are more likely to seek advice on agricultural matters, to belong to an organized group, and to feel it is important to discuss agricultural matters with friends and neighbors); are more educated (have completed slightly more years of formal schooling, are more likely to be literate, to have more literate family members, to desire more years of education for their children and to receive letters); are slightly older; have more children; and are generally more optimistic about the chances for advancement in farming than are their neighbors in the Yupi treatment areas. When compared to urban and highly developed areas of Guatemala, all of the BVE sub-areas appear to be relatively homogeneous, traditional rural areas; however, the between area differences within Oriente and between Oriente and Occidente outlined above may have been enough to cause differentiated readiness for acceptance of the various BVE media combinations. The findings presented in the remainder of this report will generally be divided into three sections: Oriente (as measured by the Yupi and Ipala sub-areas), Occidente, and the relatively more developed area of Quezada. The reader should refer to the above baseline differences between the areas in interpreting the findings from the three areas presented in the following sections.

3. Cross-Cultural Comparison of Differential Treatment Effectiveness

In the current section, using the perspective provided by a cross-cultural comparison, an analysis of the BVE program impact in the various Project sub-areas is presented. The main focus of the analysis is on the BVE impact on change in agricultural behavior and the findings of the behavior change analysis are presented in the first portion of the section. In the following portions the impact of the BVE treatment on attitude change and the use of the various media as sources of new agricultural knowledge is explored in order to elaborate on the behavior change findings and to provide a more complete picture of the impact of the media combinations on knowledge about attitudes toward and use of modern agricultural practices.

1. BVE impact on behavior change

The primary dimensions of analysis presented here are: 1) differential change in agricultural behavior in the two cultural settings; 2) differential impact of the treatment conditions on change in behavior; and 3) cross-cultural difference in the impact of the various media combinations on behavior change. For reasons discussed previously, major cross-cultural

comparisons involved comparing Yupiltepeque and Ipala in the Oriente and Momostenango and Chichicastenango in the Occidente. The Quezada area which served as the beginning experimental region in the Oriente will also be discussed where applicable.

Noting that change is highly related to initial level of practice is important. The higher the initial practice level, the lower the level of change. In addition to, and independent of, this covariate effect, the analysis of variance results indicate three other important findings: 1) that the average amount of change in the Occidente and Oriente areas was not equal; 2) that the average amount of change in the five treatment sub-areas (Occidente and Oriente combined) was not equal; and 3) that the average amount of change in the five treatment sub-areas was not the same for the two cultures (i.e., that the order of treatment effectiveness in producing behavior change varies in the two cultural areas). The findings of the overall treatment effectiveness analysis for the Occidente areas and the comparable areas of Oriente (Yupi and Ipala) combined are presented in Table 22 in Appendix D.

The following sections will be devoted to a discussion of the above findings in greater detail.

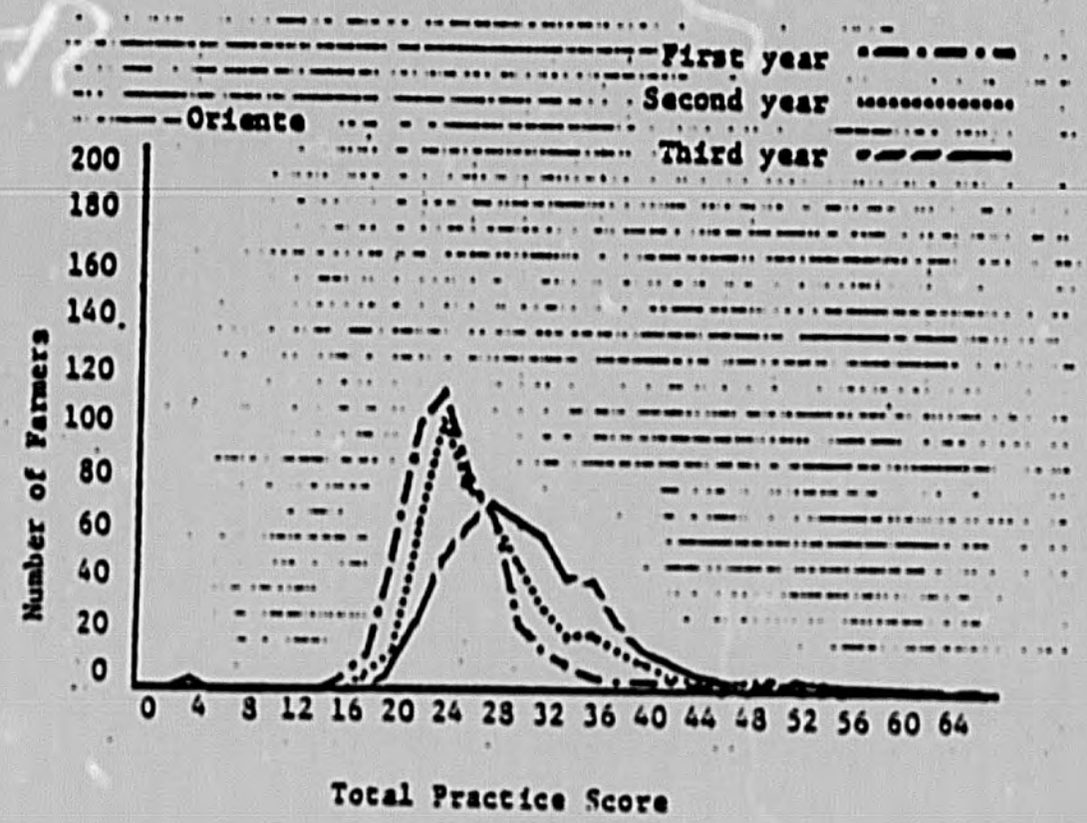
a. Cultural differences in average amount of behavior change. Farmers in the Oriente, on the average, made greater positive changes in their agricultural behavior than did farmers in the Occidente portion of the BVE sample. This is true even when the differences in initial practice scores are controlled.

Although the difference between the two cultures is relatively small, it is large enough for the probability of its having occurred merely by chance to be very slight. Figure 11 gives a graphic representation of these between treatment differences in amount of change over the three year measurement period. It is interesting to note from the figure that, in both cultures, the variability in the distribution as well as the average level increases over the three years. In other words, in addition to becoming generally more technologically advanced, the farmers within each culture are also becoming more and more dissimilar.

b. Differential treatment effectiveness - overall. The order of treatment effectiveness, when Oriente and Occidente are combined is shown below, by treatment condition and mean change score.

RMA	5.24
M	4.32
RM	3.13
R	2.90
C	2.51

The RMA treatment areas experienced the greatest amount of positive change over the two year period. The M area achieved the second highest average change score while the least change was observed in the R area (see Table 22, Appendix D, for the complete Analysis of Variance results).



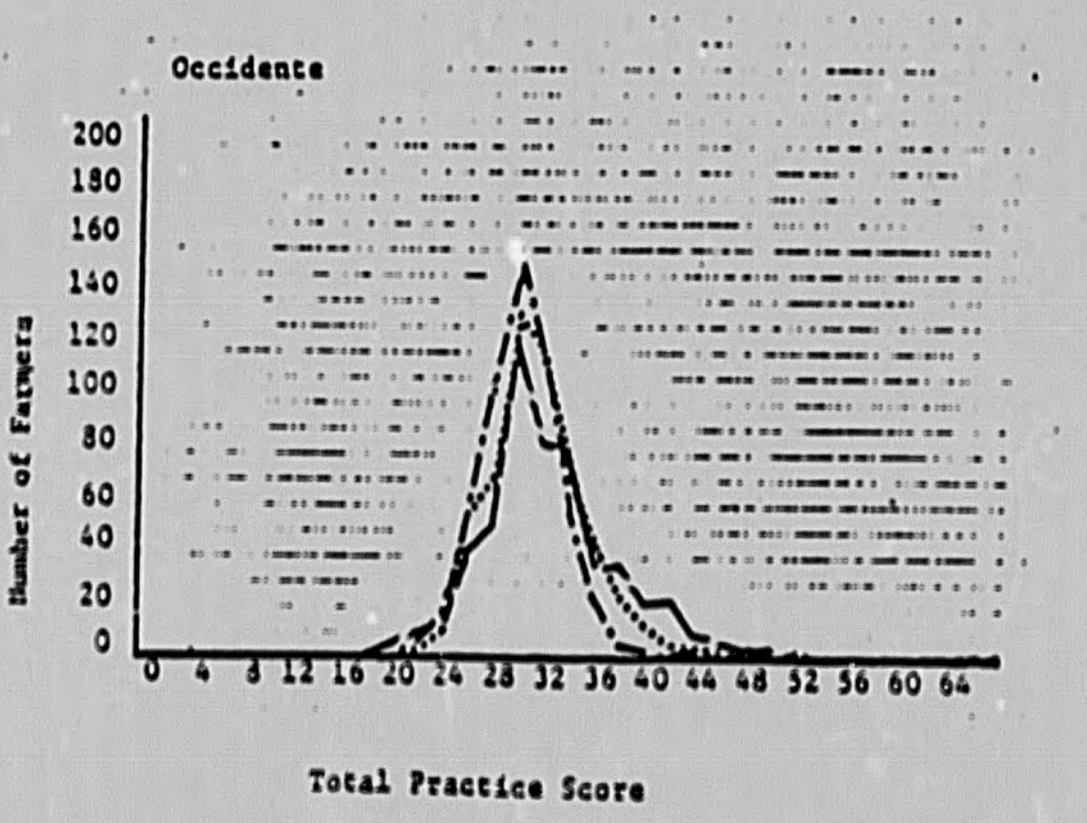


Figure 11. First, second and third year practice scores in Oriente and Occidente.

Furthermore, while RMA and M both differed significantly from the control area, neither the RM nor the R areas showed such significant differences when the Oriente and Occidente portions of the BVE design are combined.

c. Cross-cultural differences in treatment effectiveness.

i. Oriente: While the various BVE treatment areas experienced differing amounts of behavior change during the life of the Project, these differences are not the same for the two cultures. The order of treatment effectiveness for Yupi and Ipala is shown below by treatment condition and mean change score.

RMA	7.48
M	6.71
R	4.80
C	3.93
RM	3.58

In the Yupi and Ipala sub-areas of Oriente the most effective treatments are, as for the total sample, RMA and M. Furthermore, the RMA and M areas remain the only two treatment areas which differ significantly from the control area in terms of average amount of change in agricultural practice (see Table 23 in Appendix D). The RM area in Yupi actually shows less change than the control area; however, as for the total sample, neither the RM nor the R areas differ significantly from the control area.

The treatment effectiveness results in the Quezada sub-area give a somewhat different picture of the BVE impact in Oriente. The order of treatment effectiveness for the Oriente, including Yupi, Ipala and Quezada is shown below, by treatment condition and mean change score.

YRMA	6.82
QR	6.29
M	6.09
QRMA	5.49
QRM	5.17
YR	4.01
C	3.24
YRM	2.76

ii. Occidente: The order of treatment effectiveness for the Occidente is shown below, by treatment condition and mean change score.

RMA	3.13
RM	2.70
M	1.94
C	1.07
R	1.01

The difference between treatments was highly significant and the order of effectiveness is as follows: RM was the most effective followed by RM, M, C and R. As in Oriente, the RMA treatment condition is the most

effective. Unlike Oriente, however, the monitor-alone condition does not produce significantly more change than that evidenced in the control area, and the radio-monitor area did show significantly higher change. The Occidente differential treatment effectiveness results are taken from Table 26 found in Appendix D.

iii. Oriente and Occidente Compared: When all of the treatment areas in Oriente and Occidente are compared using adjusted mean scores, the results are clearly indicated. These results are presented in graphic form in Figure 12.

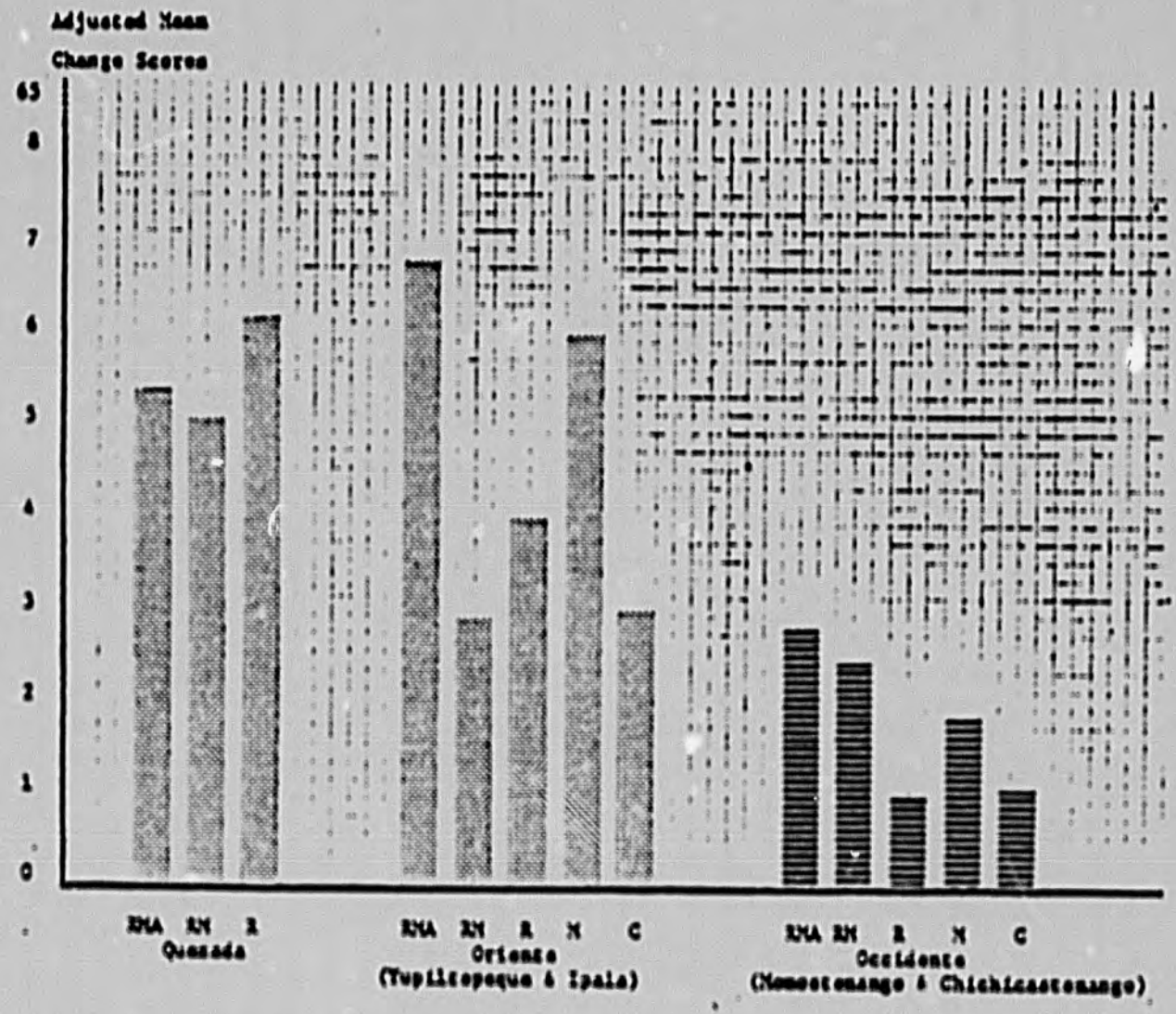


Figure 12. Comparative change in BVE treatment areas.

In Oriente the RMA and M treatments are the most effective in producing behavior change. The radio-alone treatment, while not effective in Yupi is very effective in the Quesada region.

In Occidente the findings seem to indicate that significant levels of overall change in agricultural behavior is best induced by the mass-media/personal representative treatment combinations of RMA and RM. Furthermore, not only were the RMA and RM treatments the only ones to produce greater positive behavior change, but they also evidenced significantly greater amounts of such change than did the radio-alone area.

d. A summary of BVE impact on behavior change. The order of effectiveness by treatment has been discussed in the preceding material. The relative effectiveness appears as follows:

Oriente and Occidente combined	Oriente (Yupi and Ipala)	Oriente (Yupi and Quezada and Ipala)	Occidente
RMA	RMA	RMA	RMA
M[2]	M	M	RM
RM	R	R	M
R	C	RM	C
C	RM	C	R

While some oversimplification may result, the following summary statements appear to be appropriate from this approach to the analysis:

1) The RMA communication condition is highly effective in all sections
2) The monitor-alone condition is highly effective in the Oriente and only slightly less so in the Occidente.
3) The results with the radio/monitor condition indicate highly effective results in the Occidente but it was not effective in the Oriente.
4) The radio-condition results are mixed. In Quezada where the radio is located, effectiveness was clear. In Yupi and the Occidente, as a treatment condition, only limited or no impact is found.

The most puzzling finding is the performance of the RM condition. There is little reason to believe that the radio delivered message is less effective than the same message delivered by a cassette. In RM Yupi the performance of the monitor may have been poorer than the Ipala monitor. Readiness for change may have varied in the RM and M alone areas, and there is some evidence of differences such as lower literacy levels in the YRM area. Consideration of this question by field staff may assist in clarifying what has occurred.

Why is such limited effect by the radio condition found in the Occidente? The rank order of treatments suggests the importance of personal contact, and this may be a major factor. However, the reported high listenership in the area makes the lack of impact difficult to understand.

Despite these variations in findings, the pattern remains. Treatment effectiveness varies directly with degree of interpersonal contact and radio-alone provides mixed benefits in the Ladino area and none in the Occidente, in relation to behavior change.

2. BVE Impact on Attitude Change: Reduction of Risk Perception

The major analysis of BVE Project impact, as noted earlier, is made on the basis of change in agricultural behavior. The content of the educational programs presented in the various treatment areas has been directed toward

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[2] Treatment areas above the line differ significantly from the control area in amount of change.

such behavior change, and the Project's success should be manifested therein. The literature on the adoption of new agricultural practices indicates, however, that such behavior changes occur slowly in traditional settings, and that widespread changes may not be evident until long after the two-year measurement period available for this study. It is important, therefore, to consider the attitude change which may have begun in the BVE treatment areas but which may not as yet have been translated into overt behavior change. To this end, six questions concerning the farmers' perception of risk in various agricultural practices were included in the BVE questionnaire (see Table 10).

Table 10. List of items comprising the risk index.

Item #	Variable #	
1	37	Do you think there is any danger planting new seed?
2	101	Do you think there is any danger to your crops using insecticide?
3	107	Do you think there is any danger in the use of fertilizers?
4	136	Do you think there is any danger in using herbicides?
5	141	Do you think there is any danger using fungicide on your crops?
6	171	Do you think there is any danger in borrowing money for your crops?

a. Construction of the risk index. These items have been dichotomized so that a farmer is given a point for each practice which he does not see as risky. While this index is not clearly as comprehensive nor as carefully constructed as the main practice index, it is internally consistent and should give some indication of the attitude change, or lack of attitude change, evident in the BVE treatment areas.

b. Findings. In general, Oriente farmers perceived as risky only two or three out of the six practices included in the index, while Occidente farmers tended to see close to four of the practices as potential sources of risk to family, land and/or crops (see Table 27 in Appendix D).

The order of positive change in risk perception is shown below. Negative numbers indicate a change in the direction of increased perception of risk in selected agriculture practices.

In the Oriente		In the Occidente	
M	.05	RM	.48
RM	-.18	RMA	.35
RMA	-.19	R	.28
R	-.41	M	-.68
C	-.53	C	-.72

In Oriente (Yupi and Ipala), where relatively little risk was perceived prior to BVE programming, negative change (i.e., an increase in the perception of risk) occurred between the pre- and post-treatment measures. In Occidente, on the other hand, substantial change in a positive direction occurred. Furthermore, in Occidente the treatment areas which included radio as a part of the delivery system (including the radio alone treatment condition) showed substantial positive change in risk attitudes, while the non-radio areas (the monitor and control) showed negative change (i.e., increased risk perception).

Several factors may have contributed to this discrepancy. First, it should be remembered that the calendar years covered by the programming differ in the two areas. Consequently something may have occurred during the 1974-75 period which increased the perception of risk and produced the negative change scores in Oriente but would only have lowered the baseline scores in Occidente. It is also possible that the use of some practices increased perception of their potential risk. Since there was more trial of new practices in Oriente than in Occidente, this effect may also have produced the cross-cultural differences in negative change scores.

Despite the confounding possibilities, however, the findings seem to indicate that in Occidente the radio was quite successful in reducing the risk perception of modern agricultural practices. Such findings may indicate that in areas in which a great deal of risk is seen in the use of modern practices, the radio, while not generally effective in direct behavior change, may be effective in reducing the perception of risk which may in turn lead to future behavior change.

3. BVE Impact on New Knowledge: Sources of Information

The previous sections of this chapter have presented findings concerning the effect of the various BVE media combinations on changes in behavior and on attitudes. Such change is presumably predicated on the receipt of new knowledge from the BVE media. A lack of change in either attitudes or practices does not necessarily imply, however, that knowledge has not been received. While changes in attitudes and practices are certainly the desired outcomes of a project such as BVE, and the effectiveness of the various BVE media must be judged by their success in producing such changes; knowledge received from the BVE media is also important and may be an indication that the first step toward behavior change has been taken. The current section will, therefore, be devoted to a discussion of the reported sources of recently received agricultural information in the treatment areas of the BVE Project as another, and less stringent, approach to estimating the effectiveness of the various communication treatments.

The remainder of this section will be divided into two major parts. In the first, the sources reported during the first year of programming will be discussed; and in the second, sources reported during the second year of BVE will be discussed and contrasted to the first-year sources. Cross-cultural comparisons will be made in each section.

a. Sources reported in the Oriente and Occidente treatment sub-areas during the first year.

i. Method of measurement of information sources in the time sample surveys: Each farmer interviewed in the time sample was asked if he had heard any new information concerning the particular agricultural practice

in question. 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" or "Radio Momostenango" (the BVE radio stations), the "BVE monitor," the "BVE agronomist," "friends and neighbors," "own experience," "other (non-BVE) agronomist," and/or any combination of these sources. In tabulating the responses for this report, the combinations were added to the basic source; that is, the responses listed under radio include radio alone or in combination with another source.

For the purpose of these analyses, responses for all six time sample surveys administered during the first program year were combined. All "Source" percentages are based on the total number of times that a particular source was mentioned by farmers who reported having received new information concerning the recommended level of practice.

ii. Findings: During the first year of programming in Oriente, "friends and neighbors" was the source most often mentioned by those who reported new information. This was followed by "radio" in those areas served by the radio station. "Monitor" was mentioned in the RM and RMA areas but not in the M area (see Table 11).

Table 11. Sources of information reported in Oriente (Yupi and Ipala) - first program year.

N = 144*

	Treatment Areas					
Sources of information	R	RM	RMA	C	M	Total Sample
Friends and neighbors	45%	50%	47%	60%	27%	44%
Non-BVE agronomist	12%	6%	16%	30%	38%	17%
Own experience	20%	3%	9%	10%	35%	15%
Radio**	22%	31%	19%	0%	0%	18%
Monitor**	0%	17%	16%	0%	0%	8%
BVE agronomist**	0%	0%	0%	0%	0%	0%

* N is the total number of responses in the time sample series that indicated new information.

** Percentages are based on number of respondents who mention the source alone or in combination with other sources. For example, if a respondent reports radio and BVE monitor as the source of his new information, he is counted in both the radio and the monitor percentages. For this reason, the percentages do not total to 100%.

During the first year of programming in Occidente, "monitor" was the source most often mentioned by those who reported new information. This was followed by "friends and neighbors." There was, however, considerable difference among treatment areas in reported sources: "friends and neighbors" was the most common in the R area; "Radio" was the most common in the RM area; "Monitor" was the most common in RMA and M areas; and "friends and neighbors" as well as "own experience" were the primary sources in the control area (see Table 12).

Table 12. Sources of information reported in Occidente in the first program year.

N = 171*	Treatment Areas					
Sources of Information	R	RM	RMA	C	M	Total Sample
Friends and neighbors	53%	14%	9%	7%	19%	23%
Non-BVE agronomist	3%	0%	0%	0%	4%	1%
Own Experience	22%	8%	0%	33%	0%	9%
Radio**	22%	59%	42%	0%	0%	36%
Monitor**	0%	46%	80%	0%	62%	46%
BVE agronomist**	0%	10%	18%	0%	15%	10%

* N is the total number of responses in the time sample series that indicated new information.

** Percentages are based on number of respondents who mention the source alone or in combination with other sources. For example, if a respondent reports radio and BVE monitor as the source of his new information, he is counted in both the radio and the monitor percentages. For this reason, the percentages do not total to 100%.

The responses clearly show that during the first year of programming there are differences in sources utilized in the Oriente sub-areas of Yupi and Ipala and those utilized in the Occidente sections of Momos and Chichi. Friends and neighbors appear to serve as much more frequent sources of information in Yupi and Ipala than in Momos and Chichi. Only in the radio-alone sub-area of Occidente do friends and neighbors appear to serve as sources with frequency comparable to that in the Oriente.

Another obvious cross-cultural difference lies in the use of radio as a source in the radio-alone areas. In Oriente radio is reported as the second most important source in all areas to which it is available, and the frequency with which it is reported does not vary drastically between the radio areas in Oriente. In Occidente, on the other hand, use of radio as a source is much more frequent in the RM and RMA areas than in the radio area alone.

The use of the monitor as a source also varies a great deal between the two cultural areas. In Oriente, the monitor is infrequently mentioned, while in Occidente he appears as a very important source.

iii. Summary of sources reported during the first year of programming: The findings of the first year time sample series indicate that the BVE monitor is the single most important source in the Occidente area. The findings also indicate that when "official/personal" sources (i.e., monitor and/or agronomist) are available in combination with radio, the radio is utilized as source more often than when these personal sources are not available. In the absence of "official/personal" sources, farmers in the Occidente tend to obtain new information from friends and neighbors rather than from the BVE radio during the period of initial exposure to the BVE educational program.

In the Oriente, friends and neighbors are of prime importance during the first program year, regardless of whether "official/personal" sources (i.e., monitor and agronomist) are available.

It seems clear that while mass medium of radio is utilized in both cultures during the first year, it is not the primary direct source of new information. It is important to bear in mind, however, that these findings are based only on those respondents who had gained new information during the first year of the BVE experimental program. Sources of information reported by those who obtained information in the second program year will be investigated in the following section.

b. Second year sources. The findings presented in the following section are based on the results of the time sample series (TS14-19 in Oriente and TS20-25 in Occidente) conducted during the second year of BVE programming in Occidente. The method of measurement was identical to that outlined in the previous section.

During the second program year the Oriente farmers began to look more the way the Occidente farmers had looked during the first program year. In the radio-alone area, there was a dramatic increase in the frequency with which friends and neighbors were reported as a source (see Table 13).

Table 13. Sources of information reported in Oriente (Yupi and Ipala) - second program year.

N = 630*

Sources of information	Treatment Areas R	RM	RMA	C	M	Total Sample
Friends and neighbors	78%	30%	43%	64%	53%	52%
Non-BVE agronomist	5%	3%	7%	30%	19%	11%
Own experience	3%	5%	2%	4%	4%	4%
Radio**	14%	49%	28%	1%	3%	21%
Monitor**	0%	25%	25%	0%	23%	17%
BVE agronomist	0%	0%	2%	0%	0%	1%

* N is the total number of responses in the time sample series that indicated new information.

** Percentages are based on number of respondents who mention the source alone or in combination with other sources. For example, if a respondent reports radio and BVE monitor as the source of his new information, he is counted in both the radio and the monitor percentages. For this reason, the percentages do not total to 100%.

In the areas in which a personal BVE representative was available, however, the trend was toward the BVE media. In both the RM and RMA areas, the monitor and radio were mentioned more frequently in the second year than in the first; and in the monitor-alone area, the monitor increased from 0% in the first year to 23% in the second. Thus, while friends and neighbors appear to remain the predominant sources in Yupi and Ipala, the official personal

and mass media sources become much more important wherever a personal representative of BVE is available.

