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INDIVIDUAL, FAMILY AND VILLAGE LITERACY IN DEVELOPMENT

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Thomas A. Rich
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EXECUTIVE SUMMARY

Literacy has long been considered an important factor in promoting individual change toward more modern behavior. An individual's own literacy has traditionally been the variable investigated--with conflicting results. It has been proposed by several authors that a clearer picture of the importance of literacy to individual behavior change in peasant societies may be gained by investigating the relationship between an individual's membership in a literate group (and the amount of literacy in the group) and his tendency to change his behavior in the direction of more modern practices. It is the purpose of the current study to explore the relationships between an individual's literacy, that of his family and village and his tendency to adopt modern farm practices. The basic research questions posed by the study are:

1. How important is an individual's own literacy to his adoption of modern farm practices?
2. How important is an individual's membership in a literate family to his adoption of modern farm practices?
3. How important is an individual's residence in a village with relatively high levels of literacy to his adoption of modern farm practices?
4. How do the relationships between individual, family and village literacy and practice adoption differ in different cultural areas of less developed countries?
5. How do background characteristics such as farm size, age and wealth affect the relationships posed above?

Data for this study were obtained from the Basic Village Education Project (BVE) -- a multi-year, panel study designed to assess the effectiveness of various communications media in promoting changes in agricultural practices in less developed countries. While the BVE Project was not designed to answer the research questions posed above, data collected during the conduct of the project contained information on the literacy of over 1300 Guatemalan farmers, and members of their families, as well as the tendency of these farmers to adopt modern agricultural practices. Furthermore, the BVE data-set contained extensive background information about a panel of respondents in two