In Occidente the trend appears to be toward friends and neighbors in all areas except R, in which the use of radio increases substantially (see Table 14).

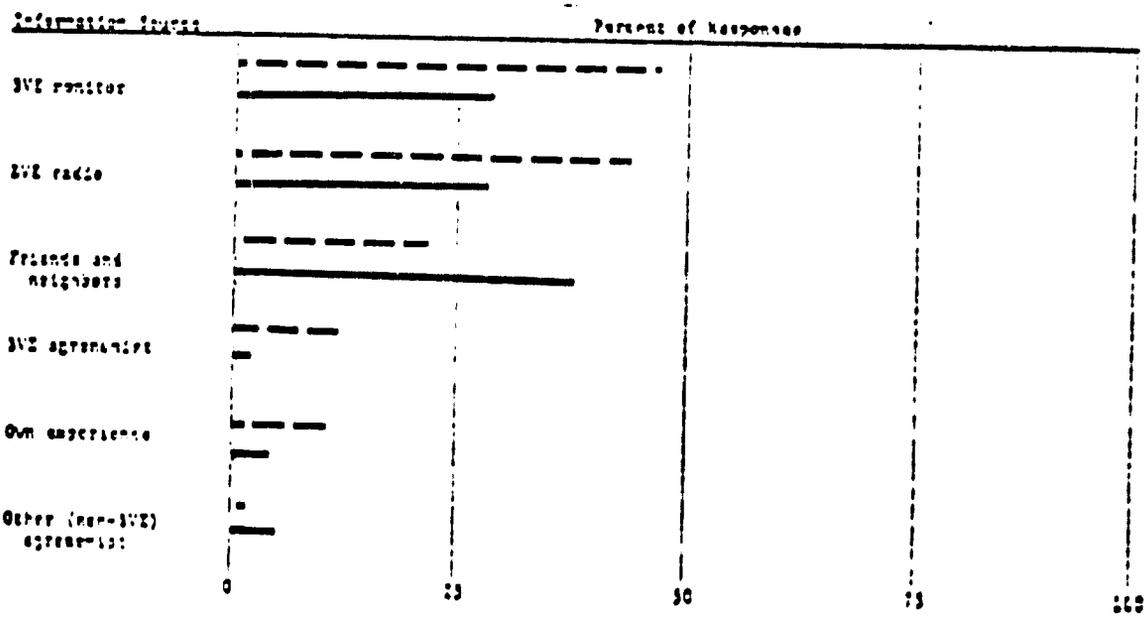
Table 14. Sources of information reported in Occidente in the second program year.

N = 235* Sources of Information	R	RM	RMA	C	M	Total Sample
Friends and neighbors	50%	33%	38%	54%	38%	41%
Non-BVE agronomist	12%	8%	2%	35%	20%	14%
Own experience	3%	4%	6%	8%	11%	7%
Radio**	34%	39%	16%	3%	21%	22%
Monitor**	0%	31%	39%	0%	18%	21%
BVE Agronomist**	0%	0%	2%	0%	0%	0%

* N is the total number of responses in the time sample series that indicated new information.

** Percentages are based on number of respondents who mention the source alone or in combination with other sources. For example, if a respondent reports radio and BVE monitor as the source of his new information, he is counted in both the radio and the monitor percentages. For this reason, the percentages do not total to 100%.

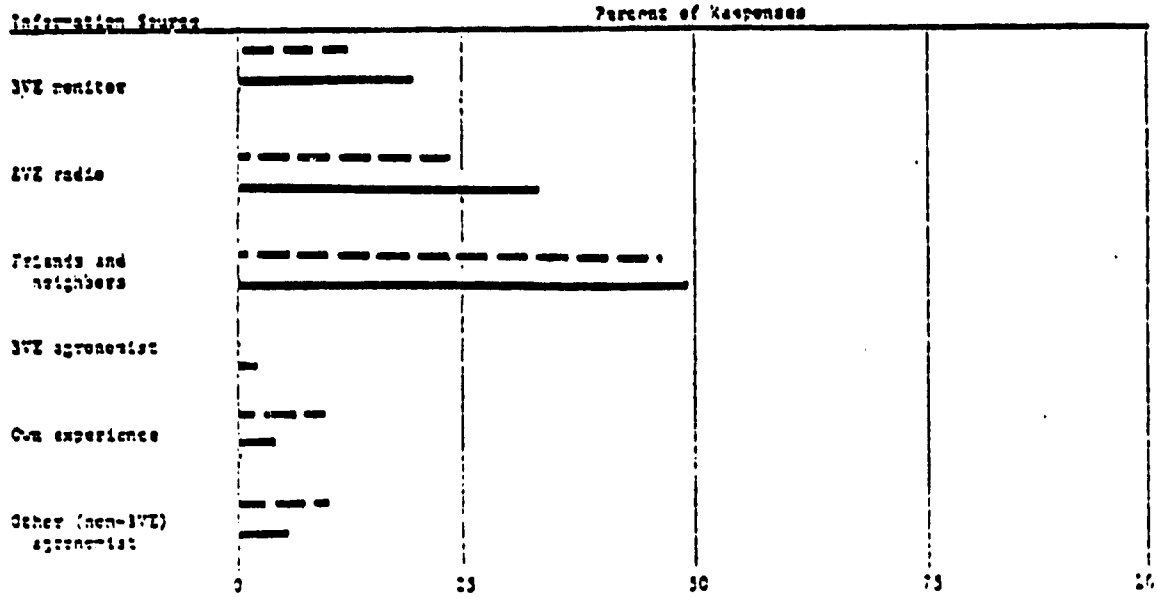
Figures 13 and 14 depict the sources in reported in the R, RM and RMA



* Percent of responses based on total number of farmers who reported having received new information about a method of practice recommended by the BVE program.

— — First program year
——— Second program year

Figure 13. Sources of new information reported in first and second program years in the treatment sub-areas of Mcmostenango.



* Percent of responses based on total number of farmers who reported having received new information about a method of practice recommended by the BVE program.

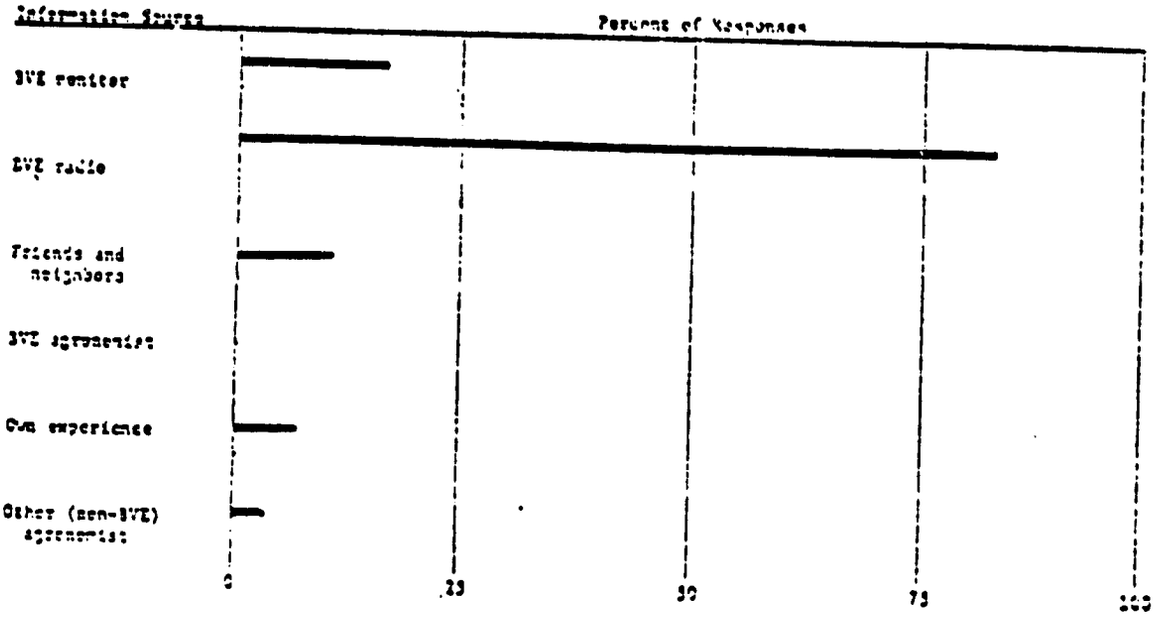
— — First year programming
——— Second year programming

Figure 14. Sources of new information reported in first and second program years in the treatment sub-areas of Yupi.

While comparable data are not available for the Quezada sub-areas of Oriente during the first program year, data are available for the sources utilized during the second. Figure 15 shows quite clearly that in Quezada radio is the primary source of new information. Furthermore, Table 15 shows that radio is the primary source in all three treatment areas in Quezada. Thus, it appears from these findings that not only is radio more effective in encouraging behavior change in Quezada than in either of the other areas of Oriente or Occidente, but also that it is used much more widely as a source of new information in Quezada than in any other sub-area of the BVE Project.

c. Summary of sources of information. While the trends in the various areas certainly appear to differ, they point to several tentative generalizations.

First, in the relatively prosperous area of Quezada, radio is the primary source of new agricultural information. Second, in both Oriente (Yupi and Ipala) and Occidente, personal sources appear to reinforce the use of mass media. The use of radio as a source is greater in areas served by a monitor in the first year in Occidente and in the second year in Oriente. Third, the BVE message is diffused by friends and neighbors to those not directly influenced by the BVE sources. The diffusion process appears to begin sooner in the Oriente than in the Occidente, but is evident in both cultures. Fourth, the mass media, while clearly enhanced by personal



* Percent of responses based on total number of farmers who reported having received new information about a method of practice recommended by the BVE program.

—— Second year programming

Figure 15. Sources of new information reported in second program year in the treatment sub-areas of Quezada.

Table 15. Sources of information reported in Quezada - second program year.

N = 191*

Sources of information	Treatment Areas R	RM	RMA	Total Sample
Friends and neighbors	10%	2%	13%	9%
Non-BVE agronomist	4%	0%	2%	2%
Own experience	7%	2%	4%	5%
Radio**	79%	95%	81%	83%
Monitor**	0%	10%	38%	16%
BVE agronomist**	0%	0%	0%	0%

* N is the total number of responses in the time sample series that indicated new information.

** Percentages are based on number of respondents who mention the source alone or in combination with other sources. For example, if a respondent reports radio and BVE monitor as the source of his new information, he is counted in both the radio and the monitor percentages. For this reason, the percentages do not total to 100%.

reinforcement, does reach some farmers in the areas not served by a monitor or agronomist. Fifth, the official/personal sources (monitor and agronomist) appear to be more important than the local communication network (friends and neighbors) in providing encouragement for early use of the mass media in Occidente. The Yupi farmers, on the other hand, appear to need the second year to begin trusting the official sources, whether mass media or personal (i.e., monitor and/or agronomist); while the Occidente farmers appear to trust the personal/official sources earlier, but need the second year to begin trusting mass media not reinforced by a personal representative.

4. Project impact on knowledge, attitude and practice

The current chapter has presented findings concerned with the differential impact of the media combinations on receipt of new knowledge, changes in attitudes and changes in agricultural behavior. Based on these findings, several generalizations concerning BVE impact can be made.

a. The various BVE media combinations differed with respect to impact on behavior change in the following ways:

i. Regardless of the economic and cultural background of the target area, the radio/monitor/agronomist media combination, is effective in encouraging immediate change toward more modern agricultural behavior. The RMA treatment condition worked well in the traditional setting of the Occidente; in the less traditional but economically poorer areas of Yupi; and in the relatively highly developed areas of Quezada.

ii. The radio/monitor treatment combination also appears to be effective in encouraging change in different cultural settings. The RM treatments in Occidente and in Quezada were both quite effective.

iii. The effectiveness of the monitor alone condition seems to be dependent on the characteristics of the area. In Oriente where the monitor alone condition was in a highly integrated village the monitor was very successful. This success was not replicated in the Occidente. Success of the radio without personal reinforcement from the agronomist and/or monitor appears to be highly dependent on the cultural, economic and social characteristics of the target group.

iv. Radio alone was effective in inducing immediate behavior change only in the Quezada area which differed significantly from the other Oriente sub-areas in terms of economic well-being and general modernity of attitudes and from the Occidente sub-area in terms of traditional culture.

b. BVE media, including radio, served as sources of attitude change. In the Occidente areas, where the perception of risk in agricultural practices was relatively high, the radio alone or in combination with other media had a significant impact on the reduction of the farmers' perception of danger in various modern practices.

c. The radio was used as a source of new agricultural information in all areas of the BVE Project. The sub-areas differed, however, with respect to the source of information used more frequently.

i. In the Quezada area the radio is by far the most frequently used source of information.

ii. In the less developed Oriente sub-area of Yupi, radio takes second place to friends and neighbors as a direct source of new information. Since the "new information" reported is that which was broadcast by the BVE media it would seem that for most Yupi farmers, friends and neighbors are the carriers of the radio message at least during the first year. Use of radio as a direct source increased during the second year wherever the agronomist and/or monitor have been available to reinforce its use as a source.

iii. In the Occidente area the preference for the monitor as a source is pronounced. In addition to acting as a prime source of information the monitor appears to encourage direct use of the radio as a source of new agricultural information.

In conclusion, it appears from the findings presented in this chapter that the effectiveness of the BVE media combinations varied with the level of development of and the cultural constraints placed on the target area. In highly developed areas in which farmers have had the advantage of prior educational programs and other technical assistance the full RMA treatment combination is not necessary for maximum impact on knowledge, attitude and behavior change. In less developed areas, on the other hand, while some impact on knowledge and attitudes may be achieved by the radio alone, immediate impact on behavior change will probably not be felt without the reinforcement provided by an agronomist and/or a monitor. Thus, the cultural and other background characteristics of the target group appear to influence the group's readiness for change and thereby affect the potential impact of various media on knowledge, attitude and behavior change within the group. In the following section individual farmers who changed and those who did not will be compared in order to see if these same background characteristics are related to individual differences in amount of BVE induced change.

C. Individual Background Characteristics and Their Relation to Change in Agricultural Behavior

In previous sections, the analysis focused on the differential impact of the BVE communication media as measured by change in agricultural practice attitudes toward these practices and receipt of new knowledge concerning such practices. While the results indicate that the various treatments do exert differential influence in the above areas, it is also quite evident that there are many background factors which also influence agricultural behavior and which may have had an impact on the observed change in agricultural practice.

Previous sections have described the between-culture differences in these background factors evident at the start of the Project and have also noted the pre-BVE differences between Quezada and Yupi. The differences in Project impact found in the various sub-areas may be due, at least in part, to these background factors. It seems clear that one can expect

different results from the various communication media depending on factors such as differences in degree of integration into the mainstream of the predominant social system; differences in level of development as measured by relative economic well-being, educational attainment; "modernity" of attitudes, and other background characteristics such as prior exposure to mass media, group membership and literacy.

While these same characteristics are generally found to be related to an individual farmer's tendency to use modern agricultural practices, we cannot infer from the group differences in effect found in the BVE data that the wealthier, better-educated farmers have been more responsive to the BVE program. On the contrary, friends and neighbors as a source of the BVE broadcast information may well indicate that the BVE information is shared very generally within the group, and that it is the general level of development of the group and not of the individual that influences his tendency to change.

The purpose of the present section is therefore two-fold: to reexamine the individual characteristics traditionally associated with adoption of more modern practices, and to determine whether such characteristics are also associated with the change toward more modern behavior induced by the BVE program. The current section is divided into two major parts corresponding to the above purposes. The first will be devoted to the identification of a package of background characteristics which best discriminate between farmers who, prior to BVE programming, were practicing relatively modern practices, and those functioning at a very traditional level (i.e., high vs. low-practice farmers). In the second section, an attempt will be made to differentiate between farmers who moved toward more modern practices and those who have not (i.e., high- and low-change farmers) based on the same characteristics.

1. High and low practice farmers

Previous research on the relationship between agricultural practice and various individual background characteristics tends to indicate that high- and low-practice farmers (i.e., those using relatively modern vs. less modern agricultural techniques) differ in at least four general areas: economics; educational attainment; attitude variables; and other general background characteristics (i.e., age and number of children) (see Rogers and Shoemaker Communication of Innovations: A Cross-Cultural Approach, New York: The Free Press, 1971).

High-practice farmers have generally been found to be wealthier (i.e., to have more land, to own rather than rent or sharecrop, to have more animals, to plant and produce more crops, and therefore to have greater revenue from farm products, to live in better houses, to have more varied diets, etc.); to have more modern attitudes (i.e., to see no risk in modern practices, to place a high value on money, to value education, to value mass media and educational programs) to be better educated and literate, to be more mobile (i.e., to make more visits to cities and to the capital); to make agricultural decisions pertinent to their land and to belong to an organized group than are low practice farmers. High and low practice farmers have been found to differ with respect to both age and family size.

In the current section, high and low practice farmers are compared with respect to over forty variables which were carefully selected from those included in the BVE survey and which correspond to the above mentioned characteristics. These characteristics are the same ones used in earlier sections in describing the differences between Oriente and Occidente, and between Quezada and the other Oriente sub-areas.

High- and low-practice farmers were defined in terms of their baseline scores on the 13-item practice index described in Chapter I. As previously noted, total practice scores have a potential range of 0 to 65 points. Scores actually ranged from 16 to 52 as shown in Figure 16.

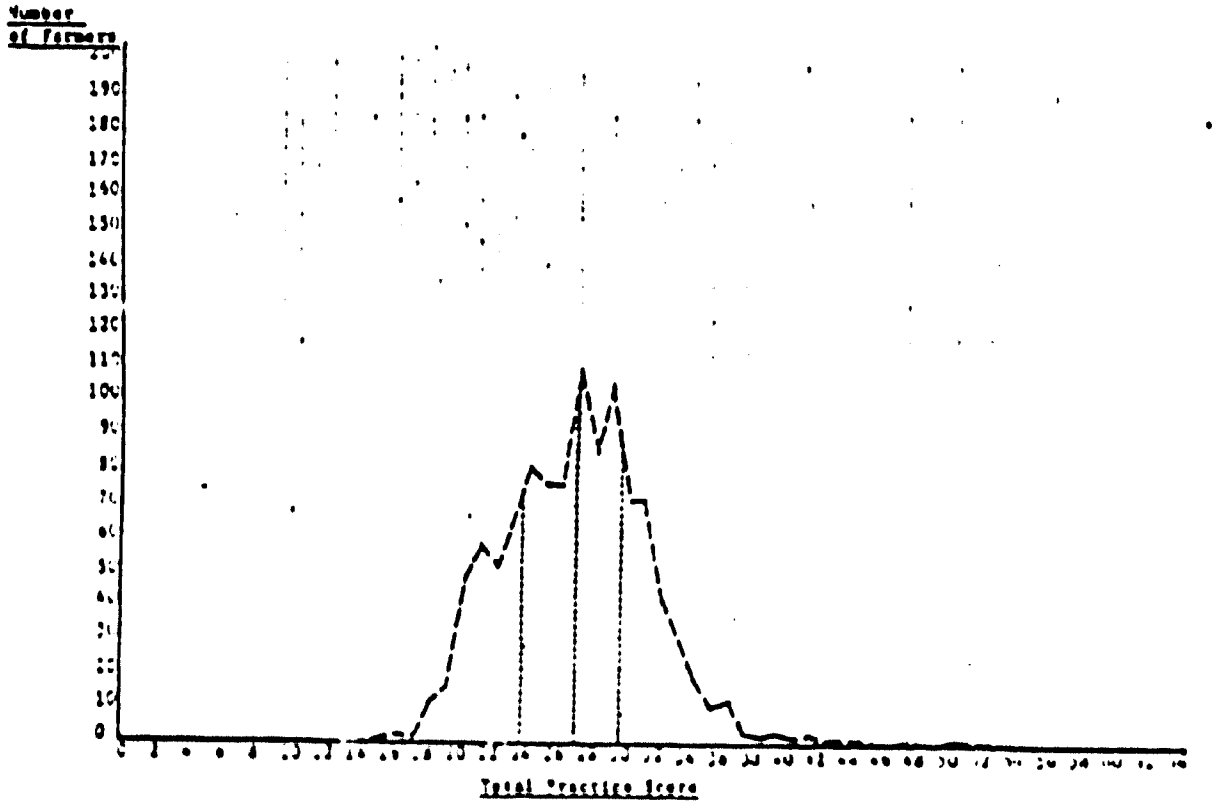


Figure 16. Distribution of total practice scores: Oriente (Yupi and Ipala) and Occidente combined.

The practice score distribution was divided into quartiles (indicated by the broken vertical lines in Figure 16), with approximately 250 individuals in each quartile. The upper quartile of the distribution includes farmers with total practice scores of 30.00 or greater and are defined as high-practice farmers. The lower quartile includes farmers with total practice scores less than 24.00 and are categorized as low-practice farmers. As can be seen from Figure 16, these quartile division are based on the entire distribution of

scores for Oriente (Yupi and Ipala) and Occidente (Momos and Chichi) combined. By this means it was assured that the definition of a high- and low-practice farmer within the two cultures would be equivalent. Cross-cultural comparisons of the Oriente and Occidente differences between high and low practice farmers are therefore relatively straightforward since the requirements for classification are the same in both cultural areas. It should be kept in mind, however, that there are many fewer Oriente farmers in the top quartile than there are Occidente farmers (see Figure 17).

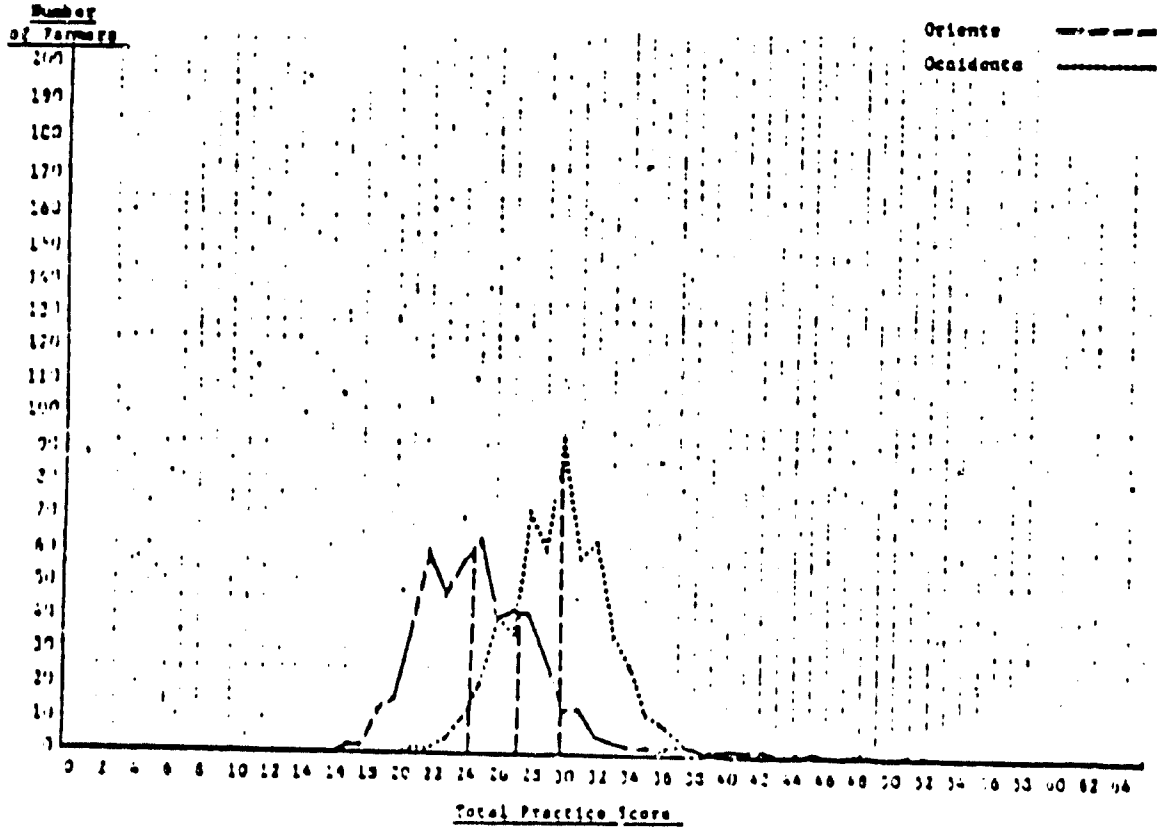


Figure 17. Distributions of practice scores in Oriente and Occidente with joint quartile divisions.

Table 16 shows the percentage of farmers falling within the four quartiles in both cultures, and Figure 17 shows a graphic representation of the two distributions and the joint quartile divisions.

Table 16. Practice Quartiles by Culture.

Practice Quartile	Culture: Oriente	Occidente	Total Sample
1 (low practice)	251 (49%)	23 (4%)	275 (26%)
2	134 (26%)	93 (17%)	227 (22%)
3	66 (13%)	214 (39%)	280 (26%)
4 (high practice	65 (13%)	213 (39%)	278 (26%)
Total	516 (101%)	543 (99%)	1059 (100%)

Findings based on the division of the separate Oriente and Occidente distributions have been presented in previous reports, and while they vary somewhat from those presented here, the general interpretations are corroborated by the findings using the joint distribution in defining high and low practice farmers.

The findings reported in this section are based primarily on a discriminant analysis and on an examination of the individual variables for differences between the high and low practice groups (see Tables 28 and 29, Appendix D).

Findings. These findings corroborate previous research. High practice farmers in both cultures do appear to be economically better off than their low practice neighbors. Farmers who use relatively modern practices tend to plant more and have more produce from corn and bean crops; to have higher annual income and to live in generally better circumstances (i.e., better house, slightly more varied diet, etc.). In addition, as expected, high-practice farmers have more "modern" attitudes than do low practice farmers: they tend to perceive less risk in modern practices and value money and mass media more often. In Oriente, high- and low-practice farmers also appear to differ with respect to educational variables. High-practice farmers have had more formal schooling, and are more likely to be literate. Differences on these educational variables, are however, slight and are reduced further when the other background characteristics are controlled. Furthermore, the educational variables do not differentiate between the categories in Occidente.

In conclusion, it would appear from the above that high- and low-practice farmers in both cultures (prior to BVE programming) differed significantly and consistently with respect to economic well being and modernity of attitudes (especially with respect to agriculture). One can reasonably conclude that these factors had, prior to the implementation of the BVE program, had an effect on the individual farmers' access to information on and willingness and ability to implement modern agricultural techniques. The following section will be devoted to an examination of these same factors and their relationship to improvement in practice during the BVE treatment period.

2. High- and low-change farmers

As mentioned previously, the BVE program was designed to reach those farmers who traditionally have not had access to information on modern agricultural techniques. The program was, therefore, developed to reach all farmers in the sample regardless of wealth, land size, education or literacy. In the previous section, the suggestion was made that some of the relationship between background characteristics and practice level may be a function of this differential access to information. To the extent that this is true, the relationship between pre-BVE adoption and the wealth variable should not be found between BVE induced change and the various characteristics. Previous research has, however, suggested that the relationship may not be solely one of differential access, but rather an effect of general openness to modernization which may be enhanced by the advantages associated with higher income, more education and greater social status. For this reason, high- and low-change farmers may also differ on the background characteristics which discriminate between traditionally high- and low-practice farmers.

High- and low-change farmers were defined in terms of the difference between their 1975 and 1977 practice scores that is before and after two years of BVE programming. The joint distribution of such change scores ranged from -19 to 22. As with the practice score distribution, the joint distribution of change scores was divided into quartiles with roughly 250 farmers in each of the four categories. The lower change quartiles contained farmers whose practice scores decreased by more than zero points while the upper quartile includes those who increased at least six points over the two year period. Table 17 and Figure 18 show the joint quartile divisions and the difference between the two cultures in terms of representation in the various quartile categories.

Table 17. Change quartiles by culture.

	Culture		
Change quartile	Oriente	Occidente	Total Sample
1 (low change)	85 (17%)	217 (40%)	302 (28%)
2	112 (22%)	121 (22%)	233 (22%)
3	112 (22%)	101 (19%)	213 (20%)
4 (high change)	207 (40%)	104 (19%)	311 (29%)
Total	516 (101%)	543 (100%)	1059 (99%)

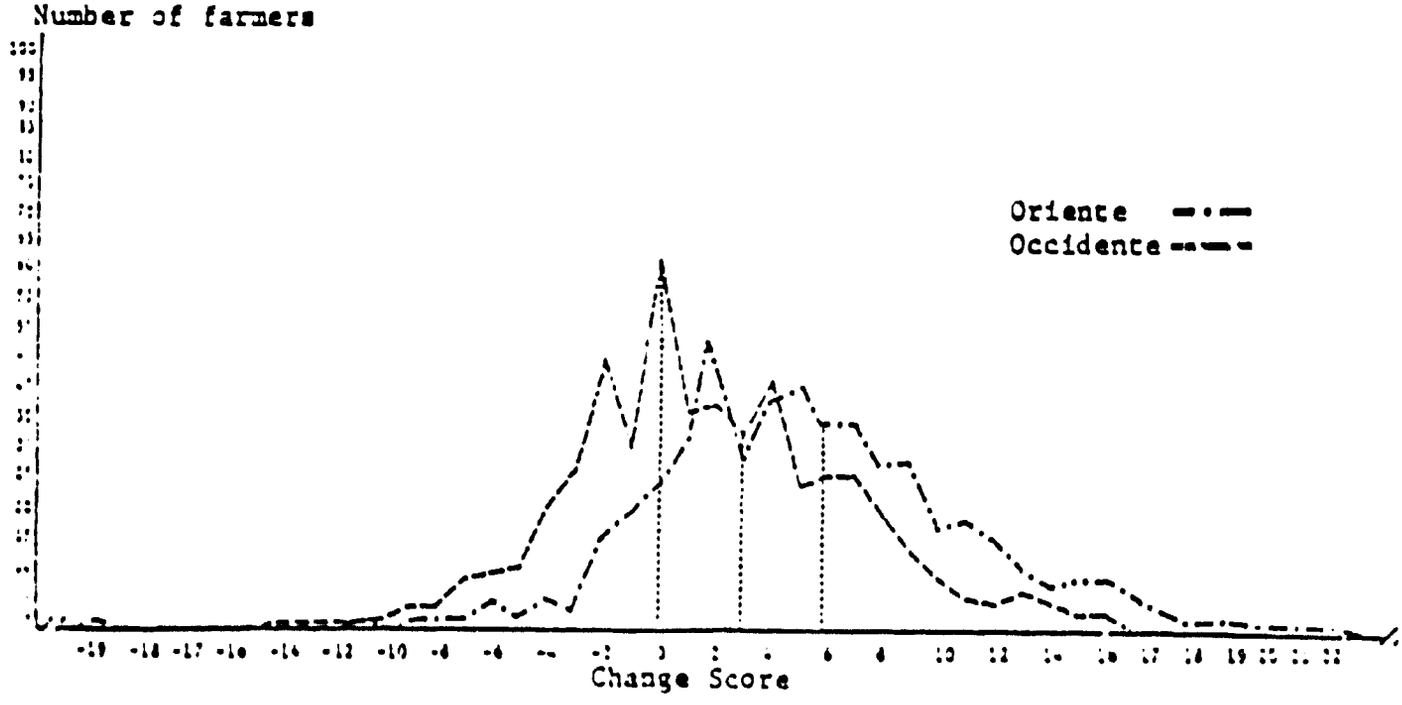


Figure 18. Distributions of change scores in Oriente and Occidente with quartile divisions.

Prior to describing differences between high and low change farmers in the two cultures, noting any differences in the individual practices which have the greatest importance to the overall change scores in the two cultures is important.

As described earlier, the 13-item practice index was used to define high- and low-change farmers. Each of the 13 items on the practice index represents a programming package with potential for differential reactions across cultures. By looking at this comparison on each item a better understanding of exactly what the high-change and low-change farmers did in terms of changing their practices is obtained.

In Figure 19 the change scores for high-change and low-change farmers in the Oriente are presented. High-change farmers moved in a positive direction on the majority of items, while the low-change farmers either stayed close to zero or moved in a negative direction away from the practice level of the baseline year. Major changes seen are in the type and amount

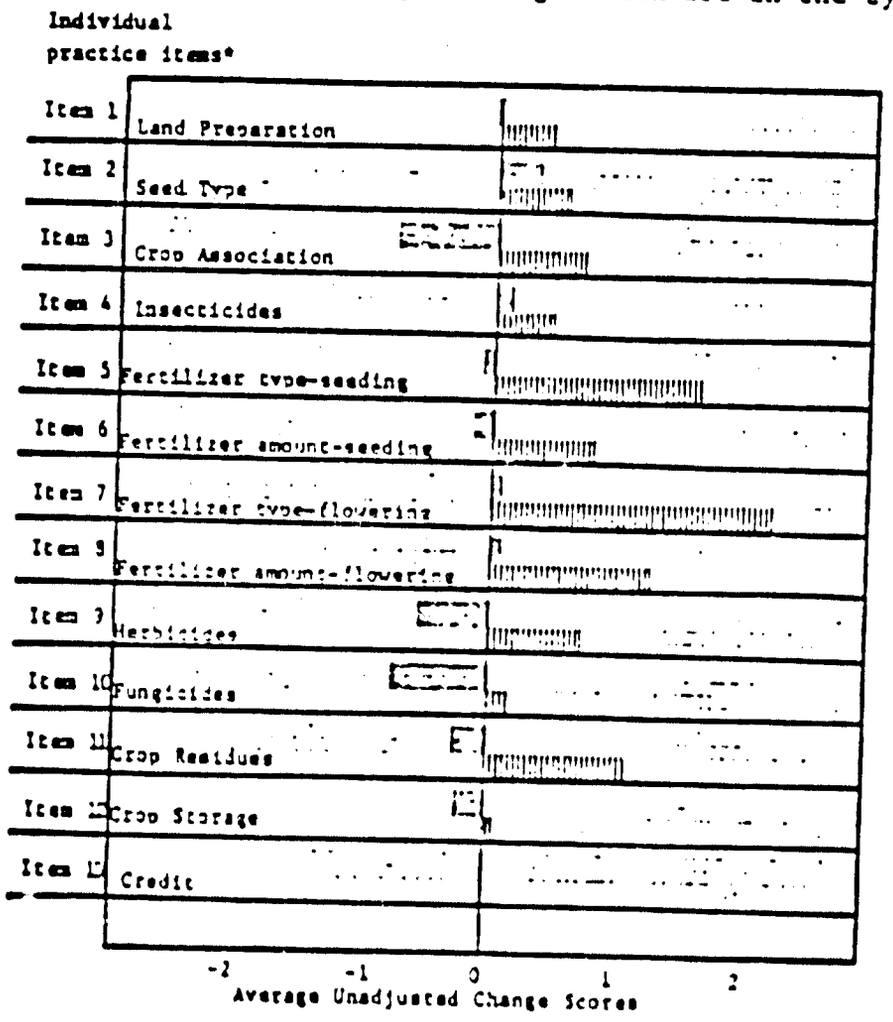


Figure 19. Average change on 13 individual practice items in Oriente.

of crop residues and planting of crops in association. When practice level (Table 30 in Appendix D) is considered, the type of fertilizer used at flowering by both high- and low-change farmers was at almost identical baseline levels in the beginning, with a very minimal increase reported by the low-change farmers and a large increase in practice level in the high change group.

On the other end of the spectrum is found the item on credit with baseline figures of almost zero and no-change found over the course of the experiment.

In looking at the data from the Occidente (see Figure 20), compared to the Oriente, there are fewer practices showing any meaningful change. Change items are highly concentrated on fertilizer and one insecticide change. In the Occidente, practice (see Table 31, Appendix D) on these particular items was at a higher level in general than in the Oriente and a readiness for change to a more modern level of functioning was clearly demonstrated. Also, as seen in the Oriente, the Occidente low-change farmers

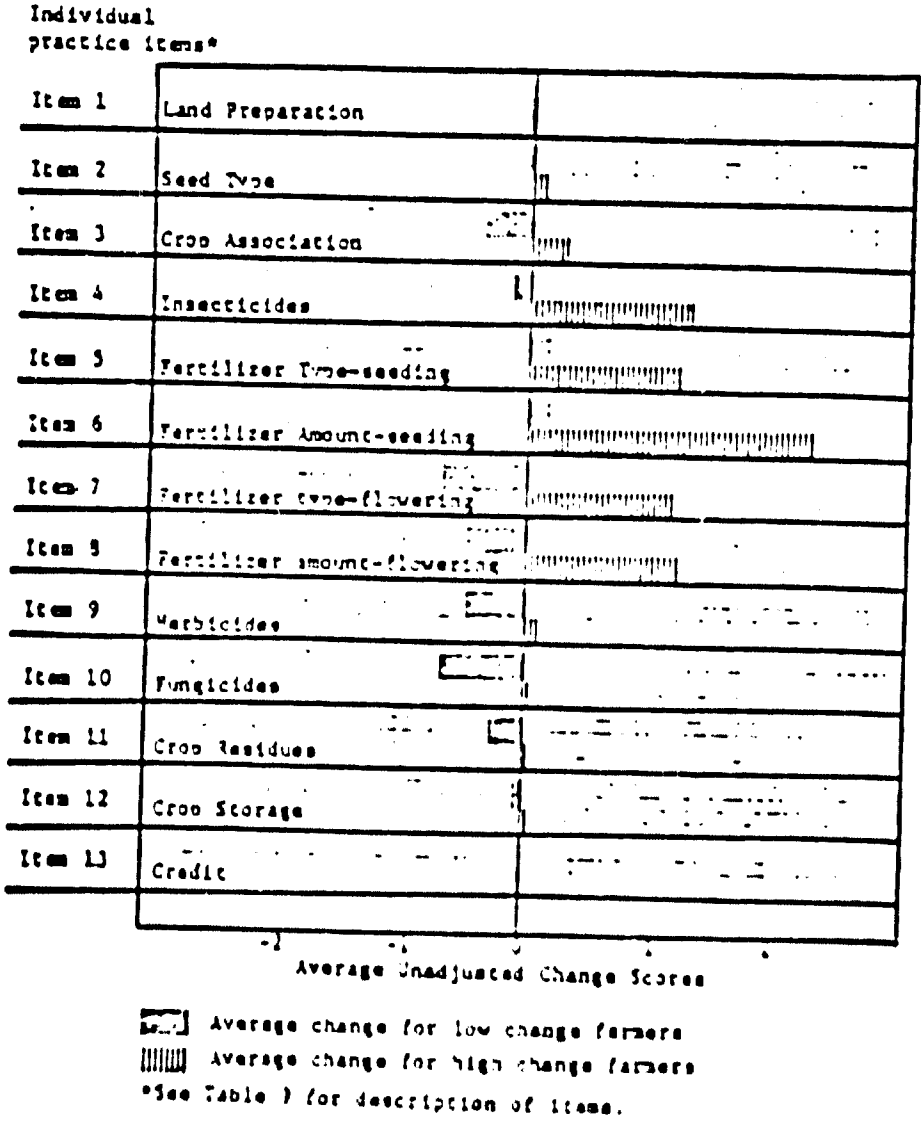


Figure 20. Average score on 13 individual practice items in Occidente.

tended to move in a negative direction, suggesting that they might have exaggerated their reports in the first stage of the experiment, or have actually dropped some practices to return to a more traditional level.

A comparison of Figures 19 and 20 also reveals that the magnitude of practice change on certain individual items was equivalent to, or greater in, the Occidente when compared to the Oriente--but not on as many items. The early baseline studies have indicated that the Indian population accepted the use of fertilizer, and they appeared ready to improve their practices.

It should be kept in mind, when interpreting the findings of the current section, that the behavior which determined membership in the high-change as opposed to low-change quartile in the Occidente is limited to fewer practices than in Oriente, and may be characteristic of a more specialized kind of readiness for change. With this caution in mind we will proceed with the description of differences between individual farmers in the two cultures who changed their practices in the direction of more "modern" agricultural technology over the two-year period and those who did not.

High- and low-change farmers in both cultures like high- and low-practice farmers, differ with respect to various background characteristics. The differences between the change quartiles are, however, much less drastic than the practice quartile differences. The overall F ratios for change category differences in both cultures are considerably lower than the corresponding ratios for the practice differences (see Tables 32 and 33, Appendix D). Furthermore, more error occurs in the classification into change quartiles than into the practice quartiles in both cultures. An inspection of the univariate F ratios also shows that very few individual characteristics differentiate between the change categories in either culture.

In Occidente, high- and low-change farmers do not differ with respect to any of the agricultural, economic indicators nor do they differ with respect to house type, fuel, water or toilet facilities or variety of diet. High-change farmers do report more radio listenership and radio ownership prior to BVE than do their low-change neighbors. The only attitude variables on which the two change quartiles differ in Occidente are perception of monetary gain as the main motive for education and perception of risk in fertilizer use. Contrary to expectations, high-change farmers are both less likely to have perceived the monetary motive for education and more likely to have perceived fertilizer use as risky prior to BVE programming. The only other significant between-quartile difference in individual terms is that high-change farmers are younger and more likely to work away from the farm.

Significant differences between change categories and individual items are similarly scarce in Oriente. High-change farmers in Oriente have slightly more land which is divided into a greater number of parcels; are slightly more likely to visit the nearest municipality; are more likely to use lard in their weekly diet; are more likely to have toilet facilities; and are more likely to be literate and have more literate members in their households than do their low-change neighbors.

In both cultures, several other variables become significant discriminators when the effects of all other variables are controlled; however, in neither culture is the total combination of variables very useful in predicting membership in the high- or low-change group, and only 20% of the variance in the background characteristics in either culture is accounted for by being a high as opposed to a low-change, farmer.

3. Summary

While a slight but significant difference between high- and low-change farmers in terms of background characteristics is found in both cultures, high- and low-change farmers do not differ significantly in nearly as many background characteristics as do high and low practice farmers. High-change farmers do not appear to be consistently wealthier, more likely to live in better circumstances or to have more "modern" attitudes, than their low change neighbors.

In conclusion, it would appear from the findings presented in this section that BVE-induced change toward more modern behavior is not nearly as dependent upon the background characteristics generally thought to be related to practice adoption as was pre-BVE practice level. It would seem, therefore, that the kind of programming implemented by BVE was relatively equally accessible to all farmers, regardless of these characteristics. While the level of development of an area on a traditional/modernity scale does seem to be related to the group's readiness for change, individual variation in social and economic characteristics within the group does not appear to be highly related to individual change. The findings presented here, along with previously discussed diffusion of information through friends and neighbors would seem to indicate that if the area is ready for change, the information delivered by a program such as BVE will be relatively equally well received by the farmers living within the area. The findings presented in this area are necessarily only tentative since the BVE Project was not designed to measure the effects of "group readiness" as opposed to "individual readiness" or acceptance and use of new agricultural information. The findings do seem to indicate that such group readiness may be a much more important factor than the individual's own characteristics in determining his tendency to change toward more modern agricultural behavior.

CHAPTER X

IMPLICATIONS

This chapter is a synthesis of overall Project findings and is presented with implications for utilization in other projects and settings. The inferences that are drawn are based on the findings from multiple sources including both the evaluation data gathered over the past five years and observations made in the field by the evaluation staff. After five years of immersion in this large data pool, the evaluation staff can now initiate the kind of bridging conclusions that lead us from the direct, concrete field evidence to rudimentary model building with its potential for generalization and wider applicability.

A. For Future Project Design

In the BVE Project, several approaches were utilized as a means of evaluation. The annual survey and the time sampling procedure were the most critical tools developed as a part of the research design, and their future use and potential effectiveness in other settings is discussed. Other factors concerning applicability of the evaluation process have emerged over the five year period of the Project. This section will provide a discussion of some of the major issues.

It is commonly assumed that an evaluation instrument is only a way of measuring the principal variables under study. While this measurement is a primary function of the surveys in the BVE Project, the survey instruments were also used as a means of providing feedback to the program so that incourse corrections could be made to increase effectiveness. The feedback function, therefore, becomes a key partner to the evaluation function.

The baseline survey not only provided a base from which to measure, but also established population characteristics in terms of levels of knowledge and practice which helped to set appropriate programming. The time sampling also provided a mechanism which verified levels of functioning in certain key areas as well as giving immediate feedback in terms of response to the program. The implication for dual utilization of all the instruments of evaluation must be carefully considered. Within this framework the following questions seem appropriate:

1. Is a baseline survey necessary? The baseline survey may not be as necessary in terms of measurement of pre-and-post change as it is in terms of understanding the nature of the population being studied and giving feedback for assistance in programming. A baseline survey, therefore, could be quite lengthy in its initial application but could be shortened considerably

for post-test measure by including only those items keyed to specific project goals. The most critical function of the baseline survey may be to provide information on current practices and current levels of development within the population, for which some communication media is being developed. There were many instances, during the development and use of the present survey, which indicated that the assumed knowledge of "experts," in any special content area, cannot be taken for granted as a statement of the level of functioning within the population at risk.

2. Could the time sampling procedure, by itself, be used for evaluation? The time sampling procedure provides immediate feedback in terms of program effect, and, if linked with some reasonable baseline information, it could be developed as a method of ongoing evaluation. While it would lack the rigor of large sample pre-and-post studies, it is a procedure that could be carried on quite efficiently by most program staff and could provide the kind of information needed to understand the response to the programming by the target population. As in the use of the baseline or annual surveys the key is feedback to the programming staff, and the time sampling appears to be a highly efficient method of obtaining this.

3. Would a monitor or some other informant system suffice for feedback and evaluation? A monitor or informant system could function quite efficiently as a feedback mechanism to keep the program on track, but would work much less effectively as an evaluation system. This is not necessarily negative in terms of program development, since vigorous evaluation need not be conducted in every setting in which a project is initiated. A monitor in a target area, given the task of providing systematic feedback concerning current programming (as was done in the BVE study), could provide information quite useful and quite similar to the time sample. The reliability and validity of the monitor in terms of evaluating the overall impact of programming would, however, be difficult to establish.

4. How could the evaluation instruments be utilized if the topic were nutrition, health or literacy? Items dealing with agricultural practice and potential for agricultural change are included on the present baseline survey questionnaires. Some of these items were deliberately designed for feedback and utilization by the field in developing its programming; others were more carefully designed for the measurement of change. Such items could be replaced by health and nutrition items with a behavioral base, or self-report, on attitude change. The same approach could apply in changing the time sample questions to fit a new programming content emphasis.

5. How much time is needed to confirm that change has taken place? The two years of study in each area discussed, under the cross-cultural comparison, indicate that change does indeed take place and is measurable over a two-year span. A longer time span would certainly be desirable to better estimate long-range benefits. The major findings, however, indicate that change does take place even in a two year period. The relatively short time might, however, account for some of the variations in the results found under different treatment conditions. For example, the pre-conditions

in the Quezada R treatment area were so different from the pre-conditions in Yupi R that two years of programming were not enough to overcome the differential starting point and readiness for mass media that was typical in Quezada. A greater time period would also help to smooth out the yearly variations in weather that are so closely related to agricultural production. Response to programming is related to the stage of development and varies considerably in different areas. If Project goals relate only to immediate impact, then year-by-year measures are sufficient, but, if a view of the process of change is a goal, time periods of five years or more would be important.

Further, the greater initial changes found in the Oriente, compared to the Occidente, raises the issue of whether the programming was adaptable enough to account for subtle baseline cultural variations in order to have a sufficient impact in the Occidente in the two year period. A further factor may be that in the Quezada sub-area of Oriente the procedure appeared to be a one-step kind of diffusion process where "information---radio---farmer = change" is the order of events for at least a significant part of the population. In the Occidente, information appears not to go directly from the radio to the farmer to produce change, but appears to go through an interpersonal network before change takes place. This process could also change over time and thereby make the long range effects in the two areas more similar than the short range evidence would suggest.

6. How well does agriculture serve as a content area to measure the results of communication treatment? There is no doubt that agricultural information meets many of the necessary criteria for an experimental program such as SVE. There is a felt need among the target audience for the new information, and the information can be made available within reasonable cost limits, relatively free of social principles, and also relates directly to the problem of world hunger.

There are, however, some limitations. Agricultural programming, unlike mathematics, equally appropriate at any time of the year - it must fit the agricultural cycle or wait until the next cropping season. The results are also dependent on weather and soil conditions that vary greatly even in carefully matched experimental areas. These variations must be accounted for because they can affect the results more than the experimental treatment itself.

a. Weather, in an agriculturally oriented program is a potentially confounding variable, difficult to control experimentally or statistically. Accurate local measurements could be developed, however, and made available for analysis. In a health project, local outbreaks of infectious viral disorders could be similarly confounding and could need accurate measurement.

b. Land. Despite careful sampling, some variation in areas did occur. In Yupi RM the poor quality of available land appeared to place a major constraint on change. A scale for classifying land could assist in the analysis.

c. Yield and production. Farmer estimates of yield and production varied considerably from fall to January in the two surveys conducted. A more exact method of determining production figures is essential, particularly for cost/benefit measures.

d. Oil crisis. Generally agriculture is free of local and international political problems, yet the international oil crisis in 1974 had a direct impact on the early results of the BVE Project. Moderate amounts of chemical fertilizer-use were part of the recommended practices included in the information package, and with the oil crisis, fertilizer increased in price to four times its original value and in some areas was not even available.

These issues are representative of some of the possibilities and problems encountered in all field measurement. While the problems do not negate the evaluation process, they do introduce sources of error in the analysis. They need to be dealt with by full involvement of field staff in the search for alternatives as well as in the interpretation of findings. In future studies, where external factors represent important variables, greater rigor of measurement could be developed.

B. Communication Treatments

In Chapter IX, the differential effectiveness of the various BVE media combinations was discussed in detail. It was noted, that many extra-experimental factors appear to effect the success of the radio, monitor and agronomist treatments in inducing change. In the current section each of the BVE media combinations will be considered in terms of its advantages in a variety of circumstances, and the limitations of its effectiveness that are indicated by the data. It is hoped that by this means the reader will become aware of the circumstances under which each type of communication media can be effectively applied to the problem of inducing changes in knowledge about, attitudes toward, and use of modern agricultural practices.

1. How effective is radio alone?

> "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 transmitters (Radio Quezada Educativa and Radio Momostenango Educativa for the Oriente and Occidente, respectively)."

a. Advantages

i. Radio can reach large numbers of people. As indicated in the year-end surveys, the listenership was as high as 90% in some of the experimental areas served by the BVE radios. The listenership studies that were conducted by the field personnel also confirmed a high rate of listenership well beyond the experimental areas.

ii. Radio can quickly become an acceptable source of new information. The earliest indication of acceptance came in the first time-sample survey conducted shortly after the broadcasts were initiated. People were listening and were able to identify specific agricultural recommendations.

iii. Radio can make a significant impact on attitude change. This was indicated by the time-sample surveys, as early as the first year. It was confirmed in the significant change in risk orientation in the Momos area of Occidente in the final analysis.

iv. Radio can be focused on specific behavior changes. Radio not only is useful in giving general background information but can actually be focused on specific behavior or skills. The BVE programming was based on specific behavioral objectives.

v. Radio can make a significant impact on behavior change. In the Quezada R area, early indications were that recommended agricultural practices were adopted as a result of the radio message. The final analysis of data confirmed that there had been a significant change in practice. This is possible when an area has already had some experience with development projects.

vi. Radio can become a personalized media. Radio does not necessarily have to be categorized as an impersonal media and therefore as not appropriate in a traditional setting. The personalization of BVE radio was accomplished by audience letters, questions and answer programs, local announcements of events, farmer interviews, focusing messages on urgent and felt needs, use of local modes of expression, and a workable feedback system to keep the programs on track.

vii. Radio can effectively combine education and entertainment. Perhaps the broad and continued listenership of the BVE audience was due to this more than any other factor. The "radio-novela" that combined the agricultural recommendations with a real life drama was one of the most popular programs. The audience identified with the characters and undoubtedly used them as models. The musical request programs were also popular, as were the straight programs of agricultural recommendations.

viii. Radio can effectively transmit new information to illiterates. If an illiterate does, in effect, have a mind-set against new information, it does not seem to prevent his capturing the idea by radio. There was no significant difference found between literates and illiterates in the adoption of new agricultural practices in the areas served by the BVE radio.

ix. Radio can effectively use a variety of programming approaches. It is important to note that the same BVE message was presented in a number of different ways. In addition to the novel and the interview, spot announcements and straight talk shows were used. Not only can variety be used but the fact that it was used probably accounts for the high audience interest.

b. Limitations

i. Radio alone does not bring about attitude change in all settings. There was a significant change in risk perception in the radio area of Momos but not in the radio area of Yupi. The reasons for this are not clear, but it may be due to a greater personal identification with the radio station in Momos than in Yupi.

ii. Radio alone does not bring about behavior change in all settings. Radio did not make a significant impact on changes in agricultural practices in radio alone areas of either Yupi or Momos during the two-year program period. When these areas are compared to the Quezada radio alone area (where significant change did take place), they seem to lack previous experience in development projects and community organization.

iii. The radio message must be well prepared, well presented and accompanied by a feedback system to be effective. It is important to remember that all of the BVE treatment conditions involved an extensive message preparation and feedback system which included the monitors and agronomists as sources of advice and feedback. The results cannot be generalized to a less highly integrated radio education system.

iv. The success of radio is dependent on the cultural, social and economic characteristics of the target area. There is a complex interrelationship between the effectiveness of radio as a communication-treatment condition and the characteristics of the geographical area and population involved. Quezada appeared to be ready for change. As more baseline information was gathered, it was clear that Quezada had been exposed to other programming and had already begun to modernize in their practices. They saw little risk in new practices, owned sufficient land and animals for flexibility in approach, listened to radio on a regular basis and were higher in number than other areas in number of literate family members and personal literacy. These seem to be the characteristics that related to the group's readiness for change. Yupi, although apparently matched in the beginning of the experiment, emerged with continued study of the baseline information, as clearly more traditional and less ready for change. Cultural factors in the Occidente also appear to impinge on the effectiveness of radio in that personal contact, rather than radio, appears to be much more highly valued initially for the transmission of information.

2. How effective is the monitor alone?

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

a. Advantages

i. The monitor is an effective source of new information in all cultural settings. The BVE monitor was an important source of new information in both Oriente and Occidente, and was by far, the most often mentioned source in the Occidente areas.

ii. The monitor can be effective in bringing about changes in practice. In areas such as the Ipala monitor-alone area, that are highly homogeneous and that form an integrated community, the monitor can be an effective promoter of behavior change even in the short time-span of two years.

iii. The monitor is the key person in the feedback link. As previously mentioned, the BVE monitor was part of the message delivery system but was also a necessary link in the feedback system.

iv. The monitor can help in assuring that back-up services are provided. Message credibility depends on the availability of products and services in the villages. Field reports showed evidence that the monitor often served as the go-between in order to ensure that such recommended materials as insecticides were available locally.

b. Limitations

i. The monitor alone does not bring about attitude and behavior change in all settings. There was significant attitude and behavior change in the Ipala monitor-alone area but not in Monitor-alone area of Occidente. All of the people in Ipala were part of one village and had some previous experience in development projects. This was not true in the Occidente monitor area.

ii. The monitor reaches a limited number of people when compared to radio. Although the monitor's message reached beyond those personally involved in the weekly monitor meetings by means of diffusion of information through friends and neighbors, the potential of the monitor as a direct source of information is much more limited than that of radio.

iii. The monitor depends on a message system to be effective. It must be remembered that the monitor did not work on the strength of his own knowledge of the subject matter nor on his ability to organize and prepare the teaching material. All of the message content was well enough prepared and organized to be presented by radio. This preparation was backed up by audio visual aids. The lesson was also covered in the weekly meeting with the agronomist and other monitors. Results of the BVE monitor-alone condition cannot be generalized to situations without this level of preparation and organization.

3. How effective is the Radio/Monitor treatment?

> "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 communication 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."

a. Advantages

i. The radio/monitor treatment can reach larger numbers of people than the monitor alone. This combination has all of the advantages of coverage that radio alone has.

ii. The radio/monitor treatment is an effective means of getting new information to the people. The monitor serves to reinforce the use of the radio as a source of information. The presence of the monitor tends to increase the frequency with which the radio is mentioned as a source.

iii. The radio/monitor treatment can be an effective means of changing attitudes and practice in areas that are ready for change. In all of the RM areas except that in Yupi, there was evidence of significant change in agricultural behavior. Furthermore, in the RM area of Occidente where modern techniques were seen as very risky prior to BVE, a significant improvement in attitude was also found.

b. Limitations

i. The radio/monitor treatment is not an effective means of bringing about behavior change in all settings. In the Yupi area the RM treatment condition did not have a significant impact on behavior change.

ii. The radio/monitor treatment depends on a well-developed message system. The same comments that were made concerning the monitor alone treatment apply here also. The monitor may work in the community alone, but in the BVE program he was always dependent on a well prepared and packaged message and the guidance of the agronomist.

4. How effective is the radio/monitor/agronomist treatment?

> "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."

a. Advantages

i. The radio/monitor/agronomist treatment is an effective means of communicating new information. Knowledge of new practices was reported in all of the BVE areas covered by the RMA treatment.

ii. The radio/monitor/agronomist treatment is an effective means of changing behavior. There was a significant difference in the adoption of new agricultural practices in all geographical and cultural areas served by the RMA treatment. This change was registered even during the brief two-year programming period of the BVE Project. The radio/monitor/agronomist treatment has the advantages of coverage, personal impact, use of varied media and methods, as well as the feedback linkage that have been previously mentioned.

iii. The success of the RMA combination is not dependent on the background characteristics of the target area. The RMA treatment condition was successful in inducing behavior change in the relatively prosperous area of Quezada, the much less prosperous area of Yupi and the traditional Indian area of Momostenango.

b. Limitations

The agronomist is not always recognized as a source of information. There is little doubt as to the overall impact of the agronomist, when added to the communication treatment, but he is not always recognized as the source of information. Apparently the monitor serves as the visible personal media and group discussion facilitator, while the agronomist serves as a backup to reinforce and give authority to the message.

c. Conclusions

The original objective of the BVE experimental project was to

"determine the effectiveness of different mixes of communication media in influencing change in agricultural practices..."

It appears from the findings of five years of evaluation that there is no single most effective media combination for all situations. The potential effectiveness of the various treatment combinations varies with the level of development, the economic well being and the present and prior exposure to mass media and technical assistance in the target area. It would appear that given an area like the Yupi sub-area of Oriente where land is poor, levels of literacy and formal education are low and the general level of living is low compared to other areas of Oriente, and where few educational programs had been targeted prior to BVE, the maximum program impact on knowledge and behavior change is not achieved without the full radio/monitor/agronomist media combination. The BVE findings suggest that in such areas the message must be diffused through friends and neighbors before direct use of the educational sources is made. In time, the necessity of agronomist and/or monitor may be reduced since it is evident that the BVE sources were utilized more frequently in the second than in the first program year. It is clear, however, that in areas like Yupi, for immediate behavior change the mass media personal reinforcement combination is of key importance.

In the traditional Occidente areas like those of Mames and Chichi, the radio is capable of introducing new agricultural ideas, and reducing the fear of implementing such ideas. Without reinforcement from an agronomist and/or monitor, however, maximum direct use of the radio as an information source will not be achieved, nor will the information be translated into positive behavior change during a two-year program period. There is some evidence that given more time, friends and neighbors may be able to take over

the job of encouraging use of the radio as a source. It is certain from our findings, however, that the probability of immediate behavior change is greatly enhanced by the addition of an agronomist and/or a monitor to the message delivery system.

Given an area like Quezada which has reasonably modern attitudes, exhibits a high degree of community organization, has been previously exposed to the mass media and other educational programs, and has had the advantage of previous and present technical assistance, radio alone will be immediately used as a source of new information and much of this new information will be translated into positive behavior change. In such an area the direct reinforcement provided by the agronomist and/or monitor is not as necessary for program impact.

It seems clear from the evaluation findings, that good baseline information on the potential target area is an essential prerequisite to choosing the best educational media for the area. In the absence of such data, the most prudent procedure would probably be to initiate the program with the full treatment combination; however, as soon as evaluation data or formal feedback indicates that farmers in the area are making use of the radio as a major source of new information, the delivery system could be reduced to radio alone.

In conclusion, while all of the BVE media combinations had measurable impact on knowledge about, attitudes toward and/or use of modern agricultural techniques, the precise media combination which is best suited for meeting specific educational objectives will vary depending on the circumstances in the target area.

PART FOUR

BVE PROJECT COSTS AND BENEFITS

CHAPTER XI

APPROACHES AND DATA SOURCES USED IN ECONOMIC ANALYSIS OF THE BVE PROJECT

Efficiency is the major criterion used in economics to determine whether or not a particular investment is worthwhile for the production and distribution of goods and services in a society. It is measured, if possible, by the increase in net monetary value that the society as a whole receives from that investment. Within this economic framework, prices for goods and services are used to represent their social values.

This basic approach has been applied by many economists over the last several decades in evaluating programs aimed at rural development. Agriculture is particularly amenable to such an approach, and the efficiencies of alternative technologies for improving agricultural productivity have been much studied. Educational programs have also been evaluated from this standpoint, in terms of whether or not their economic benefits justify the economic costs incurred.

The overall approach described above has been followed in this economic analysis of the BVE system. That system is viewed as an educational/informational program that impacts on farmer behavior which in turn impacts upon agricultural productivity. The value of any increase in agricultural productivity is considered to be a measure of BVE benefits. Resources used by the BVE program and the additional resources used in farming due to following BVE recommended changes in practice constitute the costs.

More specifically, this overall economic framework relies on cost, cost-effectiveness, and cost-benefit analysis to evaluate any system that involves resource use. Cost analysis summarizes the total value of resources used by a system in monetary terms. Cost-benefit analysis is the preferred tool for evaluating the worth of this resource commitment, by comparing it with system benefits which are also measured in monetary terms. Cost-effectiveness analysis is viewed as a necessary tool only when the impacts of a system cannot be valued in monetary terms, in order to compare the efficiency with which different systems achieve certain objectives quantified in non-monetary terms.

Costs and benefits of alternative BVE treatments are summarized, projected and compared in the present analysis. Their cost-effectiveness, with effects measured in terms of change in an index of agricultural practices, is also considered for two reasons: 1) agricultural practice changes are a key intermediate step to changing agricultural productivity; and 2) changes in practices due to different communications treatments are of interest in examining the effectiveness of alternative media, regardless of productivity changes which may or may not result.

There is a large body of economic theory which criticizes the fundamental assumption upon which the above approach is based — that prices can be used to measure the value to society of an activity. Critical economic theory emphasizes questions of equity and the conflict between competing societal groups which have very unequal power. Agricultural development programs are viewed from a structural, historical perspective that

focuses on the international forces of a global capitalist system that places countries in dependent positions, and that places the rural populace in a marginal position within their own country. Educational and communications systems are viewed as investments in maintaining and reinforcing the inequalities that exist. The perspective this version of economics would bring to evaluation of the BVE Project is obviously quite different from that posed above. While the present analysis follows the approach of conventional economics, some of the important questions posed by this critical economics framework will be considered in the conclusions section.

Data used in this analysis are derived from results of the BVE experiment. Cost projections for a region-wide BVE system are based on detailed analysis of actual costs incurred and their relationship to key system variables, such as the number of hours of local programming produced or the ratios of monitors and agronomists to farm families. Effectiveness information is taken from the University of South Florida (USF) examination of changes in agricultural practices resulting from the BVE experiment. Estimations and projections of the costs and benefits of these practice changes rely on three sources: 1) careful studies by agronomists of the potential benefits that can be gained through following these practices; 2) the results of BVE crop demonstrations which show what these new practices yield in actual field situations; and 3) an analysis of the large amount of survey data gathered by USF relating to changes in agricultural productivity which occurred during the BVE experimental period.

CHAPTER XII

BVE COSTS, BENEFITS, AND ECONOMIC RETURNS

The value of increased agricultural productivity that can be attributed to BVE Project impact is the economic measure of BVE benefit. However, the primary objective of the BVE experiment was to assess effectiveness of various media mixes rather than to increase productivity per se. Furthermore, the relatively short experimental period placed serious limitations on the possibility for obtaining a measurable increase in agricultural productivity, due to constraining effects of forces external to the Project (Chapter VII) and the nature of the adoption process. Any analysis of Project costs and benefits requres making assumptions to compensate for such factors.

Nonetheless, decision-makers are vitally interested in the costs and benefits of alternative strategies among which they must choose and allocate resources. Thus, while recognizing several of the constraints cited above, the BVE Project Implementation Plan called for a cost-benefit analysis, and for determination of cost effectiveness with extrapolation for a larger audience. Results of that analysis, and major assumptions upon which it was based, are summarized in the sections which follow.

A. Costs

Although the economist's primary concern is with the evaluation of a system in terms of its social value, a decision-maker is usually more concerned with the impacts of a decision on the budget than with its total resource implications. The cost analysis reported herein uses budgetary data collected during the course of the BVE Project to approximate the economic costs of alternative BVE treatments.

Costs are expressed in 1979 quetzales (U.S.$1.00 = Q 1.00). Inflation is ignored in these economic cost projections, essentially assuming that the real cost of resources remains constant over time. To analyze future budget requirements, inflation rates should be projected for calculation of future resource prices and the subsequent budget impacts.

To make the analysis most useful to other countries, listings of project resource utilization based on personnel inputs and physical counting of other items are presented in the full report on this analysis (Reference J-20 in Appendix B) insofar as possible in addition to budget expenditures. Costs incurred in Guatemala reflect local salary and price conditions. Given the imperfections in the market system and varying supply and demand conditions among countries, personnel and other resource costs may be expected to differ from one country to another.

The basic methodological approach employed in the cost analysis was the development of appropriate cost functions to permit summarization and reporting in terms of total annual cost or average annual per unit cost for each of the media mixes or systems under study. Inputs from all sources -- Ministries of Education, Agriculture and Health, the contractor, AID, farmers — are aggregated in this process. Costs per category excluding

farmer costs are also reported in order to represent government agency cost requirements, and to take account of the fact that farmer costs may not represent a true economic opportunity cost (discussed below).

The needs of Guatemalan decision-makers for cost information on BVE are likely to be quite different than those of other international users of BVE results. In Guatemala, the need from this point onward will probably be for a basis for determining costs of expanding an already established program. The users in another country, in contrast, may well seek information concerning the costs of designing and implementing a new program. To meet the needs of both, total and average per unit cost projections are presented in two forms:

1) projected costs for an expanded BVE program in Guatemala, excluding all costs to date — startup, research, evaluation, technical assistance, etc. — with all salaries calculated on Government of Guatemala salary and wage scales;

2) projected costs for implementation and operation of a BVE-type program in a new setting; includes all costs incurred for startup, research, evaluation, and technical assistance over an assumed 10-year life of program.

The projected costs of regional BVE coverage are calculated for each of the four BVE systems (radio only, radio-monitor, radio-monitor-agronomist, and monitor only) plus a less intensive radio-monitor-agronomist system and a traditional extension system using neither radio nor monitors. Annual total, per farm family and per farmer listening hour costs were calculated for each of six systems with and without farmer costs, and with and without startup costs.

Results of the BVE cost analysis, summarized in Tables 18 and 19, are discussed in terms of the expanded program in Guatemala. Costs for implementation and operation of a regional program in an international setting differ only in an increase over the former in annual fixed costs of Q 195,000 and Q 129,000 for the Oriente and Occidente, respectively.

The effect of including farmer costs in total cost of most systems is substantial. Assumed in the farmer cost are a "wage rate" of Q 0.10 per hour for listening time, and Q 0.01 per hour for battery cost. It may be argued that farmers will not sacrifice productive work time for radio listening, and that they would be listening to the radio for entertainment in any event; if this is true, farmer costs may not involve additional use of social resources and therefore should not be included.

Average per unit annual costs for the radio only system, excluding farmer costs, are projected at Q 0.03 and Q 0.02 per farmer listening hour and Q 2.08 and Q 0.93 per farm family for the Oriente and Occidente respectively. Although total costs are somewhat higher in the Occidente, due to the necessity to use a diesel-electric system to power the transmitter and somewhat higher production costs, projected unit costs are lower as the result of a larger population within the range of a BVE transmitter (150,000 and 91,650 rural families in Occidente and Oriente, respectively).

Table 18

Total and average per unit annual cost projections for an expanded BVE program in Guatemala.[1]

Treatment	Oriente[2]			Occidente[3]		
	Total	Per farm family	Per farmer listening hour	Total	Per farm family	Per farmer listening hour
	Q	Q	Q	Q	Q	Q
Radio only:[4]						
Including fmr. cost	820,800	8.96	0.14	882,500	5.88	0.13
Without fmr. cost	190,700	2.08	0.03	140,000	0.93	0.02
Radio-Monitor:[5]						
Including fmr. cost	2,120,000	23.13	0.37	5,293,200	35.29	0.78
Without fmr. cost	1,452,800	15.85	0.25	4,480,600	29.87	0.66
Radio-Monitor-Agronomist (I):[6]						
Including fmr. cost	3,615,900	39.45	0.63	9,975,200	66.50	1.48
Without fmr. cost	2,902,400	31.67	0.51	9,101,600	60.68	1.35
Radio-Monitor-Agronomist (II):[7]						
Including fmr. cost	2,889,800	31.53	0.50	7,634,200	50.89	1.13
Without fmr. cost	2,198,800	23.99	0.38	6,791,900	45.28	1.01
Monitor only:						
Including fmr. cost	1,501,500	16.38		4,559,300	30.40	
Without fmr. cost	1,464,400	15.98		4,489,200	29.93	
Traditional Agricultural Extension:[8]						
Including fmr. cost	3,090,200	33.72		9,514,100	63.43	
Without fmr. cost	3,027,300	33.03		9,389,100	62.59	

1 Excludes all costs to date: startup, research, evaluation, technical assistance, etc. All salary levels are calculated on basis of Government of Guatemala scales.

2 Assumes 91,650 farm families with 125 hours of original radio programming (excluding radio forum) and 45 radio forums annually.

3 Assumes 150,000 farm families; with 90 hours of original radio programming (excluding radio forum) and 30 radio forums annually.

4 Assumes that 50 percent of the farmers listen to all programs.

5 Assumes monitor to farm family ratios of 1:250 and 1:150 for Oriente and Occidente, respectively (based on Project experience).

(Footnotes continued on page 103)

Table 19

Total and average per unit annual cost projections for implementation and operation of a regional BVE program.[1]

Treatment	Region I[2]			Region II[3]		
	Total	Per farm family	Per farmer listening hour	Total	Per farm family	Per farmer listening hour
	Q	Q	Q	Q	Q	Q
Radio only:[4]						
Including fmr. cost	1,015,800	11.08	0.18	1,011,500	6.74	0.15
Without fmr. cost	385,700	4.21	0.07	269,000	1.79	0.04
Radio-Monitor:[5]						
Including fmr. cost	2,315,000	25.26	0.40	5,422,200	36.15	0.80
Without fmr. cost	1,647,800	17.96	0.29	4,609,600	30.73	0.68
Radio-Monitor-Agronomist (I):[6]						
Including fmr. cost	3,810,900	41.58	0.67	10,104,200	67.36	1.50
Without fmr. cost	3,097,400	33.80	0.54	9,230,600	61.54	1.37
Radio-Monitor-Agronomist (II):[7]						
Including fmr. cost	3,084,800	33.66	0.54	7,763,200	51.75	1.15
Without fmr. cost	2,393,800	26.12	0.42	6,920,900	46.14	1.03
Monitor only:						
Including fmr. cost	1,696,500	18.51		4,688,300	31.26	
Without fmr. cost	1,659,400	18.11		4,618,200	30.79	
Traditional Agricultural Extension:[8]						
Including fmr. cost	3,285,200	35.85		9,643,100	64.29	
Without fmr. cost	3,222,300	35.16		9,518,100	63.45	

(See footnotes on next page)

Footnotes to Table 18 (continued):

6 Assumes agronomist to farm family ratios of 1:500 and 1:300 for Oriente and Occidente, respectively (based on Project experience).

7 Assumes agronomist to monitor ratio of 1:4.

8 Assumes agronomist to farm family ratios of 1:250 and 1:150 for Oriente and Occidente, respectively, with no radio and no monitor.

Footnotes to Table 19:

1 Includes all costs incurred for startup, research, evaluation, and technical assistance amortized over a ten-year life of program. Represents the costs that would be incurred by other countries seeking to establish a program such as BVE (referred to in the text as "international").

2 Based on Guatemalan Oriente: 91,650 farm families and annual production of 125 hours of original radio agricultural programming (excluding radio forum) plus 45 radio forums.

3 Based on Guatemalan Occidente: 150,000 farm families, and annual production of 90 hours of original radio agricultural programming (excluding radio forum) plus 30 radio forums.

4 Assumes that 50 percent of the farmers listen to all programs.

5 Assumes monitor to farm family ratios of 1:250 and 1:150 for Regions I and II, respectively.

6 Assumes agronomist to farm family ratios of 1:500 and 1:300 for Regions I and II, respectively.

7 Assumes agronomist to monitor ratio of 1:4.

8 Assumes agronomist to farm family ratios of 1:250 and 1:150 for Regions I and II, respectively, with no radio and no monitors.

The high costs of extending monitor and agronomist services to rural families throughout the transmission region at levels utilized in the experiment are illustrated below:

System	Cost per farm family (without farmer cost)	
	Oriente	Occidente
	Q	Q
Radio alone	2.08	0.93
Radio-monitor	15.85	29.87
Radio-monitor-agronomist	31.67	60.68

Costs are higher in Occidente than Oriente due to the population patterns and access problems which result in lower monitor and agronomist to farm family ratios. If the ratio of agronomists to monitors is doubled as in the calculated less intensive radio-monitor-agronomist treatment, costs per farm family drop from Q 31.67 to Q 23.99 and from Q 60.68 to Q 45.28 per farm family for Oriente and Occidente, respectively. The per family cost for a traditional extension system, which assumes an agronomist to farm family ratio equal to that use in BVE for monitors (but which uses neither radio nor monitors), is slightly greater than the most intensive BVE system.

All of the costs discussed above take on meaning, of course, only as they are considered in relation to benefits derived from the investment made.

B. Cost Effectiveness

Although the principal purpose of this economic analysis is to examine the costs and benefits associated with BVE treatments, the issue of system cost effectiveness merits some consideration as well. Intermediate effects such as changes in knowledge and practice, although they cannot easily be expressed in monetary terms, are necessary to and may occur considerably prior to productivity benefits. Furthermore, a major thrust of the BVE evaluation effort as reported in Part Three was to examine the efficacy of BVE treatments in inducing changes in agricultural practices used by small farmers. Analysis of system cost effectiveness helps to provide a bridge between that evaluation and this examination of costs and benefits.

The USF evaluation focused on change in an index of agricultural practices over time between various treatments as one measure of BVE effectiveness. The practices included in the index were picked on the basis of their emphasis in the educational program rather than on their predicted impact on agricultural productivity. Changes which occurred in that index nonetheless provide a measure of effects that may be examined in relation to costs.

A very simple cost effectiveness analysis has already been reported in the preceding section, namely, a comparison of costs per unit of reached or potential audience. The analysis is now carried one step further to determine the average cost per unit change of the average farmer on the USF agricultural practice index. The cost per farmer used here includes full project costs, without valuing farmer time or batteries. (Other cost alternatives would yield similar ranking between treatments.) Cost data encompass two years of operation to correspond with the two year period over

which practice index change is measured.

Cost effectiveness comparisons for the BVE treatment systems are presented in Table 20, The measure of effectiveness per farmer in that table is the gain of farmers in BVE treatment areas over increases observed in the control groups. Based on examination of effectiveness alone, the USF evaluation concluded that there was a measurable BVE effect in the Oriente, but found no significant differantial effects between treatments in that region. For the Occidente, they concluded that the RM and RMA treatments were more effective than "natural change" in the control areas, but that R and M treatments did not yield significant differences.

Addition of cost information into the comparisons provides a different perspective. If measured by the cost expended per farmer to yield a one point change on the agricultural practice index, considerable differences between treatments appear. As seen in Table 20, cost-effectiveness ratios range from about Q 3 per point for radio alone in the Oriente to more than Q 300 per point for the monitor alone treatment in the Occidente. The generally lower ratios for the Oriente are due partially to the greater gains in that region, but, more importantly, to the additional costs of agronomists and monitors required to serve the Occidente region as discussed in the preceding section.

Table 20

Comparisons of cost effectiveness of the various treatments utilized in the Basic Village Education Project, Guatemala.

	Oriente				Occidente			
	R	RM	RMA	M	R	RM	RMA	M
Cost/farmer[1] (quetzales)	8.42	35.96	67.60	36.22	3.58	61.46	123.08	61.58
Effectiveness/farmer[2] (index points)	2.6	1.9	3.8	3.4	0.4	1.5	1.4	0.2
Cost-effectiveness ratio[3] (quetzales/index point)	3	19	18	11	9	41	88	308

1 Two years of full treatment costs, i.e., relevant to international decision-makers, not including farmer cost.

2 Results reported in USF, 1977, p. 106, and in USF, 1978, p. 27, again based on two year impact.

3 The ratio of the two above.

Note: R = Radio alone, RM = Radio-Monitor, RMA = Radio-Monitor-Agronomist, M = Monitor alone.

Several factors must be weighed in interpreting the above findings:

- Only regional impacts can be measured. Data are not available concerning the intensity with which particular farmers listened to or participated in BVE programs or activities. Although some farmers may have actively followed BVE recommendations with large resultant impact, that impact is averaged over the entire number of farmers in the treatment region. A small change observed in these data may signal a larger change that will occur after more years of operation.

- As discussed earlier in this report, there were several sources of potential "contamination" of the experimental design that could have partially masked differences in treatment effectiveness. Of these, the most important was that feedback from agronomists and monitors tended to make the treatments relatively interdependent.

- The data presented in Table 20 do not provide any sense of the value of a unit of change. Although effectiveness comparisons show that some treatments had a statistically significant impact on changing farmers' practices, the question of practical significance still remains.

C. Benefits

Project costs and cost effectiveness have been considered in the two foregoing sections. In both cases, the need for some measure of value to make these results more meaningful has been pointed out. The benefits derived from the investment in BVE, which would obviously provide such a measure, are discussed and projected on a regional scale in this section.

To recapitulate briefly, the BVE experiment was not designed to increase agricultural productivity directly. Opportunities for small farmers to take advantage of BVE information to increase their productivity during the experimental period were limited by forces beyond the control of the Project. Finally, existing literature on the adoption of agricultural innovations suggests that the adoption and diffusion of new agricultural practices is a relatively slow process, often requiring five to ten years for substantial impact to be observed. In short, the likelihood of achieving measurable impact on production during the short BVE experimental period was relatively low.

Although not always collected in the form most amenable to benefit analysis, the Project did generate a large and diverse body of evidence to examine with respect to agricultural benefits accruing from BVE. Two papers developed by Project agronomists, one for each region, established "theoretical" maximums for potential benefits to be derived from the correct application of BVE information. Results of crop demonstration plots conducted by BVE in cooperation with farmers in the two regions helped to determine the practical maximum impact that can be expected from the adoption of those technologies. Finally, the mass of survey data collected from a sample of farmers in the treatment and control areas during the experimental period

provided the basis for determination of whether or not BVE treatments had measurable impact on agricultural productivity in the short span of two to three years, and, if so, to what extent. Using the three sources of information together, it was then possible to make some rational assumptions upon which to base projections of BVE benefits over a longer time period.

The theoretical maximum benefit indicated that a large increase in farm profitability, as much as Q 200/manzana (1 mz. = 1.7 acres) in the Oriente and Q 300/mz. in the Occidente, would be possible from the use of improved technology then available. Crop demonstration results generally showed lower actual profits from improved practice use, and only a small difference in net gains between Oriente and Occidente. In a normal year, crop demonstration data indicated a net gain in profits of about Q 170/mz. from following BVE recommended practices. In a year of serious drought, however, following traditional practices yielded a lower net loss than following improved practices.

The investigation of actual BVE impact during the experimental period, based on a two step flow model (BVE treatment affects agricultural practice which in turn affects agricultural productivity), did not yield conclusive results. Most systems (treatments) seemed to have a positive, although relatively small, impact. However, some (especially radio) occasionally showed a negative impact. The largest observed impact was an increase in revenue of Q 50/mz. (a profit increase of some Q 35/mz.) for the RMA treatment in the Oriente in 1976.

Although it could be construed from the empirical analysis of BVE experimental period data that there are no agricultural benefits to be derived from a regional BVE system, that conclusion is rejected for the following reasons:

a) The crop demonstrations generally showed a considerable gain in yield from following BVE recommended practices.

b) The USF evaluation indicates that improved agricultural practices (as measured by their practice index) are being adopted as the result of BVE, and that the changes are great enough to appear in regional comparisons.

c) The apparent negative impact of some BVE treatments on some practices is unlikely to be causal, and probably reflects problems with the statistical models.

d) Consistently positive, although small, total revenue (and probably profit) benefits from the BVE experimental period were found for certain treatments, again indicating the possibility that changes in practices and productivity among some farmers are great enough to appear in regional comparisons.

e) The diffusion of innovation literature argues that more time than the BVE experimental period is needed for significant diffusion.

Taken together, the above points support the conclusion that agricultural

benefits can be expected to accrue from a BVE system.

The extent of such benefits is still unclear. Consequently, regional benefits have been estimated under several different assumptions:

- The maximum practical agricultural benefit attainable is estimated on the basis of crop demonstration results, taking effects of periodic unfavorable weather into account (assumes one widespread serious drought year and one semi-drought year every seven years).

- Whatever the benefits to be achieved, it is assumed (in accordance with the existing literature) that they will be the result of a relatively slow diffusion process that accelerates over time. Specifically, it is assumed that maximum system benefits will not be achieved for seven years — starting at five percent of the maximum in year one, increasing exponentially over the next six years, and remaining constant thereafter.

- Three alternative possibilities for the actual agricultural benefits generated by a BVE system are considered: one third, two thirds, and 100 percent of the practically attainable maximum.

The results of this projection of net agricultural benefits are given in Table 21. It should be noted that the regional benefits to be observed after two years using the above assumptions vary from Q 3/mz. to Q 10/mz., which is not inconsistent with the impacts observed during the BVE experimental period. The implications for BVE of these potential benefits will be discussed in the following section in relation to BVE system costs.

D. Economic Returns

The final step in the economic analysis of the BVE Project is to compare regional benefit and cost projections presented in the foregoing sections to determine the economic returns to different BVE systems under the different assumptions made. Since no firm quantitative base could be established for estimating the differential benefits that may accrue to different BVE systems, the least expensive system will yield the highest economic returns.

The cost analysis included consideration of Oriente and Occidente costs for six treatments (the four BVE treatments plus a less intensive RMA alternative and a traditional agricultural extension system) both including and excluding farmer costs. Both full system costs, with all startup and research expenditures included, and ongoing costs for expanding the BVE program in Guatemala were calculated. The unit costs were expressed as cost per farm family or per farmer listening hour, however, while the regional benefit projections were expressed on a benefit per manzana basis. To have comparable units for comparison, cost projections are presented on a per manzana basis in Table 22 (costs for each alternative are averaged over the estimated cultivated area within the reception radius of each BVE transmitter

Table 21

Net agricultural benefits projected for a BVE system, expressed in quetzales/manzana.

Year	Oriente			Occidente		
	Low[1]	Inter-mediate[2]	Maximum[3]	Low[1]	Inter-mediate[2]	Maximum[3]
	Q	Q	Q	Q	Q	Q
1	2.00	4.00	6.00	2.08	4.17	6.25
2	3.30	6.60	9.90	3.43	6.86	10.29
3	5.43	10.86	16.29	5.65	11.30	16.95
4	8.94	17.88	26.82	9.31	18.62	27.93
5	14.74	29.48	44.22	15.34	30.68	46.02
6	24.28	48.56	72.84	25.29	50.57	75.87
7 and following	40.00	80.00	120.00	41.67	83.33	125.00

1 Assumes achievement of one third of the maximum practical benefit as calculated from crop demonstration results, taking effects of periodic unfavorable weather into consideration.

2 Assumes achievement of two thirds of the maximum practical benefit.

3 Assumes that 100 percent of the farmers in the region achieve the maximum practical benefit.

-- 235,000 and 205,000 manzanas for Oriente and Occidente, respectively).

The three alternative benefit assumptions must also be utilized. Considering both cost and benefit assumptions, a total of 144 alternative situations have been developed for which economic returns could be estimated. That is fortunately unnecessary as most systems have high economic rates of return under all three benefit alternatives.

As shown in Table 23, only the two RMA alternatives in the Occidente under the lowest benefit assumption indicate a negative economic rate of return, assuming the program and its benefits are maintained for 20 years. Under this lowest benefit assumption, the returns to an RM or M system in the Occidente would range from about 8 to 15 percent, depending on the cost assumptions made. Under the intermediate benefits assumption, the most costly RMA alternative for the Occidente has a rate of return of about ten percent, and under lower cost assumptions the returns from an Occidente region RMA system could be as high as 25 percent. All other combinations would yield rates of return greater than twenty-five percent, and often

Table 22

Average annual costs of BVE system alternatives, expressed as quetzales per manzana.

	R[1]	RM[2]	RMA(I)[3]	RMA(II)[4]	M[5]	TAE[6]
	Q	Q	Q	Q	Q	Q
A. To Guatemalan Decision-makers[7]						
1. Without farmer cost:						
Oriente	0.67	5.10	10.18	7.72	5.14	10.62
Occidente	0.69	21.85	44.40	33.13	21.90	45.80
2. Including farmer cost:						
Oriente	2.88	7.44	12.73	10.13	5.27	10.85
Occidente	4.30	25.91	48.66	37.24	22.24	46.41
B. To International Decision-makers[8]						
1. Without farmer cost:						
Oriente	1.36	5.78	10.87	8.40	5.82	11.31
Occidente	1.32	22.48	45.03	33.76	22.53	46.42
2. Including farmer cost:						
Oriente	3.57	8.13	13.37	10.82	5.96	11.52
Occidente	4.43	26.45	49.29	37.87	22.87	47.04

[1] Radio alone.

[2] Radio-monitor.

[3] Radio-monitor-agronomist as in BVE; with agronomist to monitor ratio of 1:2.

[4] Same as above except that agronomist to monitor ratio is widened to 1:4.

[5] Monitor only.

[6] The traditional agricultural extension system; assumes no radio or monitors, and an agronomist to farm family ratio equal to monitors in BVE.

[7] Excludes all startup, research, evaluation and technical assistance costs.

[8] Includes all costs incurred for startup, research, evaluation, and technical assistance amortized over ten year life of program.

exceeding 100 percent. The radio alone alternative yields infinite returns, since under most assumptions there is never a year in which the costs are greater than the benefits. (The traditional agricultural extension system is not included in this discussion as no information concerning potential impact was available for that system.)

Table 23

Economic rates of return for BVE system alternatives, assuming maintenance of program and benefits for 20 years.

Alternatives	Rate of return
1. RMA(I) and RMA(II) in the Occidente, under the lowest benefits assumption	negative
2. RM and M in the Occidente, under the lowest benefits assumption; and RMA(I) in the Occidente, under the intermediate benefits assumption	8 - 25 %
3. All other alternatives	greater than 25 %

If the only criterion for system selection were economic returns, and if the implicit assumption of equal effectiveness were correct, the radio alone system would be the optimum choice among the BVE systems. That may well be the case in some situations. However, it would be dangerous to make that generalization for several reasons. For example:

- the complexity of the technology to be transferred may well determine the most effective media system to use. In the case of insect control as an illustration, the introduction of insecticide use may be entirely feasible through the radio alone system. As the farmers progress, however, and move toward an integrated insect control program involving both cultural and chemical control methods, access to a technician may be indispensable.

- in one area, a single good source of information such as radio or monitor may be adequate for inducing change among small farmers. In another area, custom or culture may dictate the use of multiple channels in order to legitimize the message and gain acceptance.

- the value of the monitor and/or agronomist to the system extends far beyond their function as "information deliverers". They also serve an essential function as feedback agents. If they are not a part of the system, some other means must be found for obtaining such feedback in order to keep the program attuned to local interest.

Costs per manzana for the various alternatives, as were shown in Table 22, are useful in taking economic, cost effective and qualitative factors into account in making a judgment as to the particular BVE system that should be selected for a given situation. That is, the per manzana benefits necessary to make an alternative system economically viable can be estimated, as well as the differential impact necessary to make one alternative more favorable than another.

For example, from the point of view of Guatemalan decision-makers, a radio system in the Oriente will cover its costs (including farmer costs) if it generates only about Q 3/mz. in benefits. The addition of a monitor to convert it to an RM system will require that an additional Q 5/mz. of benefits be generated, and so on for the various systems.

CHAPTER XIII

CONCLUSIONS FROM THE ECONOMIC ANALYSIS

Under the assumptions postulated in the analysis, most BVE treatments in most circumstances have the potential to yield substantial economic returns to both the farmer and society as a whole. Even under the lowest assumption of benefits, farmer profits would increase by two thirds over their present levels; and under the highest benefit assumptions, farmer profits would about triple. Proper interpretation of these findings requires consideration of several issues, however.

First, there are a significant number of factors completely outside the control of BVE decision-makers and the participating farmers that will affect the results obtained from a BVE system. Climate, land quality, and land distribution are clearly important factors in that regard. Input and output prices, often subject to considerable influence by the world market, also have a great impact on agricultural profitability. These and other factors will likely make the actual economic returns to a BVE system considerably different from those forecast. It is important not only to recognize these factors, but also to structure the BVE system so that it has the flexibility to adapt to continually changing conditions.

Second, although it was not possible to discriminate between the agricultural impact of different treatments in this analysis, it is likely that important differences will exist under certain situations. The complexity of the information to be disseminated, the customs and culture of the target population, and alternatives available for maintaining adequate feedback from the target population are factors which are likely to be important in this regard. Again, flexibility in the BVE system will be critically important to long term success with any BVE system.

Third, the economic evaluation undertaken was based on the framework of conventional economic analysis as stated at the outset. It would have been worthwhile, if time and resources had permitted, to examine the BVE system closely from the perspective of what we have termed critical economic theory. One major point that would probably have emerged from the latter perspective would have been whether or not it is possible to make significant changes in the well- eing of poor subsistence farmers, given the historical, structural process which has relegated them to small pieces of land from which they can barely sustain their own families. The critical question from this perspective is land tenure policy, and the argument would be made that no rural educational system can yield more than a marginal impact on this rural populace.

Despite the validity of the observation, land (or wealth) redistribution may be unlikely at present. Given these constraints a relevant question on which policy-makers focus is what can be done within the existing structure. By focusing its attention on poorer farmers with small landholdings, a BVE system may aid at least somewhat in redressing inequities. Most importantly, however, these small farmers can likely realize substantial improvements in their agricultural yields which, although not removing them from a marginal position in the social structure, can improve significantly the well-being of themselves and their families.

PART FIVE

BVE OUTREACH AND FOLLOW ON

CHAPTER XIV

BVE PROJECT OUTREACH

The Basic Village Education Project was cognizant from the beginning of the need for interaction and sharing information with other agencies and programs. Early efforts in this regard were directed principally toward design and operational aspects of BVE, while later outreach activities were more heavily weighted toward results obtained. Complete documentation of the Project was given major importance throughout the experiment.

Both operational experience and results obtained through BVE attracted attention from the outset. Representatives of numerous national and international organizations and institutions visited BVE and were briefed by Project staff. Field staff in Guatemala, the evaluation team at the University of South Florida, and the Academy for Educational Development office in Washington responded to requests for information from all parts of the world, distributing several hundred reports concerning the Project in the process.

Professional field and evaluation personnel (both Guatemalan and foreign) presented material from BVE at international conferences and professional meetings. They also responded to requests for consulting assistance in several Latin American countries, utilizing BVE experience and results in helping to design or implement new programs of non-formal education. In late 1976, the Project organized an intensive two-month training course on program production and evaluation for three representatives of a Honduran non-formal education program.

The Project interacted both formally and informally with various other Guatemalan institutions. Three examples are cited below to illustrate.

In mid-1974, unfavorable weather during the cropping season threatened to cut production of basic crops significantly. As a result, the Ministry of Agriculture mounted an intensive campaign to promote the planting of a second crop. The BVE Project was asked to help, and participated fully in the campaign for the Oriente. Later in the Project, the Director of DECA (the Ministry of Agriculture directorate responsible for agricultural extension) stated on several occasions that his institution was looking toward BVE results to provide guidance in helping DECA to improve its own programs in the future.

In the immediate postearthquake period, the Project helped to plan the effective use of audio/visual support to an emergency plan for formal education.

A major new Guatemalan non-formal education (NFE) program was designed to coordinate all NFE activities of the various ministries and to establish a regional NFE "module" in the Highlands of Guatemala. The plan envisioned coordination achieved through inter-ministerial bodies at the national level, and non-formal education carried to the rural people of the Highlands region through monitors, radio, and other delivery systems. This program received support from AID (through the Basic Rural Education Project), UNESCO, and UNICEF.

In addition to its continuing responsibility to the BVE Project, the Academy for Educational Development (under separate contract) assumed the further responsibility to provide technical services to the Basic Rural Education Project, beginning in late November 1975.

Basic Village Education 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 the new NFE program. In addition to technician inputs, BVE made educational materials available to the new program, and helped to train selected BRE personnel.

Field and evaluation staff from BVE participated jointly in several events organized specifically for the purpose of reviewing Project progress and results. Such events included a two-day conference in Guatemala in October 1976 to present preliminary evaluation results — more than 80 representatives of 18 national and international institutions participated — and four comprehensive reviews requested by AID during the April 1974 to March 1977 period.

In addition to generating numerous reports and other writings (see Appendices B and C for a partial list), the Project also produced a 16 mm color film, a 35 mm slide set, and various other materials to strengthen its outreach efforts.

CHAPTER XV

PROJECTED FOLLOW ON TO BVE

The BVE Project completed experimental programming in the Oriente at the end of 1976, and in the Occidente one year later. The Ministry of Education has since continued, without external support, to provide educational programming based on the BVE system to the people in both regions.

Guatemala inaugurated a new president in July 1978. Representatives from BVE have met with him and the newly appointed Minister of Education to initiate preliminary discussions about possible extensions of the Project. The new Government appears enthusiastic with the Project's evaluation results, and has fully supported the continuation of BVE educational programming. Construction of radio towers in areas not reached by the existing BVE stations, use of public radio time, and the possibility of educational television are among the topics discussed as possible expansions of the BVE Project.

On the international front, a number of proposals are under consideration for disseminating results and operational information from BVE more broadly through the developing world. The objective is to present such information in a manner that will facilitate its appropriate application elsewhere.

A seminar/workshop is planned for late 1978 in Guatemala to focus specifically on the relevance and applicability of the BVE experience to programs in different sectors and other settings. Workshop participants are expected to include people with decision-making responsibility for programs related to education, agriculture, health, and other development sectors from Central America and the Caribbean.

Two additional workshops of similar nature are tentatively planned in Latin America in 1979, depending upon the outcome of the one in Guatemala. In addition, it is projected that the BVE Project and its results will be included in a series of communications seminars planned for countries outside the Latin American region.

A proposal for preparation and publication of a series of reports which detail the process of planning, operating and evaluating BVE is also under consideration. Each such report would focus on the "how to" of a specific phase of the BVE Project.

The volume of data generated through the BVE evaluation was far too great to analyze exhaustively given time and resource constraints. Proposals have been developed for further analysis of that data to investigate additional significant questions.

The Project has continued to receive requests to provide training for staff of other programs both in Guatemala and elsewhere in Central America. Consideration is currently being given to establishing an on-going training center associated with and operated through BVE.

Thus, although the experiment has been completed, the BVE program is

continuing in Guatemala and measures are being taken for widespread dissemination and utilization of the Basic Village Education experience.

APPENDICES

APPENDIX A

BASIC VILLAGE EDUCATION PROJECT PERSONNEL

A. Ministry of Education

1. Administration

Prof. Mario Darién P.	Director
Blanca A. Victoria	Administrative officer
Ana Victoria E. de Romero	Accountant

2. Educational materials production

Jorge Enrique García	Production unit head
Otto G. Quattrini	Radio and recording technician
José Luis Siguil B.	Radio and recording technician
Ignacio Sánchez G.	Radio technician
Edgar Escribá	Cassette reproduction
Gilda Castro de Noguera	Scriptwriter and actress
Edelmira Sosa de Pérez	Actress
Annabella Palma de Andrade	Actress
Romeo Asturias Quevedo	Announcer, actor
Santiago León	Actor
Benjamín Chacón	Announcer
Manuel Mendoza	Artist
Magda Eunice Sánchez	Artist
Carlos Ruano	Artist
Juan Miguel Abdo	Artist
Ramiro Waldemar Ramírez	Special machines operator
Rubén Darío González	Special machines operator
José Alberto Fernández	Special machines operator
José Antonio Cacao	Photographer
Mercedes de Arriaza	Scriptwriter
Ruth Duarte	Scriptwriter
Gilberto González	Scriptwriter
Marco Aurelio Alonso	Scriptwriter
Héctor Castillo	Technical supervisor
Luis López Turcios	Technical supervisor
Clemencia de Trujillo	Editor of materials
Augustín Domingo Pacheco	Scriptwriter, translator, actor
Regino Benjamín Cush	Scriptwriter, translator, actor
Felipe Joaquín Hernández	Scriptwriter, translator, actor
Gloria Bocaletti	Scriptwriter
Herbert Otroniel Lara	Scriptwriter
Pablo Fernando Sierra	Scriptwriter
Juan de Dios Osorio	Technical supervisor
Marina Alvarez de Galindo	Scriptwriter
Elsa Chinchilla B.	Scriptwriter
Emma de la Roca Elías	Scriptwriter

José Antonio Alfaro M.	Coordinator of agricultural programs
Edgar Ottoniel Villeda	Scriptwriter
Noemí Sandoval Conde	Scriptwriter
Oscar Antonio Villatoro	Scriptwriter
German Rafael González	Scriptwriter
Odilia Martínez Mena	Scriptwriter

3. Field operations

Daniel Rodríguez	Director, Radio Quezada
Fermín Reynaldo Gaitán	Operator, Radio Quezada
Pablo Enrique Pinto	Announcer and operator, Radio Quezada
Francisco Gutierrez Escobar	Janitor, Radio Quezada
Víctor Alonzo Soto	Watchman, Radio Quezada
Antonio Diógenes Menchú	Director, Radio Momostenango
Mario A. Mendizábal	Director, Radio Momostenango
César Augusto Mora	Announcer/operator, Radio Momos.
José Francisco Guinea	Bilingual announcer/operator, Radio Momostenango
Ricardo Pelicó	Watchman, Radio Momostenango
Jorge Pineda	Janitor, Radio Momostenango
Oscar Rolando Poroj	Janitor, Radio Momostenango
Abimael Peña Medrano	Monitor, Oriente
Hipólito Esquivel	Monitor, Oriente
Raúl Cisneros	Monitor, Oriente
Oscar Mario Martínez	Monitor, Oriente
Santiago Acabal Ixcoy	Monitor, Occidente
Tomás Acabal Baten I	Monitor, Occidente

4. Evaluation

Oscar Astolfo Mellado	Interviewer, Oriente (1976)
Carlos Arturo Barillas	Interviewer, Oriente (1976)

5. Support staff (headquarters)

Graciela Anzueta Reyna	Bilingual secretary
Gladys Edith Arias	Secretary
Leticia S. de Figueroa	Secretary
Marina Quiñónez de Delio	Secretary
Ana María Haase Meyer	Secretary
María Elizabeth Lemus	Secretary
Elizabeth Sosa	Secretary
Carlos Campos Mendoza	Driver
Miguel López Taracena	Driver
Margarito Canahuí	Driver
Mardoqueo López	Driver
Guillermo Galindo Mazariegos	Driver
Mauricio López Barrios	Janitor
Guillermo Palencia Mancio	Janitor
Salvador García Porfín	Watchman
Juventino Jerónimo Jiménez	Watchman

B. Ministry of Agriculture

Ing. Jaime Solórzano	Agronomist (headquarters)
P. A. José Luis Jiménez	Field agronomist, Oriente
P. A. Oscar López Cordero	Field agronomist, Occidente

C. Ministry of Health

Dr. Carlos de la Roca	Technical advisor on health

D. Academy for Educational Development

1. U. S. and third country technical assistance

Dr. Richard Adams	Feasibility study team	1972
Dr. Richard Anderson	Data processing	Life of Project
Mr. Dennis Archambeau	Research assistant (USF)	1976-77
Dr. John Arnaud	Feasibility team, radio engineer	Life of Project
Mr. Jerrold Arnold	Agricultural specialist	1974-75
Mr. William Bradford	Senior administrative officer	1973-75
Dr. Robert Carmack	Anthropological study, Occidente	1974-75
Dr. Royal Colle	Audiovisual specialist	1973-74
Ms. Dallas Fanning	Visual arts specialist (in N.Y.)	1975-76
Mr. Thomas Fanning	Feasibility, visual arts	1972, 1975-76
Mr. Michael Foley	Admin. support (Washington)	Life of Project
Mr. Sergio García	Graphic arts specialist	1975-76
Ms. Cheryll Greenwood	Logistics manager	Life of Project
Ms. Casma Henlon	Research assistant (USF)	1975-77
Ms. Maureen Hersey	Secretary (USF)	1973
Mr. Clyde Hostetter	Feasibility team	1972
Ms. Sandra Kellaher	Research assistant (USF)	1974-77
Dr. Steven Klees	Economic analysis of Project	1975
Dr. Billy Kluver	Feasibility team	1972
Dr. Thomas LaBelle	Feasibility team	1972
Mr. Hector Marchisio	Visual arts consultant	1973
Mr. Stephen Moseley	Project coordinator (Washington)	Life of Project
Dr. Edgar Nesman	Evaluation co-director (USF)	Life of Project
Dr. Douglass Norvell	Benefit/cost analysis	1974-77
Dr. Howard Ray	Field program leader	1973-1976
Dr. Thomas Rich	Evaluation director (USF)	Life of Project
Ms. Sara Rivers	Research assistant (USF)	1975-present
Rockwell International	Various radio maintenance tech.	1975-76
Dr. Everett Rogers	Feasibility team	1972
Mr. William Ross	Agricultural specialist	1974
Mr. Máximo Sánchez	Radio specialist	1973-74
Mr. Omar Seritella	Visual arts consultant	1973
Ms. Joan Sheppard	Secretary (USF)	1974-present

Mr. Victor Stephen	Graphic arts specialist	1976
Mr. Gordon Straub	Field super., field prog. leader	1974-78
Mr. Robert Terzuola	Field super., dy. prog. ldr.	1973-77
Mr. David Thompson	Field supervisor	1976
Mr. Oscar Viganó	Graphic arts specialist	1976
Dr. William Ward	Agric. information consultant	1973
Dr. Stuart Wells	Economic analysis of Project	1978
Dr. Jean Wight	Feasibility team	1972
Dr. Laurence Wolff	Feasibility team	1972

2. Guatemalan local hire personnel

Ing. Inf. Luis Fernando Aldana	Agronomist	1977
Carlos Arturo Barillas	Interviewer, Oriente	1974-75
Ing. Jaime A. Carrera	Agric. section coord.	1975-76
Fabián Chay Medrano	Interviewer, Occidente	1975-76
Julio Figueroa	Materials testing	1976 (temp.)
Victor Grijalva	Materials evaluator	1975-76
Oscar Astolfo Mellado	Interviewer, Oriente	1974-75
Ing. Guillermo Menegazzo	Agronomist	1975-77
Ing. José Luis Monterroso	Agric. section coord.	1974-75
Carlos Ortiz	Artist	1976
P. A. René Peña López	Agronomist	1973-76
Sayda Miriam Q. de Pineda	Bilingual secretary	1973-78
Fausto Pinto	Materials testing	1976 (parttime)
Faustino Poroj	Materials testing	1975-76
José Abraham Roquel	Administrative assistant	1975-77
Tomás Tiriquiz Mateo	Monitor, Occidente	1975-77 (parttime)
Justiniano Velasquez Pacheco	Interviewer, Occidente	1977

NOTE: Not included in the above list of personnel provided by the contractor are approximately forty interviewers employed for the various evaluation surveys, and a few operating personnel for Radio Quezada provided during the first full year of its operation.

APPENDIX B

SELECTED WRITINGS ON BASIC VILLAGE EDUCATION PROJECT FIELD OPERATIONS[1]

A. Official Reports

A-1. Staff. Jan. 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. Aug. 1973. Basic Village Education Project, Guatemala; The Project Implementation Plan. Typed report, 64 pp. (English).

Basic 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).

A-6. Staff. Aug. 1977. The Basic Village Education Project, Guatemala; Oriente Region Combined Report, 1973 - 1976. Multilithed report, 172 pp. (English and Spanish).

A-7. Staff. June 1978. The Basic Village Education Project, Guatemala; Field Operations - Occidente Region, 1974 - 1977. Typed report, 27 pp. (English and Spanish).

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).

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1 - A more nearly complete listing of writings on BVE field operations may be obtained through reference to BVE Interim Reports (A-3 - A-7).

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 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. Mar. 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).

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-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).

C-8. Aldana, Luis Fernando. Oct. 1977. Ciclo de conferencias. Typed report, 4 pp. (Spanish).

Describes a series of scriptwriter conferences on forestry.

D. BVE Communications "Treatments"

D-1. Staff. June 1975. Mixes of communications media utilized in the Project. Mimeo report, 16 pp. (English).

E. Radio

E-1. Staff. June 1975. The story of one BVE radio program (Revista Agrícola no. 303). Mimeo report, 4 pp. (English).

Describes the production of one BVE radio program from the investigation stage through scriptwriter orientation, approval of final scripts, recording, editing, and field distribution.

F. Monitor

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).

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.

G. Crop Demonstrations

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).

G-6. Menegazzo, Guillermo. May 1977. Descripción esquemática de las parcelas demostrativas de EBR desde 1974, Oriente. Typed report, 11 pp. (Spanish).

Summary report of BVE demonstration plots from 1974 to 1976.

G-9. Aldana, Luis Fernando, Guillermo Menegazzo, Oscar López. Jan. 1978. Informe de las parcelas demostrativas desarrolladas por el Programa de Educación Básica Rural en Occidente (draft copy). Typed report, 31 pp. (Spanish).

Summary report of 1977 BVE crop demonstrations in the Occidente region of the Project.

H. Development and Field Testing of Program Materials

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; includes objectives, methodology and results.

H-4. Staff. Mar. 1976. Field evaluation of selected graphics produced by BVE for National Emergency Committee. 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).

An overview of BVE graphics production and field testing, including methodology and results.

H-7. Vigan6, 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-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.

H-12. Viganó, Oscar. Feb. 1977. Estudio sobre aceptación y efectividad de las fotonovelas e historietas en la comunicación de conocimientos en areas rurales de Guatemala. Mimeo report, 16 pp. (Spanish).

Final report on the evaluation of hand-rendered and photographic "historietas" in the Oriente and Occidente regions of the Project.

I. Summative Evaluation

I-2. Terzuola, Robert. Oct. 1973. Selection and training of field interviewers. Typed report, 2 pp. (English).

Detailed description of field interviewer training program prior to first baseline survey in Oriente.

I-3. Terzuola, Robert G. Oct. 1974. 1974 survey field report. Typed report, 4 pp. (English).

Description of 1974 annual survey field activities.

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-10. Straub, Gordon A. July 1977. The 1977 Occidente year-end survey design. Typed report, 6 pp. (English).

Description of planned activities for 1977 Occidente year-end survey.

J. Progress and Special Reports

J-1. Fanning, Thomas and Serritella, Omar. Sept. 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. Sept. 1973. Ideas and plans related to the utilization of radio broadcasting in the Quezada area. Typed report, 13 pp. (Spanish and English).

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 international conference on "Non-Formal Education: New Strategies for Developing an old Resource," 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-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). Mimeo report, 15 pp. (English).

A preliminary analysis of first year costs of the BVE program, including: methodology, data analysis and some tentative conclusions.

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-13. Ray, Howard E. Mar. 1977. The Basic Village Education Project -- concept and operation. Mimeo report, 12 pp. (English).

Text of a slide presentation on BVE Project prepared for AID/W review of BVE Project in March 1977.

J-16. Ray, Howard E. June 1977. The Basic Village Education Project, Guatemala. Mimeo report, 27 pp. (English).

A case study of the BVE Project prepared for the 1977 ICET World Assembly, Lagos, Nigeria, July 30 - August 2, 1977.

J-19. Aldana, Luis Fernando. Jan. 1978. Potencial de incremento en el ingreso de los pequeños agricultores del altiplano de Guatemala al utilizar los elementos de tecnología agrícola recomendados por EBR (preliminary draft). Typed report, 40 pp. (Spanish).

A study of the potential effects the BVE agricultural messages on improved practices may have on small farmers in the Highlands of Guatemala.

J-20. Klees, Steven, and Stuart Wells. Sept. 1978. Cost-benefit analysis of non-formal educational techniques for agricultural development; a case study of the Basic Village Education Project in Guatemala.

APPENDIX C

SELECTED WRITINGS ON BASIC VILLAGE EDUCATION PROJECT EVALUATION

A. Interim and Final Reports

1. Basic Village Education Project, Guatemala. First Interim Report for period May, 1973 - June, 1974. Part II. 215 pp. The body of the report included an Overview; Background; Design, Evaluation, Analysis; and Plans for 1974-75. The Appendix included the Baseline Survey - First Phase Summary Tables; Baseline Survey - Second Phase Summary Tables and Time Sample I - Summary Tables.

2. Basic Village Education Project, Guatemala. Second Interim Report Evaluation Component, September, 1975. 201 pp. A summary of the results of the first year of operation are included in this report. Also included are the features of the evaluation research design and the evaluation prospects for 1975-76.

3. Basic Village Education Project, Guatemala. Third Interim Report Evaluation Component, July, 1976. 202 pp. This report deals primarily with the evaluation of the differential effectiveness of a series of communication treatments in producing change in attitude, knowledge, practice and production in dealing with the effectiveness of communication treatments in the Oriente.

4. Basic Village Education Project, Guatemala. Oriente Region, Combined Report, 1973-1976, August, 1977. 101 pp. plus Summary and Appendices. This report deals primarily with the BVE educational program, its findings and the implications of the findings.

5. Basic Village Education Project, Guatemala. Fourth Interim Report, Evaluation Component, Occidente Region. December, 1977. 24 pp. This report is a status report on the Occidente region and includes the current state of the experimental design; a discussion of the types of surveys conducted in Occidente; some preliminary findings based on data currently available (collected in 1975 and 1976); and projected plans for analysis of the final Occidente data.

6. Basic Village Education Project, Guatemala. Occidente Region, Final Report, Evaluation Component, 1974-1977. July, 1978. 165 pp. This report deals primarily with the BVE educational program, its findings and the implications of the findings.

B. Summary Pamphlets

1. "The Basic Village Education Project Impact in the Oriente Region of Guatemala: A General Summary." Evaluation Summary No. 1, March, 1978.

2. "The Basic Village Education Project Impact in the Occidente Region of Guatemala: A General Summary." Evaluation Summary No. 2, July, 1978.

9. Measurement of Change: Results of 1975 Time Sample Surveys Among Subsistence Farmers in Oriente, Guatemala. Working Paper No. 9, University of South Florida, November, 1976, 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. Summary of the 1975 Year-End Survey of Subsistence Farmers in the Experimental Areas of Oriente. Working Paper No. 10, University of South Florida, June, 1977, 134 pp. This paper is a summary of the responses of farmers from the interviews conducted in the 1975 annual survey in Oriente, Guatemala. It contains 9 pages of narrative and 125 pages of tables.

11. Summary of the 1976 Year-End Survey of Subsistence Farmers in the Experimental Areas of Oriente. Working Paper No. 11, University of South Florida, February, 1978, 239 pp. This paper is a summary of the responses of farmers from interviews conducted in the 1976 annual survey in Oriente. It contains 9 pages of narrative and 230 pages of tables.

12. Measurement of Change: Results of the 1976 Time Sample Surveys Among Subsistence Farmers in Oriente, Guatemala. Working paper No. 12, University of South Florida, February, 1978, 181 pp. This paper is a summary of the findings of the results of the 1976 Time Sample Surveys conducted in Oriente, Guatemala. It contains 24 pages of narrative and 157 pages of tables.

13. Data Collected in the Oriente Region of Guatemala (1973-1977): A Codebook. Working Paper No. 13, University of South Florida, February, 1978. It contains 3 pages of narrative and complete codebook.

14. Comparison of the 1975 and 1976 Year-End Surveys of Subsistence Farmers in the Experimental Areas of Occidente. Working Paper No. 14, University of South Florida, June, 1978, 236pp. This paper is a summary of the responses of farmers from interviews conducted in the 1975 and 1976 annual surveys in Occidente. It contains 9 pages of narrative and 227 pages of tables.

15. Summary of the 1976 Annual Survey of Subsistence Farmers in the Experimental Areas of Occidente. Working Paper No. 15, University of South Florida, June, 1978, 222pp. This paper is a summary of the responses of farmers from interviews conducted in the 1976 annual survey in Occidente. It contains 9 pages of narrative and 213 pages of tables.

16. Summary of the 1977 Annual Survey of Subsistence Farmers in the Experimental Areas of Occidente. Working Paper No. 16, University of South Florida, June, 1978 243pp. This paper is a summary of the responses of farmers from interviews conducted in the 1977 annual survey in Occidente. It contains 9 pages of narrative and 236 pages of tables.

C. 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 Baseline 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 responses 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.

17. Data Collected in the Occidente Region of Guatemala (1974-1978): A Codebook. Working Paper No. 17, University of South Florida, June, 1978. This paper contains 3 pages of narrative and complete codebook.

18. Results of the 1976 Time Sample Surveys Among Subsistence Farmers in Occidente, Guatemala. Working paper No. 18, University of South Florida, July, 1978 . This paper is a summary of the findings of the results of the 1976 Time Sample Surveys conducted in Occidente Guatemala. It contains 15 pages of narrative and tables.

19. Results of the 1977 Time Sample Surveys Among Subsistence Farmers in Occidente, Guatemala. Working Paper No. 19, University of South Florida, July, 1978. This paper is a summary of the findings of the results of the 1977 Time Sample Surveys conducted in Occidente, Guatemala. It contains 19 pages of narrative and summary tables.

D. Professional Papers

1. Ray, H., Rich, T., Nesman, E., Dardon, M. "The Role of Modern Communication Technology in Strategies to Accelerate Rural Development," presented at 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 annual meeting of the Rural Sociological Society, August, 1974, 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., 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, Georgia.

5. Rivers, S., Maza, P., Nesman, E., Rich, T. "Differential Effects of Individual and Group Literacy on Social Change," presented at the Southern Sociological Society Meeting, March, 1978, New Orleans, Louisiana.

6. Nesman, Edgar G., Rich, Thomas A., Rivers, Sara G. "The Basic Village Education Project" in Development Communication Report , April, 1978, No. 22, Washington, D.C. Kathleen Courrier (ed.).

E. 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 September 18, 1973.

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 Nonformal 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 1974 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 (Oriente) and Momos (Occidente).

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 15, 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 insect 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. 9 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 Chichi 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 1974 AVE 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. 1 pg., 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 area in 1974.

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 the 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., January 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 - TS11--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 - TS12--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.

60. Time Sample Survey - TS13--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 - TS14--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, Yupi and Ipala areas of Oriente.

74. Time Sample Summary - TS14 - 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, Yupi, and Ipala areas of Oriente (revised E.R. 73).

75. Time Sample Survey - TS15 - 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, Yupi and Ipala areas of Oriente.

76. Time Sample Survey - TS14 - 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 Momos and Chichi areas of Occidente.

77. Time Sample Survey - TS15 - 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 Momos and Chichi 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 13-19, 1976.

83. Time Sample Survey - TS16 - 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, Yupi and Ipala areas of Oriente.

84. Time Sample Survey - TS17 - Data Summary - Oriente - June 1976. 5 pp., plus 26 pp. of TS17, November 30, 1976. A summary of the data from the Time Sample Survey conducted during June of 1976 in the Quezada, Yupi and Ipala areas of Oriente.

85. Time Sample Survey - TS18 - 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, Yupi 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 - TS19 - 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, Yupi 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 yield 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, and 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.

100. Comparison of Farmers in Oriente and Costalenta. 2 pp., May 20, 1977. Includes table showing comparisons.

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.

102. Data Summary - Time Sample Survey -TS16 - Occidente - August, 1976. 4 pp. plus 27 pp. of TS-16, October 28, 1977. A summary of the data from the Time Sample Survey conducted during August of 1976 in the Momos and Chichi areas of Occidente.

103. Data Summary - Time Sample Survey - TS17 - Occidente - September, 1976. 4 pp. plus 27 pp. of TS-17, October 31, 1977. A summary of the data from the Time Sample Survey conducted during September of 1976 in the Momos and Chichi areas of Occidente.

104. Data Summary - Time Sample Survey - TS18 - Occidente - October, 1976. 4 pp. plus 18 pp. of TS-18, November 8, 1977. A summary of the data from the Time Sample Survey conducted during October of 1976 in the Momos and Chichi areas of Occidente.

105. Data Summary - Time Sample Survey - TS19 - Occidente - November, 1976. 4 pp. plus 21 pp. of TS-19, November 11, 1977. A summary of the data from the Time Sample Survey conducted during November of 1976 in the Momos and Chichi areas of Occidente.

106. Data Summary - Time Sample Survey - TS20 - Occidente - May, 1977. 4 pp. plus 27 pp. of TS-20, November 16, 1977. A summary of the data from the Time Sample Survey conducted during May of 1977 in the Momos and Chichi areas of Occidente.

107. Data Summary - Time Sample Survey - TS21 - Occidente - May, 1977. 5 pp. plus 27 pp. of TS-21, November 21, 1977. A summary of the data from the Time Sample Survey conducted during May of 1977 in the Momos and Chichi areas of Occidente.

108. Data Summary - Time Sample Survey - TS22 - Occidente - July, 1977. 6 pp. plus 27 pp. of TS-22, December 1, 1977. A summary of the data from the Time Sample Survey conducted during July of 1977 in the Momos and Chichi areas of Occidente.

109. Data Summary - Time Sample Survey - TS23 - Occidente - July, 1977. 4 pp. plus 18 pp. of TS-23, December 1, 1977. A summary of the data from the Time Sample Survey conducted during July of 1977 in the Momos and Chichi areas of Occidente.

110. Analysis of Change in Individual Practice Items: Occidente 1975-1976. 16 pp., December 12, 1977. A summary of the amount of change in thirteen agricultural practices between 1975 and 1976 in Occidente.

111. Data Summary - Time Sample Survey - TS24 - Occidente - October, 1977. 5 pp. plus 21 pp. of TS-24, January 4, 1978. A summary of the data from the Time Sample Survey conducted during October of 1977 in the Momos and Chichi areas of Occidente.

112. Data Summary - Time Sample Survey - TS25 - Occidente - October, 1977. 4 pp. plus 27 pp. of TS-25, January 4, 1978. A summary of the data from the Time Sample Survey conducted during October of 1977 in the Momos and Chichi areas of Occidente.

APPENDIX D

TABLES REFERENCED IN CHAPTERS VIII AND IX

Table 18. Scoring procedure for the agricultural practices included in the practice level index.

15. How do you prepare the land for your crops?
    0. No answer
    1. Does nothing
    2. Burns off
    3. Cleans with machete and hoe
    4. Cleans and plows once
    5. Cleans and plows twice or more

26. What type of corn seed did you use this year?
    0. No answer or null
    1. Doesn't know or hybrid from own harvest
    2. Unselected, native seed
    3. Selected native seed
    4. (Missing)
    5. New, improved, certified or new, treated, hybrid

29. What type of bean seed did you use this year?
    0. No answer or did not plant
    1. Doesn't know
    2. Unselected native
    3. Selected from own harvest
    4. (Missing)
    5. New, improved seed

32. What type of sorghum seed did you use this year?
    0. No answer or did not plant
    1. Doesn't know or hybrid from own crop
    2. Unselected, native seed
    3. Selected, native seed
    4. (Missing)
    5. New treated, hybrid or certified

94. What crops do you plant in association?
    0. No answer or other
    1. Corn, sorghum
    2. Does not plant in association or corn, beans, sorghum or corn with sorghum/corn with beans or corn with sorghum/sorghum with beans
    3. (Missing)

4. Corn, horsebean, beans
5. Corn with beans or beans with sorghum

99. Which insecticides did you use to control insects? How many?
0. No answer
1. Doesn't know what they are or none
2. (Missing)
3. Only one
4. (Missing)
5. Two or three or four or five or more

102. If you fertilized your first crop at seeding, what type of fertilizer did you use?
0. No answer
1. Did not fertilize at seeding
2. Doesn't know
3. Nitrogen or organic
4. Nitrogen/Phosphorus
5. Complete

103. If you fertilized your first crop just before flowering, what kind of fertilizer did you use?
0. No answer
1. Did not fertilize before flowering
2. Doesn't know
3. Complete or organic or nitrogen/phosphorus
4. (Missing)
5. Nitrogen

114. How much chemical fertilizer did you use this year when seeding your first crop of corn planted alone?
0. No answer or did not plant
1. Did not fertilize at seeding
2. Less than 0.5 cwt/mz
3. 0.5 - 1.5 cwt/mz
4. 1.6 - 2.0 cwt/mz or more than 3.0 cwt/mz
5. 2.1 - 3.0 cwt/mz

115. How much chemical fertilizer did you use this year when seeding your first crop of beans planted alone?
0. No answer or did not plant
1. Did not fertilize at seeding
2. Less than 0.5 cwt/mz
3. 0.5 - 1.5 cwt/mz
4. 1.6 - 2.0 cwt/mz or more than 3.0 cwt/mz
5. 2.1 - 3.0 cwt/mz

116. How much chemical fertilizer did you use this year when seeding your first crop of sorghum planted alone?
0. No answer or did not plant
1. Did not fertilize at seeding
2. Less than 0.5 cwt/mz

3. 0.5 - 1.5 cwt/mz
4. 1.6 - 2.0 cwt/mz or more than 3.0 cwt/mz
5. 2.1 - 3.0 cwt/mz

117. How much chemical fertilizer did you use this year when seeding your first crop of corn associated with beans?
0. No answer or did not plant
1. Did not fertilize at seeding
2. Less than 0.5 cwt/mz
3. 0.5 - 1.5 cwt/mz
4. 1.6 - 2.0 cwt/mz or more than 3.0 cwt/mz
5. 2.1 - 3.0 cwt/mz

118. How much chemical fertilizer did you use this year when seeding your first crop of sorghum associated with beans?
0. No answer or did not plant
1. Did not fertilize at seeding
2. Less than 0.5 cwt/mz
3. 0.5 - 1.5 cwt/mz
4. 1.6 - 2.0 cwt/mz or more than 3.0 cwt/mz
5. 2.1 - 3.0 cwt/mz

119. How much chemical fertilizer did you use this year when seeding your first crop of corn associated with beans and sorghum?
0. No answer or did not plant
1. Did not fertilize at seeding
2. Less than 0.5 cwt/mz
3. 0.5 - 1.5 cwt/mz
4. 1.6 - 2.0 cwt/mz or more than 3.0 cwt/mz
5. 2.1 - 3.0 cwt/mz

120. How much chemical fertilizer did you use this year when seeding your first crop of corn associated with sorghum?
0. No answer or did not plant
1. Did not fertilize at seeding
2. Less than 0.5 cwt/mz
3. 0.5 - 1.5 cwt/mz
4. 1.6 - 2.0 cwt/mz or more than 3.0 cwt/mz
5. 2.1 - 3.0 cwt/mz

121. How much chemical fertilizer did you use this year when seeding your first crop of corn associated with beans and horsebeans?
0. No answer or did not plant
1. Did not fertilize at seeding
2. Less than 0.5 cwt/mz
3. 0.5 - 1.5 cwt/mz
4. 1.6 - 2.0 cwt/mz or more than 3.0 cwt/mz
5. 2.1 - 3.0 cwt/mz

122. How much chemical fertilizer did you apply this year at flowering on your first crop of corn planted alone?

0. No answer or did not plant
1. Did not apply at flowering
2. Less than 0.5 cwt/mz
3. 0.5 - 1.0 cwt/mz or more than 3.0 cwt/mz
4. 1.1 - 1.5 cwt/mz or 2.1 - 3.0 cwt/mz
5. 1.6 - 2.0 cwt/mz

123. How much chemical fertilizer did you apply this year at flowering on your first crop of beans planted alone?
0. No answer or did not plant
1. Did not apply at flowering
2. Less than 0.5 cwt/mz
3. 0.5 - 1.0 cwt/mz or more than 3.0 cwt/mz
4. 1.1 - 1.5 cwt/mz or 2.1 - 3.0 cwt/mz
5. 1.6 - 2.0 cwt/mz

124. How much chemical fertilizer did you apply this year at flowering on your first crop of sorghum planted alone?
0. No answer or did not plant
1. Did not apply at flowering
2. Less than 0.5 cwt/mz
3. 0.5 - 1.0 cwt/mz or more than 3.0 cwt/mz
4. 1.1 - 1.5 cwt/mz or 2.1 - 3.0 cwt/mz
5. 1.6 - 2.0 cwt/mz

125. How much chemical fertilizer did you apply this year at flowering on your first crop of corn associated with beans?
0. No answer or did not plant
1. Did not apply at flowering
2. Less than 0.5 cwt/mz
3. 0.5 - 1.0 cwt/mz or more than 3.0 cwt/mz
4. 1.1 - 1.5 cwt/mz or 2.1 - 3.0 cwt/mz
5. 1.6 - 2.0 cwt/mz

126. How much chemical fertilizer did you apply this year at flowering on your first crop of sorghum associated with beans?
0. No answer or did not plant
1. Did not apply at flowering
2. Less than 0.5 cwt/mz
3. 0.5 - 1.0 cwt/mz or more than 3.0 cwt/mz
4. 1.1 - 1.5 cwt/mz or 2.1 - 3.0 cwt/mz
5. 1.6 - 2.0 cwt/mz

127. How much chemical fertilizer did you apply this year at flowering on your first crop of corn associated with beans and sorghum?
0. No answer or did not plant
1. Did not apply at flowering
2. Less than 0.5 cwt/mz
3. 0.5 - 1.0 cwt/mz or more than 3.0 cwt/mz
4. 1.1 - 1.5 cwt/mz or 2.1 - 3.0 cwt/mz
5. 1.6 - 2.0 cwt/mz

128. How much chemical fertilizer did you apply this year at flowering on your first crop of corn associated with sorghum?
0. No answer or did not plant
1. Did not apply at flowering
2. Less than 0.5 cwt/mz
3. 0.5 - 1.0 cwt/mz or more than 3.0 cwt/mz
4. 1.1 - 1.5 cwt/mz or 2.1 - 3.0 cwt/mz
5. 1.6 - 2.0 cwt/mz

129. How much chemical fertilizer did you apply this year at flowering on your first crop of corn associated with beans and horsebeans?
0. No answer or did not plant
1. Did not apply at flowering
2. Less than 0.5 cwt/mz
3. 0.5 - 1.0 cwt/mz or more than 3.0 cwt/mz
4. 1.1 - 1.5 cwt/mz or 2.1 - 3.0 cwt/mz
5. 1.6 - 2.0 cwt/mz

134. Did you use herbicide to control weeds?
0. No answer
1. Doesn't know what they are
2. Has weed problems but did not use
3. Doesn't have weed problems
4. (Missing)
5. Yes, uses herbicides

139. Did you use fungicides to control disease on your crops?
0. No answer or did not plant
1. Doesn't know what they are
2. Has problems but did not use
3. Does not have problems
4. (Missing)
5. Yes, uses fungicides

142. Do you destroy the crop residues after the last crop of the year?
0. No answer
1. Does not clean field
2. Cleans but does not destroy crop residues
3. Burns the crop residues
4. Buries the crop residues
5. Uses crop residues to make compost

151. Where do you store your corn until it is sold or used by you and your family?
0. No answer or did not plant or does not store
1. In ears
2. In sacks or in wooden boxes
3. In tin cans
4. In metal drums
5. In household granary

152. Where do you store your beans until they are sold or used by you and your family?
0. No answer or did not plant or does not store or null
1. In sacks
2. In wooden boxes
3. In tin cans
4. In metal drums
5. In household granary

153. Where do you store your sorghum until it is sold or used by you and your family?
0. No answer or did not plant or does not store
1. In ears
2. In sacks or in wooden boxes
3. In tin cans
4. In metal drums
5. In household granary

156. Where do you store your horsebeans until they are sold or used by you and your family?
0. No answer or did not plant or does not store or null
1. In sacks
2. In wooden boxes
3. In tin cans
4. In metal drums
5. In household granary

169. Did you borrow money for your crops this year? Where?
0. No answer or did not borrow or from family or from a friend
1. From a usurer
2. (Missing)
3. (Missing)
4. From a private bank
5. From the cooperative or private entity

Table 19. Difference between farmers in the Oriente and Occidente in terms of background characteristics: results of discriminant analysis. *

a. Univariate relationships between culture and individual background characteristics.

Background Items	Oriente $\bar{X}$	Oriente SD	Occidente $\bar{X}$	Occidente SD	Univariate F Ratio	Significance of F Ratio (df=1, 1057)
Makes agricultural decisions alone	.96	.20	.97	.16	2.28	NS
Sees no risk in use of new seed	.80	.40	.53	.50	90.83	< .001
Sees no risk in insecticide use	.67	.47	.48	.50	39.71	< .001
Sees no risk in fertilizer use	.80	.40	.85	.36	5.38	< .05
Sees no risk in herbicide use	.56	.50	.17	.37	214.57	< .001
Sees no risk in fungicide use	.46	.50	.26	.44	52.77	< .001
Sells part of corn crop	.19	.39	.03	.16	77.04	< .001
Sells part of bean crop	.68	.47	.05	.22	772.96	< .001
Sees no risk in use of credit	.23	.42	.06	.23	67.24	< .001
Seeks advice on agricultural matters	.32	.46	.03	.16	184.30	< .001
Number of parcels into which land is divided	2.25	1.10	1.46	.72	192.11	< .001
Percent of landholdings owned	.48	.43	.99	.07	740.02	< .001
Percent of landholdings rented	.41	.44	.01	.06	447.18	< .001
Total amount of land available for planting	3.14	1.89	1.67	1.11	239.94	< .001

Background Items	Oriente $\bar{X}$	Oriente SD	Occidente $\bar{X}$	Occidente SD	Univariate F Ratio	Significance of F Ratio
Feels land is worse than neighbors	.11	.31	.03	.17	24.16	< .001
Number of animals owned	1.53	2.08	1.90	2.06	8.39	< .01
Works away from the farm	.32	.47	.33	.47	.21	NS
Works as a skilled worker (teacher, merchant, driver)	.01	.08	.16	.36	85.08	< .001
Perceives of money as important	.92	.27	.99	.11	29.96	< .001
Feels that money is more important than friends	.21	.40	.68	.47	310.51	< .001
Sees chances of advancement in farming	.93	.26	.85	.36	15.32	< .001
Receives letters	.45	.50	.22	.42	64.86	< .001
Owns a radio	.49	.50	.44	.50	2.88	NS
Listens to a radio	.81	.39	.48	.50	141.19	< .001
Belongs to an organized group	.11	.32	.07	.25	6.37	< .05
Feels that meeting with friends & neighbors about agricultural matters is important	.75	.43	.55	.50	51.99	< .001
Visits nearest municipality at least a few times/ year	.93	.26	.99	.11	25.54	< .001
Visits the department capital at least a few times/year	.68	.47	.53	.50	25.92	< .001
Visits Guatemala City at least a few times a year	.28	.45	.19	.39	13.04	< .001

Background Items	Oriente $\bar{X}$	Oriente SD	Occidente $\bar{X}$	Occidente SD	Univariate F Ratio	Significance of F Ratio
Feels that family has more health problems than others	.13	.34	.08	.21	23.49	< .001
Includes bread in weekly diet	.45	.50	.82	.38	190.48	< .001
Includes lard in weekly diet	.42	.49	.49	.50	6.01	< .05
Includes plantains in weekly diet	.05	.22	.26	.44	97.34	< .001
Includes rice in weekly diet	.35	.48	.46	.50	13.36	< .001
Includes vegetables in weekly diet	.28	.45	.69	.46	217.76	< .001
Includes meat in weekly diet	.27	.44	.89	.32	686.60	< .001
Includes cheese in weekly diet	.61	.49	.29	.45	126.50	< .001
Includes milk in weekly diet	.46	.50	.20	.40	86.44	< .001
Includes incaparina in weekly diet	.13	.33	.36	.48	80.73	< .001
Owns own house	.94	.24	.99	.06	30.89	< .001
Has better than thatch roof on house	.54	.50	.82	.38	107.14	< .001
Has better than mud-fill walls	.50	.50	.90	.30	244.35	< .001
Uses fuel other than wood or candles for lighting	.92	.28	.84	.36	13.27	< .001
Gets water from other than river or stream (i.e. well or faucet)	.64	.48	.82	.38	44.88	< .001
Has toilet facilities	.02	.16	.06	.23	6.79	< .01

Background Items	Oriente X	Oriente SD	Occidente X	Occidente SD	Univariate F Ratio	Significance of F Ratio
Number of children	3.73	2.57	3.48	2.30	2.70	NS
Sees monetary gain as main motive for education	.78	.42	.55	.50	67.45	< .001
Number of years of education desired for children	4.59	1.96	4.02	2.05	21.17	< .001
Corn production (first crop)	18.92	16.75	18.13	18.28	0.53	NS
Bean Production (first crop)	7.10	7.29	1.81	2.14	262.76	< .001
Total revenue from corn & beans	378.11	307.44	158.63	151.49	220.54	< .001
Number of literate members in household	1.77	1.69	0.75	0.93	151.05	< .001
Number of years of formal education completed	.65	1.27	.45	1.04	8.01	< .01
Literacy	.35	.48	.30	.46	2.65	NS
Age	40.02	13.91	38.47	12.88	3.58	NS
Initial score on practice index	24.23	4.45	28.78	3.13	374.16	< .001

b. Variables included in the discriminant function (in order of relative contribution.)

Background Items	Standardized discriminant function coefficients	Multivariate partial F Ratios	Significance of F Ratios (df = 45, 1013)
Percent of land-holdings owned	.19	137.47	< .001
Initial score on practice index	.18	138.44	< .001
Corn production	.16	48.06	< .001
Total revenue from corn and bean crops	-.15	21.76	< .001
Sells part of bean crop	-.14	61.36	< .001

Background Items	Standardized discriminant function coefficients	Multivariate Partial F Ratios	Significance of F ratios (df = 45, 1013)
Includes meamt in weekly diet	.12	51.84	<.001
Listens to the radio	-.10		<.001
Number of literate members in household	-.09	28.74	<.001
Sees no risk in herbicide use	-.09	28.32	<.001
Seeks advice on agricultural matters	-.09	45.10	<.001
Total amount of land available for planting	-.09	28.66	<.001
Includes cheese in weekly diet	-.09	26.00	<.001
Feels that money is more important than friends	.09	31.57	<.001
Has better than mud-fill walls	.07	24.14	<.001
Includes milk in weekly diet	-.07	14.54	<.001
Works away from the farm as a skilled worker	.06	19.71	<.001
Includes vegetables in daily diet	.06	18.60	<.001
Includes plantains in daily diet	.06	14.82	<.001
Sees no risk in use of new seed	-.06	17.31	<.001
Sees monetary gain as main motive for education	-.06	17.35	<.001
Visits Guatemala City at least a few times a year	-.05	13.28	<.001

Background Items	Standardized discriminant function coefficients	Multivariate Partial F Ratios	Significance of F Ratios (df=45, 1013)
Literacy	.05	7.71	<.001
Number of years of formal eudcation	-.04	7.93	<.001
Feels land is worse than neighbors	-.04	10.26	<.001
Works away from the farm	.04	9.61	<.001
Owns a radio	.04	4.88	<.001
Number of animals owned	.04	7.06	<.001
Gets water from vource other than stream or river	.04	8.20	<.001
Includes lard in weekly diet	.04	6.48	<.001
Feels that family has more health problems than others	-.04	8.40	<.001
Sees no risk in insecticide use	-.04	7.04	<.001
Sells part of corn harvest	-.03	4.77	<.001
Bean production	-.03	2.61	<.001
Age	-.03	6.09	<.001
Visits the department capital at least once a year	-.03	5.26	<.001
Includes incaparina in weekly diet	.03	3.90	<.001
Number of parcels into which land is divided	-.03	4.22	<.001
Sees no risk in credit use	-.03	4.47	<.001

Background Items	Standardized discriminant function coefficient	Multivariate Partial F Ratios	Significance of F Ratios (df=45, 1013)
Has toilet facilities	.03	4.19	< .001
Perceives of money as important	.03	3.93	< .001
Sees no risk in use of fertilizer	.02	3.05	< .001
Sees no risk in fungicide use	.02	2.21	< .001
Sees chances of advancement in farming	-.02	2.77	< .001
Feels that meeting with friends & neighbors about agricultural matters is important	-.02	1.82	< .001
Owns own house	.02	1.38	< .001.

Group Centroids:
Oriente = -.96
Occidente = .91

Multivariate F ratio (for the discriminant function) = 151.77, p< .001
Canonical correlation (for 2 groups equivalent to multiple R) = .93
Canonical correlation squared (proportion of variance accounted for) = .86
Wilks' Lambda for best single predictor variable(sells part of bean crop) =.58
Wilks' Lambda for discriminant function = .13

c. Results of prediction of group membership based on discriminant function.

Actual Group	Predicted Group: Oriente	Occidente	Total Sample
Oriente	508(98.4%)	8(1.6%)	516 (100%)
Occidente	3(0.6%)	540(99.4%)	543 (100%)

99% of the cases were classified correctly

*Discriminant analysis, like 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 dependent variable. In discriminant analysis, however, the dependent variable is not continuous (i.e., as is practice score) but rather consists of two or more discrete

categories. The weighted linear combination of variables (called the discriminant function) is derived such that it maximally distinguishes between categories. Practices are selected as components of the function on the basis of their ability to discriminate between groups when their relationship with the other variables in the function is taken into account (i.e., on the basis of their "unique" discriminability). The discriminant analysis tables included in the chapter contain: a) the canonical correlation between the set of discriminating variables and category membership (for two groups this is equivalent to the multiple R in regression) and its square (the percent of variance accounted for); b) the significance of the discriminant functions ability to discriminate (multivariate F); c) the univariate F ratio for each item in the discriminant function (i.e., the individual item's ability to discriminate between categories - not corrected for the item's correlation with other variables in the function); d) the multivariate partial F for each item (corrected for the item's correlation with other variables); and e) the standardized discriminant function coefficient for each item (the standardized weight applied to the item in calculating the discriminant function - similar to beta weights in the regression equation). In addition to this information, the mean scores on each item from which the equation was calculated (including those which did not enter the final equation) for the two categories, and the item univariate F ratio are included in the tables in Appendix D.

Table 20. Difference between farmers in the Oriente and Occidente in terms of agricultural practices.

a. Univariate relationships between culture and individual practice items.

Individual Practice Items	Oriente $\bar{X}$	Oriente SD	Occidente $\bar{X}$	Occidente SD	Univariate F Ratio	Significance of F Ratio
Item #1 (land preparation method)	3.31	0.66	3.01	0.16	109.58	< .001
Item #2 (seed type)	2.58	0.61	2.98	0.12	228.83	< .001
Item #3 (planting in association)	2.61	1.41	4.35	1.12	498.18	< .001
Item #4 (insecticide use)	1.45	0.98	1.40	0.90	0.82	NS
Item #5 (type of fertilizer at seeding)	1.26	0.79	2.60	0.88	675.00	< .001
Item #6 (amount of fertilizer at seeding)	1.18	0.59	2.43	1.19	464.91	< .001
Item #7 (type of fertilizer at flowering)	1.34	0.99	2.69	0.71	636.44	< .001
Item #8 (amount of fertilizer at flowering)	1.12	0.47	1.11	0.55	0.10	NS
Item #9 (herbicide use)	1.99	1.16	1.41	0.75	93.92	< .001
Item #10 (fungicide use)	1.70	0.85	1.66	0.88	0.68	NS

Individual Practice Items	Oriente $\bar{X}$	Oriente SD	Occidente $\bar{X}$	Occidente SD	Univariate F Ratio	Significance of F Ratio
Item #11 (crop residue destruction)	1.83	1.06	3.95	0.55	1687.88	<.001
Item #12 (crop storage method)	4.15	0.86	1.08	0.26	6254.04	<.001
Item #13 (credit use)	0.14	0.81	0.12	0.73	0.18	NS

b. Variables included in the discriminant function (in order of relative contribution).

Item #	Standardized Discriminant Function Coefficients	Multivariate Partial F Ratios	Significance of F Ratios (df = 11, 1047)
#12	.62	1391.64	<.001
#11	-.19	187.78	<.001
#2	-.11	118.39	<.001
#5	-.10	56.60	<.001
#3	-.07	42.68	<.001
#7	-.06.	16.40	<.001
#1	.06	32.12	<.001
#8	.05	25.12	<.001
#6	-.05	18.37	<.001
#19	.02	2.84	<.001
#13	-.02	2.89	<.001

Group Centroids:
Oriente = .98
Occidente = -.93

Multivariate F (for discriminant function) = 1043.51, p <.001
Canonical correlation (for 2 groups, equivalent to multiple R) = .96
Canonical correlation squared (proportion of variance accounted for) = .92
Wilks' Lambda for best single predictor variable (Item #12) = .11
Wilks' Lambda for discriminant function = .08

c. Results of prediction of group membership based on discriminant function.

Actual Group	Predicted Group: Oriente	Occidente	Total Sample
Oriente	506(98.1%)	10(1.9%)	516(100%)
Occidente	1(0.2%)	542(99.8%)	543(100%)

99% of cases classified correctly

Table 21. Difference between farmers in the Quezada and Yupi areas in terms of background characteristics: results of discriminant analysis.

a. Univariate relationships between farmers in the Quezada and Yupi areas.

Background Items	Quezada $\bar{X}$	Quezada SD	Yupi $\bar{X}$	Yupi SD	Univariate F Ratio	Significance of F Ratio (df=1, 622)
Makes agricultural decisions alone	1.0	0.2	0.9	0.2	0.3	NS
Sees no risk in use of new seed	1.0	0.2	0.8	0.4	19.3	< .001
Sees no risk in insecticide use	0.9	0.3	0.7	0.4	31.2	< .001
Sees no risk in fertilizer use	1.0	0.2	0.8	0.4	28.7	< .001
Sees no risk in herbicide use	0.7	0.5	0.6	0.5	8.3	< .01
Sees no risk in fungicide use	0.6	0.5	0.5	0.5	8.8	< .01
Sells part of corn crop	0.2	0.4	0.2	0.4	0.1	NS
Sells part of bean crop	0.7	0.4	0.6	0.5	6.1	< .05
Sees no risk in use of credit	0.3	0.5	0.2	0.4	7.6	< .01
Seeks advice on agricultural matters	0.6	0.5	0.4	0.5	37.8	< .001
Number of parcels into which land is divided	2.5	1.2	2.1	1.0	21.2	< .001
Percent of landholdings owned	0.7	0.4	0.5	0.4	27.8	< .001
Percent of landholdings rented	0.1	0.3	0.3	0.4	46.6	< .001
Total amount of land available for planting	3.8	2.1	3.3	2.1	11.2	< .001

Background Items	Quezada $\bar{X}$	Quezada SD	Yupi $\bar{X}$	Yupi SD	Univariate F Ratio	Significance of F Ratio
Feels his land is worse than his neighbors	0.1	0.2	0.1	0.3	3.8	< .05
Number of animals owned	2.4	2.8	1.5	2.1	22.0	< .001
Works away from the farm	0.4	0.5	0.4	0.5	0.1	NS
Works as a skilled worker (teacher, merchant, driver)	0.0	0.1	0.0	0.0	4.2	< .05
Perceives of money as important	1.0	0.3	0.9	0.3	4.2	< .05
Feels that money is more important than friends	0.2	0.4	0.2	0.4	3.2	NS
Sees chances of advancement in farming	1.0	0.2	0.9	0.3	7.5	<.01
Receives letters	0.7	0.5	0.4	0.5	41.0	< .001
Owns a radio	0.6	0.5	0.5	0.5	19.2	< .001
Listens to a radio	1.0	0.2	0.8	0.4	31.7	< .001
Belongs to an organized group	0.2	0.4	0.1	0.3	10.0	< .01
Feels that meeting with friends & neighbors about agricultural matters is important	0.9	0.3	0.8	0.4	18.9	< .001
Visits nearest municipality at least a few times/ year	1.0	0.2	0.9	0.3	8.4	< .01
Visits the department capital at least a few times/year	0.9	0.3	0.7	0.4	39.8	< .001
Visits Guatemala City at least a few times a year	0.4	0.5	0.4	0.5	1.2	NS

Background Items	Quezada $\bar{X}$	Quezada SD	Yupi $\bar{X}$	Yupi SD	Univariate F Ratio	Significance of F Ratio
Feels that family has more health problems than others	0.1	0.3	0.1	0.3	0.4	NS
Includes bread in weekly diet	0.6	0.5	0.4	0.5	17.1	< .001
Includes lard in weekly diet	0.6	0.5	0.4	0.5	34.9	< .001
Includes plantains in weekly diet	0.1	0.3	0.1	0.2	9.4	< .01
Includes rice in weekly diet	0.5	0.5	0.3	0.5	20.4	< .001
Includes vegetables in weekly diet	0.6	0.5	0.2	0.4	81.6	< .001
Includes meat in weekly diet	0.4	0.5	0.2	0.4	30.8	< .001
Includes cheese in weekly diet	0.8	0.4	0.6	0.5	54.9	< .001
Includes milk in weekly diet	0.7	0.5	0.4	0.5	52.2	< .001
Includes incaparina in weekly diet	0.3	0.4	0.2	0.4	7.8	< .01
Owns own house	1.0	0.1	1.0	0.2	4.2	< .05
Has better than thatch roof on house	0.9	0.3	0.3	0.5	314.5	< .001
Has better than mud-fill walls	0.9	0.3	0.5	0.5	120.9	< .001
Uses fuel other than wood or candles for lighting	0.9	0.3	1.0	0.2	13.7	< .001
Gets water from other than river or stream (i.e. well or faucet)	0.4	0.5	0.6	0.5	36.9	< .001
Has toilet facilities	0.1	0.3	0.0	0.1.	31.9	< .001

Background Items	Quezada $\bar{X}$	Quezada SD	Yupi $\bar{X}$	Yupi SD	Univariate F Ratio	Significance of F Ratio
Number of children	5.1	2.4	3.8	2.6	41.9	< .001
Sees monetary gain as main motive for education	0.8	0.4	0.8	0.4	1.0	NS
Number of years of education desired for children	5.2	1.6	4.6	2.0	15.5	< .001
Corn production (first crop)	25.9	56.0	17.1	17.6	7.2	<.01
Bean Production (first crop)	10.4	9.5	7.2	6.7	23.6	< .001
Total revenue from corn & beans	$401.95	435.25	308.96	244.76	11.0	< .001
Number of literate members in household	3.0	2.2	1.7	1.7	69.2	< .001
Number of years of formal education completed	0.9	1.4	0.6	1.2	6.8	<.01
Literacy	0.4	0.5	0.3	0.5	5 0	<.05
Age	46.0	14.0	40.5	13.9	24.2	< .001

b. Variables included in the discriminant function (in order of relative contribution).

Background Items	Standardized discriminant function coefficients	Multivariate partial F (df=35, 588)	Univariate F (df=1, 622)
Total revenue from corn and beans	-1.2	48.8***	11.0***
Corn production (first crop)	1.0	47.6***	7.2**
Bean production (first crop)	0.6	50.8***	23.6***
Has better than thatch roof on house	0.5	79.4***	314.5***
Gets water from other than river or stream (i.e. well or faucet)	-0.2	38.0***	36.9***
Uses fuel other than wood or candles for lighting	-0.2	19.9***	13.7***

Background Items	Standardized discriminant function coefficient	Multivariate partial F (df=35, 588)	Univariate F (df=1, 622)
Works away from the farm	0.2	15.4***	0.1
Percent of landholdings rented	-0.1	12.5***	46.6***
Seeks advice on agricultural matters	0.1	13.8***	37.8***
Includes vegetables in weekly diet	0.1	9.7***	81.6***
Number of parcels into which land is divided	0.1	9.2***	21.2***
Age	0.1	8.8***	24.2***
Literacy	-0.1	5.2***	5.0*
Total amount of land available for planting	-0.1	6.0***	11.2***
Number of animals owned	-0.1	5.4***	22.0***
Number of literate members in household	0.1	5.3***	69.2***
Sees no risk in use of new seed	0.1	5.2***	19.3***
Includes cheese in weekly diet	0.1	4.4***	54.9***
Includes meat in weekly diet	0.1	3.9***	30.8***
Makes agricultural decisions alone	0.1	3.9***	0.3
Has better than mud-fill walls	0.1	2.4***	120.9***
Number of years of formal education completed	0.1	1.9***	6.8**
Sees no risk in insecticide use	0.1	2.7***	31.2***
Belongs to an organized group	0.1	2.9***	10.0**
Sees chances of advancement in farming	0.1	3.0***	7.5**
Has toilet facilities	0.1	2.6***	31.9***
Sees no risk in use of credit	0.1	2.8***	7.6**
Feels that meeting with friends and neighbors about agricultural matters is important	0.1	2.8***	18.9***
Feels land is worse than neighbors	-0.1	2.3***	3.8*

Visits the department capital at least a few times a year	0.1	2 1***	39.8***
Works as a skilled worker (teacher, merchant, driver)	0.1	2.2***	4.2*
Sees no risk in fertilizer use	0.1	1.7***	28.7***
Feels that money is more important than friends	-0.0	1.6***	3.2
Perceives of money as important	-0.0	1.6***	4.2*
Number of animals owned	0.0	5.4***	22.0***

Group Centroids:
Quezada = 0.8
Yupi = -0.7

Multivariate F ratio (for the discriminant function) = 22.7, $p < .001$
Canonical correlation (for 2 groups equivalent to multiple R) = 0.8
Canonical correlation squared (proportion of variance accounted for) = 0.6
Wilks' Lambda for best single predictor variable(roof type) = 0.6
Wilks' Lambda for discriminant function = 0.4

c. Results of prediction of group membership based on discriminant function.

	Predicted Group		
Actual Group	Quezada	Yupi	Total Sample
Quezada	272 (90%)	32 (10%)	304 (100%)
Yupi	49 (15%)	271 (85%)	320 (100%)

87% of the cases were classified correctly

* $p < .05$
** $p < .01$
*** $p < .001$

Table 22. Differential treatment effectiveness in two cultures as measured by change in total practice score - controlling for effect of initial practice score on amount of change.

a. Analysis of variance between culture and treatment conditions on change with initial practice level as a covariate.

Source	df	Sum of Squares	Mean Square	F Ratio	F Prob.
Main Effects					
Culture	1	287.2	287.2	11.9	=.001
Treatment	4	1042.1	260.5	10.8	<.001
Covariate Effects					
Initial Practice Score	1	5941.3	5941.3	246.8	<.001
Interactions					
Culture by Treatment	4	584.9	146.2	6.1	<.001
Error	1048	25228.3	24.1		

b. Rank order of cultures and treatments by adjusted and unadjusted change scores.

Culture

Unadjusted Scores*

Culture	N	Mean
Oriente	516	5.27
Occidente	543	1.92

ETA2 = .09

Adjusted Scores**

Culture	N	Mean
Oriente	516	4.16
Occidente	543	2.97

$BETA^2$ = .01

Treatment

Unadjusted Scores

Treatment	N	Mean
RMA	204	4.96
M	172	3.95
RM	225	3.34
R	239	3.27
C	219	2.44

ETA^2 = .02

Adjusted Scores

Treatment	N	Mean
RMA	204	5.24
M	172	4.32
RM	225	3.13
R	239	2.90
C	219	2.51

$BETA^2$ = .03

c. Summary of pair-wise comparisons between treatment sub-areas on adjusted change scores.

Sub-area	R	RM	RMA	M	C
R					
RM	No				
RMA	Yes	Yes			
M	Yes	Yes	No		
C	No	No	Yes	Yes	

*Unadjusted means are confounded by differences in starting point. All reported analyses are based on the adjusted means.

**Adjusted scores reported here are change scores adjusted for starting point. The more traditional procedure of adjusting post-test scores for pre-test scores produced virtually identical results.

Table 23. Differential treatment effectiveness as measured by change in total practice score - controlling for effect of initial practice score on amount of change - Oriente.

a. Analysis of variance in change in total practice score with initial practice level as a covariate

Source	df	Sum of Squares	Mean Squares	F Ratio	F Prob.
Covariate Effect	1	1340.7	1340.7	51.7	< .001
Between Treatments	4	1176.9	294.2	11.4	< .001
Within Treatments	510	13217.4	25.9		

b. Rank order of treatments by adjusted and unadjusted change scores

Unadjusted Scores *

Sub-Area	N	Mean
RMA	106	7.13
M	92	6.16
R	111	5.17
RM	103	4.16
C	104	3.79

ETA^2 = .05

Adjusted Scores **

Sub-Area	N	Mean
RMA	106	7.48
M	92	6.71
R	111	4.80
C	104	3.93
RM	103	3.58

$BETA^2$ = .08

c. Summary of pair-wise comparisons between treatment sub-areas on adjusted mean change scores

Sub-Area	R	RM	RMA	M	C
R					
RM	No				
RMA	Yes	Yes			
M	Yes	Yes	No		
C	No	No	Yes	Yes	

* Unadjusted means are confounded by differences in starting point. All reported analyses are based on the adjusted means.

** Adjusted scores reported here are change scores adjusted for starting point. The more traditional procedure of adjusting post-test scores for pre-test scores produced virtually identical results.

Table 24. Differential treatment effectiveness as measured by change between 1974 and 1976 - controlling for the effect of 1974 practice score on amount of change (Oriente - Quezada and Yupi combined).

a. Analysis of variance in change in total practice score adjusting for 1974 practice level

Source	df	Sum of Squares	Mean Squares	F ratio	F prob.
Between Treatments	4	895.6	223.9	7.5	< .001
Within Treatments	814	24371.1	29.9		
Covariate Effects	1	4966.8	4966.8	165.9	< .001
Total	819	30233.5	36.9		

b. Rank order of treatments by unadjusted and adjusted change scores

Unadjusted Scores

Sub-area	N	Mean
M	92	6.17
RMA	207	5.98
R	212	4.72
RM	205	4.23
C	104	3.80

ETA^2 = .02

Adjusted Scores

Sub-area	N	Mean
RMA	207	6.15
M	92	6.10
R	212	5.07
RM	205	3.98
C	104	3.29

$BETA^2$ = .03

Table 25. Differential treatment effectiveness as measured by change between 1974 and 1976 - controlling for the effect of 1974 practice score on amount of change (Oriente - Quezada and Yupi separately).

a. Analysis of variance in change in total practice score adjusting for 1974 practice level

Source	df	Sum of Squares	Mean Squares	F ratio	F prob.
Between Treatments	7	1503.2	214.7	7.3	<.001
Within Sub-Area	811	23763.5	29.3		
Covariate Effect	1	4966.8	4966.8	165.9	<.001
Total	819	30233.5	36.9		

b. Rank-order of sub-areas by unadjusted and adjusted change scores

Unadjusted Scores			Adjusted Scores		
Sub-Area	N	Mean	Sub-Area	N	Mean
YRMA	106	7.14	YRMA	106	6.82
M	92	6.17	QR	101	6.29
YR	111	5.17	M	92	6.09
QRMA	101	4.76	QRMA	101	5.49
QRM	102	4.29	QRM	102	5.17
QR	101	4.23	YR	111	4.01
YRM	103	4.17	C	104	3.24
C	104	3.90	YRM	103	2.76

ETA^2 = .03 $BETA^2$ = .05

Table 26. Differential treatment effectiveness as measured by change in total practice score - controlling for effect of initial practice score on amount of change - Occidente.

a. Analysis of variance in change in total practice score with initial practice level as a covariate

Source	df	Sum of Squares	Mean Squares	F Ratio	F Prob.
Covariate Effect	1	2413.1	2413.1	110.7	<.001
Between Treatments	4	397.8	99.5	4.6	=.001
Within Treatments	537	11705.4	21.8		

b. Rank order of treatments by adjusted and unadjusted change scores

Unadjusted Scores *

Sub-Area	N	Mean
RM	122	2.65
RMA	98	2.62
R	128	1.63
M	80	1.42
C	115	1.23

ETA^2 = .01

Adjusted Scores **

Sub-Area	N	Mean
RMA	98	3.13
RM	122	2.70
M	80	1.90
C	115	1.07
R	128	1.01

BETA^2 = .03

c. Summary of pair-wise comparisons between treatment sub-areas on adjusted mean change scores

Sub-Area	R	RM	RMA	M	C
R					
RM	Yes				
RMA	Yes	No			
M	No	No	No		
C	No	Yes	Yes	No	

*Unadjusted means are confounded by differences in starting point. All reported analyses are based on the adjusted means.

** Adjusted scores reported here are change scores adjusted for starting point. The more traditional procedure of adjusting post-test scores for pre-test scores produced virtually identical results.

Table 27. Differential treatment effectiveness as measured by change in perception of risk in use of modern agricultural practices.

a. Analysis of variance between culture and treatment conditions on change with initial practice level as a covariate.

Source	df	Sum of Squares	Mean Square	F Ratio	F Prob.
Main Effects					
Culture	1	162.8	162.8	113.2	<.001
Treatment	4	92.3	23.1	16.1	<.001
Covariate Effects					
Initial practice score	1	1636.6	1636.6	1137.9	<.001
Interactions					
Culture by treatment	4	77.3	19.3	13.4	<.001
Error	1048	1507.3	1.4		

b. Rank order of treatment conditions (Oriente and Occidente combined) by adjusted risk-change scores.

Oriente and Occidente Combined Adjusted Scores

Treatment	N	Mean	Significantly higher than .....
RM	225	.17	M, C
RMA	204	.09	M, C
R	239	-.04	M, C
M	172	-.29	C
C	219	-.65	None

F = 16.1, p < .001
Average pre-BVE risk score = 2.9

c. Cross-cultural comparison of rank of treatment condition by adjusted risk change scores.

Oriente Adjusted Scores

Treatment	N	Mean	Significantly higher than ...
M	92	.05	R, C
RM	103	-.13	None
RMA	106	-.19	None
R	111	-.41	None
C	104	-.53	None

F = 2.68, p < .05
Average pre-BVE risk score = 3.5

Occidente Adjusted Scores

Treatment	N	Mean	Significantly higher than ...
RM	122	-.08	C, M
RMA	98	.35	C, M
R	128	.28	C, M
M	80	-.68	None
C	115	-.72	None

F = 13.78, p < .05
Average pre-BVE risk score = 2.3

Table 28. Difference between high and low practice farmers in Oriente (Yupi) in terms of background characteristics: results of discriminant analysis.

a. Univariate relationships between high and low practice farmers in Oriente.

Background Items	Low $\bar{X}$	Low SD	High $\bar{X}$	High SD	Univariate F Ratio	Significance of F Ratio (df=1, 343)
Makes agricultural decisions alone	1.0	0.2	1.0	0.2	0.1	NS
Sees no risk in use of new seed	0.8	0.4	0.7	0.4	3.4	NS
Sees no risk in insecticide use	0.6	0.5	0.8	0.4	3.8	< .05
Sees no risk in fertilizer use	0.7	0.4	0.9	0.3	8.6	< .01
Sees no risk in herbicide use	0.5	0.5	0.6	0.5	1.8	NS
Sees no risk in fungicide use	0.4	0.5	0.6	0.5	4.2	< .05
Sells part of corn crop	0.1	0.3	0.4	0.5	27.8	< .001
Sells part of bean crop	0.6	0.5	0.8	0.4	13.3	< .001
Sees no risk in use of credit	0.2	0.4	0.3	0.5	3.7	NS
Seeks advice on agricultural matters	0.3	0.4	0.5	0.5	9.3	< .01
Number of parcels into which land is divided	2.2	1.0	2.4	1.2	3.3	NS
Percent of landholdings owned	0.4	0.4	0.6	0.4	8.7	< .01
Percent of landholdings rented	0.5	0.4	0.3	0.4	11.6	< .001
Total amount of land available for planting	2.3	2.5	4.1	2.9	23.4	< .001

Background Items	Low $\bar{X}$	Low SD	High $\bar{X}$	High SD	Univariate F Ratio	Significance of F Ratio
Feels his land is worse than his neighbors	0.1	0.3	0.0	0.2	4.2	<.05
Number of animals owned	1.1	1.8	2.8	2.4	38.0	<.001
Works away from the farm	0.3	0.5	0.2	0.4	2.1	NS
Works as a skilled worker (teacher, merchant, driver)	0.0	0.1	0.0	0.0	0.2	NS
Perceives of money as important	0.9	0.3	1.0	0.1	3.6	NS
Feels that money is more important than friends	0.2	0.4	0.2	0.4	1.7	NS
Sees chances of advancement in farming	0.9	0.3	1.0	0.2	1.2	NS
Receives letters	0.4	0.5	0.6	0.5	9.8	<.01
Owns a radio	0.5	0.5	0.7	0.5	9.2	<.01
Listens to a radio	0.8	0.4	0.9	0.3	4.8	<.05
Belongs to an organized group	0.1	0.3	0.2	0.4	13.1	<.001
Feels that meeting with friends & neighbors about agricultural matters is important	0.8	0.4	0.8	0.4	0.2	NS
Visits nearest municipality at least a few times/ year	0.9	0.3	1.0	0.2	1.1	NS
Visits the department capital at least a few times/year	0.7	0.5	0.7	0.5	0.0	NS
Visits Guatemala City at least a few times a year	0.3	0.4	0.4	0.5	2.4	NS

Background Items	Low $\bar{X}$	Low SD	High $\bar{X}$	High SD	Univariate F Ratio	Significance of F Ratio
Feels that family has more health problems than others	0.1	0.3	0.1	0.3	1.0	NS
Includes bread in weekly diet	0.4	0.5	0.6	0.5	8.9	<.01
Includes lard in weekly diet	0.4	0.5	0.5	0.5	3.6	NS
Includes plantains in weekly diet	0.0	0.2	0.1	0.3	2.8	NS
Includes rice in weekly diet	0.3	0.4	0.5	0.5	13.5	<.001
Includes vegetables in weekly diet	0.3	0.4	0.4	0.5	2.8	NS
Includes meat in weekly diet	0.2	0.4	0.4	0.5	5.4	<.05
Includes cheese in weekly diet	0.6	0.5	0.9	0.3	24.0	<.001
Includes milk in weekly diet	0.4	0.5	0.8	0.4	29.5	<.001
Includes incaparina in weekly diet	0.1	0.3	0.2	0.4	5.4	<.05
Owns own house	0.9	0.3	1.0	0.1	2.9	NS
Has better than thatch roof on house	0.4	0.5	0.8	0.4	27.1	<.001
Has better than mud-fill walls	0.4	0.5	0.7	0.4	20.9	<.001
Uses fuel other than wood or candles for lighting	0.9	0.3	0.9	0.3	0.0	NS
Gets water from other than river or stream (i.e. well or faucet)	0.6	0.5	0.6	0.5	0.1	NS
Has toilet facilities	0.0	0.2	0.0	0.2	1.1	NS

Background Items	Low $\bar{X}$	Low SD	High $\bar{X}$	High SD	Univariate F Ratio	Significance of F Ratio
Number of children	3.6	2.5	3.9	2.5	0.7	NS
Sees monetary gain as main motive for education	0.8	0.4	0.8	0.4	1.8	NS
Number of years of education desired for children	4.3	2.1	5.2	1.4	10.7	< .01
Corn production (first crop)	14.8	11.5	33.5	28.7	68.6	< .001
Bean Production (first crop)	5.7	6.0	9.7	6.5	21.7	< .001
Total revenue from corn & beans	$290.14	223.15	581.30	321.96	71.1	< .001
Number of literate members in household	1.5	1.5	2.2	1.8	10.8	< .001
Number of years of formal education completed	0.6	1.2	1.0	1.7	6.6	< .01
Literacy	0.3	0.5	0.5	0.5	9.6	< .01
Age	40.2	14.0	38.4	11.3	0.8	NS

b. Variables included in the discriminant function (in order of relative contribution).

Background Items	Standardized discriminant function coefficients	Multivariate partial F (df=22, 322)	Univariate F (df=1, 343)
Corn production (first crop)	0.4	21.7***	68.6***
Includes cheese in weekly diet	0.3	8.9***	24.0***
Has better than thatch roof	0.2	7.3***	27.1***
Visits the department capital	-0.2	7.4***	0.0
Bean production (first crop)	0.2	7.1***	21.7***
Percent of landholdings rented	-0.2	6.9***	11.6***
Sees no risk in use or new seed	-0.2	6.0***	3.4
Sees no risk in fertilizer use	0.2	3.7***	8.6**
Includes rice in weekly diet	0.2	2.9***	13.5***
Sees no risk in insecticide use	0.2	2.9***	3.8*
Literacy	0.1	2.7***	9.6**
Sees monetary gain as main motive for education	0.1	2.8***	1.9
Includes lard in weekly diet	-0.1	2.0***	3.6
Perceives of money as important	0.1	2.3**	3.6
Seeks advice in agricultural matters	0.1	1.9*	9.3**
Has toilet facilities	-0.1	1.8*	1.1
Number of literate members in household	-0.1	1.4	10.8***
Belongs to an organized group	0.1	1.5	13.1***
Works as a skilled worker	-0.1	1.5	0.2
Visits nearest municipality at least a few times a year	0.1	1.3	1.1

Background Items	Standardized discriminant function coefficients	Multivariate partial F (df=22, 322)	Univariate F (df=1, 343)
Sees no risk in credit use	0.1	1.4	3.7
Listens to radio	0.1	1.2	4.8*

Group Centroids:
Low = -0.3
High = 1.3

Multivariate F ratio (for the discriminant function) = 7.4, $p < .001$
Canonical correlation (for 2 groups equivalent to multiple R) = 0.6
Canonical correlation squared (proportion of variance accounted for) = 0.4
Wilks' Lambda for best single predictor variable (item #51) = 0.8
Wilks' Lambda for discriminant function = 0.6

c. Results of prediction of group membership based on discriminant function.

	Predicted Group		
Actual Group	Low	High	Total Sample
Low	241 (85%)	44 (15%)	285 (100%)
High	11 (18%)	49 (82%)	60 (100%)

84% of the cases were classified correctly

* $p < .05$
** $p < .01$
*** $p < .001$

Table 29. Difference between high and low practice farmers in Occidente in terms of background characteristics: results of discriminant analysis.

a. Univariate relationships between high and low practice farmers in Occidente.

Background Items	Low $\bar{X}$	Low SD	High $\bar{X}$	High SD	Univariate F Ratio	Significance of F Ratio (df=1, 234)
Makes agricultural decisions alone	1.0	0.0	1.0	0.2	0.5	NS
Sees no risk in use of new seed	0.4	0.5	0.6	0.5	4.6	< .05
Sees no risk in insecticide use	0.4	0.5	0.6	0.5	3.3	NS
Sees no risk in fertilizer use	0.5	0.5	1.0	0.1	106.1	< .001
Sees no risk in herbicide use	0.0	0.2	0.3	0.4	5.7	< .05
Sees no risk in fungicide use	0.1	0.3	0.4	0.5	5.5	< .05
Sells part of corn crop	0.0	0.0	0.0	0.2	0.9	NS
Sells part of bean crop	0.0	0.2	0.1	0.3	0.4	NS
Sees no risk in use of credit	0.0	0.2	0.1	0.3	0.5	NS
Seeks advice on agricultural matters	0.0	0.0	0.1	0.2	1.1	NS
Number of parcels into which land is divided	1.3	0.6	1.5	0.8	1.6	NS
Percent of landholdings owned	1.0	0.0	1.0	0.1	0.5	NS
Percent of landholdings rented	0.0	0.0	0.0	0.1	0.4	NS
Total amount of land available for planting	1.5	0.7	1.8	1.5	1.0	NS

Background Items	Low $\bar{X}$	Low SD	High $\bar{X}$	High SD	Univariate F Ratio	Significance of F Ratio
Feels his land is worse than his neighbors	0.0	0.2	0.0	0.2	0.3	NS
Number of animals owned	1.4	1.7	1.9	2.1	1.3	NS
Works away from the farm	0.4	0.5	0.3	0.5	0.8	NS
Works as a skilled worker (teacher, merchant, driver)	0.0	0.2	0.2	0.4	3.6	NS
Perceives of money as important	1.0	0.0	1.0	0.2	0.7	NS
Feels that money is more important than friends	0.8	0.4	0.7	0.5	2.1	NS
Sees chances of advancement in farming	0.7	0.5	0.8	0.4	3.0	NS
Receives letters	0.2	0.4	0.3	0.4	0.9	NS
Owns a radio	0.3	0.5	0.5	0.5	4.9	$< .05$
Listens to a radio	0.3	0.5	0.5	0.5	6.8	$< .01$
Belongs to an organized group	0.0	0.0	0.1	0.3	2.4	NS
Feels that meeting with friends & neighbors about agricultural matters is important	0.5	0.5	0.6	0.5	2.0	NS
Visits nearest municipality at least a few times/ year	1.0	0.2	1.0	0.1	3.7	NS
Visits the department capital at least a few times/year	0.3	0.5	0.5	0.5	4.3	NS
Visits Guatemala City at least a few times a year	0.1	0.3	0.2	0.4	0.6	NS

Background Items	Low $\bar{X}$	Low SD	High $\bar{X}$	High SD	Univariate F Ratio	Significance of F Ratio
Feels that family has more health problems than others	0.0	0.2	0.0	0.2	0.1	NS
Includes bread in weekly diet	0.8	0.4	0.8	0.4	0.2	NS
Includes lard in weekly diet	0.3	0.5	0.6	0.5	3.9	<.05
Includes plantains in weekly diet	0.3	0.5	0.2	0.4	0.8	NS
Includes rice in weekly diet	0.5	0.5	0.5	0.5	0.0	NS
Includes vegetables in weekly diet	0.7	0.5	0.7	0.4	0.0	NS
Includes meat in weekly diet	0.8	0.4	0.9	0.3	0.9	NS
Includes cheese in weekly diet	0.3	0.5	0.3	0.5	0.6	NS
Includes milk in weekly diet	0.2	0.5	0.2	0.4	0.1	NS
Includes incaparina in weekly diet	0.4	0.5	0.4	0.5	0.0	NS
Owns own house	1.0	0.0	1.0	0.0	0.0	NS
Has better than thatch roof on house	0.6	0.5	0.9	0.3	18.2	<.001
Has better than mud-fill walls	0.7	0.5	0.9	0.3	14.1	<.001
Uses fuel other than wood or candles for lighting	0.8	0.4	0.8	0.4	0.0	NS
Gets water from other than river or stream (i.e. well or faucet)	0.8	0.4	0.8	0.4	0.5	NS
Has toilet facilities	0.2	0.4	0.0	0.2	11.3	<.001

Background Items	Low $\bar{X}$	Low SD	High $\bar{X}$	High SD	Univariate F Ratio	Significance of F Ratio
Number of children	3.2	2.5	3.7	2.4	1.0	NS
Sees monetary gain as main motive for education	0.5	0.5	0.6	0.5	2.4	NS
Number of years of education desired for children	4.1	2.3	4.2	2.0	0.0	NS
Corn production (first crop)	9.1	6.4	22.9	23.4	7.8	< .01
Bean Production (first crop)	0.6	1.1	2.5	2.6	11.1	< .001
Total revenue from corn & beans	$75.27	50.26	203.99	195.97	9.8	< .01
Number of literate members in household	0.8	0.8	0.8	0.9	0.0	NS
Number of years of formal education completed	0.9	1.5	0.5	1.0	2.8	NS
Literacy	0.4	0.5	0.3	0.5	1.0	NS
Age	37.0	15.0	39.1	12.9	0.5	NS

b. Variables included in the discriminant function (in order of relative contribution).

Background Items	Standardized discriminant function coefficients	Multivariate partial F (df=19, 216)	Univariate F (df=1, 234)
Sees no risk in fertilizer use	-0.8	108.3***	106.1***
Sees chances of advancement in farming	-0.3	18.2***	3.0
Sees no risk in fungicide use	-0.2	6.5***	5.5*
Has better than thatch roof on house	-0.2	4.1***	18.2***
Visits Guatemala City at least a few times a year	0.2	5.2***	0.6
Perceives of money as important	0.2	5.0***	0.7
Has toilet facilities	0.2	5.3***	11.3***
Includes vegetables in weekly diet	0.2	4.7***	0.0
Sees no risk in use of new seed	-0.2	4.7***	4.6*
Bean production (first crop)	-0.2	3.5***	11.1***
Sees monetary gain as main motive for education	-0.1	3.0***	2.4
Feels that meeting with friends and neighbors about agricultural matters is important	0.1	2.9***	2.0
Works as a . lled worker (teacher, merchange, driver)	-0.1	2.2***	3.6
Includes lard in weekly diet	-0.1	1.8*	3.9*
Has better than mud-fill walls	-0.1	1.7*	14.1***
Works away from the farm	0.1	1.3*	0.8

Background Items	Standardized discriminant function coefficients	Multivariate partial F (df=19,216)	Univariate F (df=1, 234)
Total amount of land available for planting	0.1	1.4	1.0
Includes cheese in weekly diet	-0.1	1.2	0.6
Visits the department capital at least a few times a year	-0.1	1.1	4.3

Group Centroids:
Low = 2.2
High = -0.2

Multivariate F ratio (for the discriminant function) = 11.6, $p < .001$
Canonical correlation (for 2 groups equivalent to multiple R) = 0.7
Canonical correlation squared (proportion of variance accounted for) = 0.5
Wilks' Lambda for best single predictor variable (fertilizer risk) = 0.7
Wilks' Lambda for discriminant function = 0.5

c. Results of prediction of group membership based on discriminant function.

	Predicted Group		
Actual Group	Low	High	Total Sample
Low	18 (78%)	5 (22%)	23 (100%)
High	8 (4%)	205 (96%)	213 (100%)

95% of the cases were classified correctly

* $p < .05$
** $p < .01$
*** $p < .001$

Table 30. Comparison of high and low change farmers in terms of thirteen agricultural practice items: Oriente

Item #	Initial Level		Final Level		Change	
	Low Change	High Change	Low Change	High Change	Low Change	High Change
1	3.28	3.34	3.27	3.81	-0.01	0.47
2	2.65	2.51	2.98	3.04	0.32	0.53
3	3.20	2.31	2.41	3.02	-0.79	0.71
4	1.35	1.42	1.46	1.90	0.10	0.48
5	1.52	1.19	1.44	2.41	-0.08	1.64
6	1.29	1.07	1.14	1.88	-0.15	0.81
7	1.61	1.23	1.69	3.47	0.08	2.25
8	1.33	1.13	1.41	2.41	-0.09	1.28
9	2.38	1.76	1.81	2.48	-0.56	0.72
10	2.04	1.52	1.26	1.69	-0.78	0.16
11	2.15	1.69	1.87	2.82	-0.28	1.12
12	4.21	4.08	3.98	4.13	-0.23	0.06
13	0.28	0.13	0.13	0.49	0.00	0.00

Table 31. Comparison of high and low change farmers in terms of thirteen agricultural practice items: Occidente.

Item #	Initial Level		Final Level		Change	
	Low Change	High Change	Low Change	High Change	Low Change	High Change
1	3.01	3.02	3.00	3.01	-0.01	-0.01
2	2.99	2.96	2.95	3.06	-0.04	0.10
3	4.52	4.24	4.13	4.53	-0.39	0.29
4	1.49	1.36	1.36	2.65	-0.13	1.29
5	2.81	2.46	2.98	3.66	0.17	1.20
6	1.22	1.02	1.42	3.24	0.19	2.22
7	2.79	2.69	2.12	3.84	-0.66	1.14
8	2.76	2.22	2.30	3.43	-0.46	1.20
9	1.53	1.31	1.06	1.40	-0.47	0.10
10	1.76	1.49	1.12	1.51	-0.65	0.02
11	3.99	3.98	3.75	3.89	-0.24	0.02
12	1.09	1.05	1.02	1.08	-0.07	0.03
13	0.22	0.07	0.02	2.02	0.00	0.00

Table 32. Difference between high and low change farmers in Oriente (Yupi) in terms of background characteristics: results of discriminant analysis.

a. Univariate relationships between high and low change farmers in Oriente (Yupi).

Background Items	Low $\bar{X}$	Low SD	High $\bar{X}$	High SD	Univariate F Ratio	Significance of F Ratio (df=1, 290)
Makes agricultural decisions alone	1.0	0.2	1.0	0.2	0.7	NS
Sees no risk in use of new seed	0.8	0.4	0.8	0.4	0.6	NS
Sees no risk in insecticide use	0.7	0.5	0.6	0.5	0.6	NS
Sees no risk in fertilizer use	0.8	0.4	0.8	0.4	0.1	NS
Sees no risk in herbicide use	0.6	0.5	0.5	0.5	0.7	NS
Sees no risk in fungicide use	0.5	0.5	0.4	0.5	1.0	NS
Sells part of corn crop	0.2	0.4	0.2	0.4	0.4	NS
Sells part of bean crop	0.7	0.5	0.7	0.5	0.1	NS
Sees no risk in use of credit	0.3	0.4	0.2	0.4	1.7	NS
Seeks advice on agricultural matters	0.3	0.5	0.3	0.5	0.1	NS
Number of parcels into which land is divided	2.1	1.1	2.4	1.1	5.1	$<.05$
Percent of landholdings owned	0.4	0.4	0.5	0.4	2.7	NS
Percent of landholdings rented	0.4	0.5	0.4	0.4	1.4	NS
Total amount of land available for planting	2.5	1.7	3.4	2.0	6.2	$<.05$

Background Items	Low $\bar{X}$	Low SD	High $\bar{X}$	High SD	Univariate F Ratio	Significance of F Ratio
Feels his land is worse than his neighbors	0.1	0.3	0.1	0.3	0.2	NS
Number of animals owned	1.3	2.1	1.7	2.2	2.0	NS
Works away from the farm	0.3	0.5	0.3	0.4	1.7	NS
Works as a skilled worker (teacher, merchant, driver)	0.0	0.0	0.0	0.1	0.8	NS
Perceives of money as important	0.9	0.3	0.9	0.3	0.1	NS
Feels that money is more important than friends	0.2	0.4	0.2	0.4	0.3	NS
Sees chances of advancement in farming	0.9	0.3	0.9	0.3	0.2	NS
Receives letters	0.4	0.5	0.5	0.5	0.5	NS
Owns a radio	0.4	0.5	0.5	0.5	2.2	NS
Listens to a radio	0.9	0.3	0.8	0.4	1.1	NS
Belongs to an organized group	0.1	0.3	0.1	0.4	2.1	NS
Feels that meeting with friends & neighbors about agricultural matters is important	0.7	0.5	0.8	0.4	3.6	NS
Visits nearest municipality at least a few times/ year	0.9	0.3	1.0	0.2	5.5	< .05
Visits the department capital at least a few times/year	0.6	0.5	0.7	0.4	3.3	NS
Visits Guatemala City at least a few times a year	0.3	0.4	0.3	0.4	0.0	NS

Background Items	Low $\bar{X}$	Low SD	High $\bar{X}$	High SD	Univariate F Ratio	Significance of F Ratio
Feels that family has more health problems than others	0.1	0.3	0.1	0.3	0.0	NS
Includes bread in weekly diet	0.4	0.5	0.5	0.5	2.4	NS
Includes lard in weekly diet	0.3	0.5	0.5	0.5	4.8	<.05
Includes plantains in weekly diet	0.0	0.2	0.1	0.2	0.1	NS
Includes rice in weekly diet	0.3	0.5	0.3	0.5	0.0	NS
Includes vegetables in weekly diet	0.3	0.5	0.2	0.4	2.3	NS
Includes meat in weekly diet	0.3	0.4	0.2	0.4	0.6	NS
Includes cheese in weekly diet	0.6	0.5	0.6	0.5	0.3	NS
Includes milk in weekly diet	0.5	0.5	0.5	0.0	0.0	NS
Includes incaparina in weekly diet	0.1	0.3	0.1	0.3	0.8	NS
Owns own house	0.9	0.3	0.9	0.2	0.9	NS
Has better than thatch roof on house	0.6	0.5	0.5	0.5	1.5	NS
Has better than mud-fill walls	0.4	0.5	0.6	0.5	3.0	NS
Uses fuel other than wood or candles for lighting	0.9	0.3	0.9	0.2	2.0	NS
Gets water from other than river or stream (i.e. well or faucet)	0.5	0.5	0.6	0.5	0.1	NS
Has toilet facilities	0.0	0.0	0.1	0.2	4.7	<.05

Background Items	Low $\bar{X}$	Low SD	High $\bar{X}$	High SD	Univariate F Ratio	Significance of F Ratio
Number of children	3.5	2.6	3.6	2.6	0.1	NS
Sees monetary gain as main motive for education	0.7	0.4	0.8	0.4	1.5	NS
Number of years of education desired for children	4.4	2.0	4.9	1.9	3.2	NS
Corn production (first crop)	17.7	14.7	21.3	20.8	2.0	NS
Bean Production (first crop)	6.7	7.6	6.9	7.0	0.0	NS
Total revenue from corn & beans	$387.50	294.82	394.18	330.90	0.0	NS
Number of literate members in household	1.5	1.5	2.0	1.7	4.1	<.05
Number of years of formal education completed	0.6	1.2	0.8	1.4	2.2	NS
Literacy	0.3	0.4	0.4	0.5	5.0	<.05
Age	41.3	13.5	39.3	14.4	1.1	NS

b Variables included in the discriminant function (in order of relative contribution).

Background Items	Standardized discriminant function coefficients	Multivariate partial F (df=25, 266)	Univariate F (df=1, 290)
Has better than thatch roof on house	-0.4	9.7***	1.5
Total amount of land available for planting	0.4	6.9***	6.2*
Includes lard in weekly diet	0.4	6.9***	4.8*
Includes vegetables in weekly diet	0.3	7.6***	2.3
Listens to a radio	-0.3	5.1***	1.1
Total revenue from corn and beans	-0.3	4.1***	0.0
Has toilet facilities	0.3	5.4***	4.7*
Sees no risk in insecticide use	-0.3	5.0***	0.6
Visits Guatemala City at least a few times a year	-0.2	4.0***	0.0
Includes meat in weekly diet	-0.2	3.4***	0.6
Literacy	0.2	3.5***	5.0*
Visits nearest municipality at least a few times a year	0.2	3.4***	5.5*
Visits the department capital at least a few times a year	0.2	2.5***	3.3
Sees no risk in use of credit	-0.2	3.0***	1.7
Number of parcels into which land is divided	0.2	2.5***	5.1*
Feels that meeting with friends and neighbors about agricultural matters is important	0.2	2.0***	3.6
Number of years of education desired for children	0.2	1.9***	3.2
Sells part of bean crop	-0.2	1.9***	0.1
Percent of landholdings owned	0.2	1.8***	2.7

Background Items	Standardized discriminant function coefficients	Multivariate partial F (df=25, 266)	Univariate F (df=1, 290)
Belongs to an organized group	0.2	1.8***	2.1
Owns a radio	0.1	1.0***	2.2
Has better than mud-fill walls	0.1	1.2***	3.0
Makes agricultural decisions alone	-0.1	1.4***	0.7
Sees no risk in use of new seed	0.1	1.3***	0.6
Owns own house	0.1	1.2***	0.9

Group Centroids:
Low = -0.7
High = 0.3

Multivariate F ratio (for the discriminant function) = 3.1, $p < .001$
Canonical correlation (for 2 groups equivalent to multiple R) = 0.5
Canonical correlation squared (proportion of variance accounted for) = 0.2
Wilks' Lambda for best single predictor variable (land-item #14) = 1.0
Wilks' Lambda for discriminant function = 0.8

c. Results of prediction of group membership based on discriminant function.

Actual Group	Predicted Group: Low	High	Total Sample
Low	61 (71%)	24 (29%)	85 (100%)
High	58 (28%)	149 (72%)	207 (100%)

72% of the cases were classified correctly

* $p < .05$
** $p < .01$
*** $p < .001$

Table 33. Difference between high and low change farmers in Occidente in terms of background characteristics: results of discriminant analysis.

Background Items	Univariate relationships between high and low change farmers in Occidente. Low $\bar{X}$	Low SD	High $\bar{X}$	High SD	Univariate F Ratio	Significance of F Ratio (df=1, 319
1. Makes agricultural decisions alone	1.0	0.2	1.0	0.0	2.9	NS
2. Sees no risk in use of new seed	0.6	0.5	0.6	0.5	0.1	NS
3. Sees no risk in insecticide use	0.5	0.5	0.5	0.5	0.8	NS
4. Sees no risk in fertilizer use	0.9	0.3	0.8	0.4	3.8	< .05
5. Sees no risk in herbicide use	0.2	0.4	0.2	0.4	0.1	NS
6. Sees no risk in fungicide use	0.3	0.4	0.2	0.4	1.3	NS
Sells part of corn crop	0.0	0.1	0.0	0.2	1.2	NS
8. Sells part of bean crop	0.1	0.2	0.0	0.2	0.1	NS
9. Sees no risk in use of credit	0.1	0.2	0.1	0.2	0.0	NS
10. Seeks advice on agricultural matters	0.0	0.2	0.0	0.1	0.7	NS
11. Number of parcels into which land is divided	1.4	0.7	1.5	0.7	1.3	NS
12. Percent of landholdings owned	1.0	0.0	1.0	0.1	3.3	NS
13. Percent of landholdings rented	0.0	0.0	0.0	0.1	3.3	NS
14. Total amount of land available for planting	1.5	1.1	1.6	1.0	3.3	NS

Background Items	Low $\bar{X}$	Low SD	High $\bar{X}$	High SD	Univariate F Ratio	Significance of F Ratio
15. Feels his land is worse than his neighbors	0.0	0.1	0.0	0.2	2.0	NS
16. Number of animals owned	1.7	2.0	1.8	2.1	0.2	NS
17. Works away from the farm	0.3	0.5	0.4	0.5	5.9	$<.05$
18. Works as a skilled worker (teacher, merchant, driver)	0.2	0.4	0.1	0.3	1.6	NS
19. Perceives of money as important	1.0	0.1	1.0	0.0	1.5	NS
20. Feels that money is more important than friends	0.7	0.5	0.7	0.5	0.1	NS
21. Sees chances of advancement in farming	0.9	0.3	0.8	0.4	0.7	NS
22. Receives letters	0.2	0.4	0.2	0.4	1.6	NS
23. Owns a radio	0.4	0.5	0.5	0.5	5.1	$<.05$
24. Listens to a radio	0.4	0.5	0.6	0.5	8.1	$<.01$
25. Belongs to an organized group	0.1	0.3	0.1	0.2	0.1	NS
26. Feels that meeting with friends & neighbors about agricultural matters is important	0.6	0.5	0.6	0.5	0.1	NS
27. Visits nearest municipality at least a few times/ year	1.0	0.1	1.0	0.0	1.0	NS
28. Visits the department capital at least a few times/year	0.5	0.5	0.5	0.5	0.0	NS
29. Visits Guatemala City at least a few times a year	0.2	0.4	0.2	0.4	0.5	NS

	Background Items	Low $\bar{X}$	Low SD	High $\bar{X}$	High SD	Univariate F Ratio	Significance of F Ratio
30.	Feels that family has more health problems than others	0.0	1.0	0.0	0.2	0.1	NS
31.	Includes bread in weekly diet	0.8	0.4	0.8	0.4	1.3	NS
32.	Includes lard in weekly diet	0.5	0.5	0.5	0.5	0.0	NS
33.	Includes plantains in weekly diet	0.3	0.4	0.3	0.4	0.2	NS
34.	Includes rice in weekly diet	0.4	0.5	0.5	0.5	0.0	NS
35.	Includes vegetables in weekly diet	0.7	0.5	0.6	0.5	0.3	NS
36.	Includes meat in weekly diet	0.9	0.3	0.9	0.3	1.3	NS
37.	Includes cheese in weekly diet	0.3	0.4	0.3	0.5	0.2	NS
38.	Includes milk in weekly diet	0.2	0.4	0.2	0.4	0.2	NS
39.	Includes incaparina in weekly diet	0.4	0.5	0.3	0.5	1.4	NS
40.	Owns own house	1.0	0.1	1.0	0.0	0.5	NS
41.	Has better than thatch roof on house	0.8	0.4	0.8	0.4	0.0	NS
42.	Has better than mud-fill walls	0.9	0.3	0.9	0.3	0.0	NS
43.	Uses fuel other than wood or candles for lighting	0.8	0.4	0.9	0.3	3.2	NS
44.	Gets water from other than river or stream (i.e. well or faucet)	0.8	0.4	0.9	0.3	3.7	NS
45.	Has toilet facilities	0.1	0.2	0.1	0.3	2.4	NS

	Background Items	Low $\bar{X}$	Low SD	High $\bar{X}$	High SD	Univariate F Ratio	Signific of F Rat
46.	Number of children	3.6	2.3	3.0	2.2	3.6	NS
47.	Sees monetary gain as main motive for education	0.6	0.5	0.4	0.5	7.1	<.01
48.	Number of years of education desired for children	4.0	2.1	4.1	2.1	0.5	NS
49.	Corn production (first crop)	18.1	20.8	17.8	16.9	0.0	NS
50.	Bean Production (first crop)	1.9	2.3	1.7	1.9	0.5	NS
51.	Total revenue from corn & beans	$159.51	174.83	154.36	132.83	0.1	NS
52.	Number of literate members in household	0.7	0.9	0.9	1.0	3.0	NS
53.	Number of years of formal education completed	0.5	1.1	0.4	1.0	0.3	NS
54.	Literacy	0.3	0.4	0.3	0.5	0.7	NS
55.	Age	39.1	12.5	34.9	10.9	8.9	<.01

Variables included in the discriminant function (in order of relative contribution).

Background Items	Standardized discriminant function coefficients	Multivariate partial F (df=24, 296)	Univariate F (df=1, 319)
Sells part of corn crop	0.4	8.8***	1.2
Sees monetary gain as main motive for education	-0.4	10.4***	7.1**
Works as a skilled worker (teacher, merchant, driver)	-0.4	6.5***	1.6
Listens to a radio	0.3	9.3***	8.1**
Sells part of bean crop	-0.3	7.8***	0.1
Age	-0.3	6.9***	8.9**
Number of literate members in household	0.3	6.2***	3.0
Gets water from other than river or stream (i.e., well or faucet)	0.3	5.8***	3.7
Number of parcels into which land is divided	0.3	4.6***	1.3
Corn production (first crop)	-0.3	3.8***	0.0
Number of years of formal education completed	-0.2	4.6***	0.3
Sees no risk in fertilizer use	-0.2	5.0***	3.8*
Includes incaparina in weekly diet	-0.2	4.6***	1.4
Percent of landholdings owned	-0.2	5.1***	3.3
Visits Guatemala City at least a few times a year	0.2	3.1***	0.5
Seeks advice on agricultural matters	-0.2	3.8***	0.7
Visits the department capital at least a few times a year	-0.2	3.8***	0.0
Makes agricultural decisions alone	0.2	4.2***	2.9

Background Items	Standardized discriminant function coefficients	Multivariate partial F (df=24, 296)	Univariate F (df=1,319)
Number of years of education desired for children	0.2	2.5***	0.5
Receives letters	0.2	2.2***	1.6
Feels his land is worse than his neighbors	0.2	2.4***	2.0
Works away from the farm	0.2	1.7**	5.9*
Includes meat in weekly diet	-0.2	1.8**	1.3
Perceives of money as important	0.1	1.6*	1.5

Group Centroids:

Low = -0.3
High = 0.7

Multivariate F ratio (for the discriminant function) = 3.8
Canonical correlation (for 2 groups equivalent to multiple R) = 0.5
Canonical correlation squared (proportion of variance accounted for) = 0.2
Wilks' Lambda for best single predictor variable (age) = 1.0
Wilks' Lambda for discriminant function = 0.8

c. Results of prediction of group membership based on discriminant function.

Actual Group	Predicted Group: Low	High	Total Sample
Low	161 (74%)	56 (26%)	217 (100%)
High	31 (30%)	73 (70%)	104 (100%)

73% of the cases were classified correctly

* $p < .05$
** $p < .01$
*** $p < .001$

Background Items	Standardized discriminant function coefficients	Multivariate Partial F Ratios	Significance of F ratios (df = 45, 1013)
Includes meant in weekly diet	.12	51.84	<.001
Listens to the radio	-.10		<.001
Number of literate members in household	-.09	28.74	<.001
Sees no risk in herbicide use	-.09	28.32	<.001
Seeks advice on agricultural matters	-.09	45.10	<.001
Total amount of land available for planting	-.09	29.66	<.001
Includes cheese in weekly diet	-.09	25.00	<.001
Feels that money is more important than friends	.09	31.57	<.001
Has better than mud-fill walls	.07	24.14	<.001
Includes milk in weekly diet	-.07	14.54	<.001
Works away from the farm as a skilled worker	.06	19.71	<.001
Includes vegetables in daily diet	.06	13.60	<.001
Includes plantains in daily diet	.06	14.82	<.001
Sees no risk in use of new seed	-.06	17.31	<.001
Sees monetary gain as main motive for education	-.06	17.35	<.001
Visits Guatemala City at least a few times a year	-.05	13.23	<.001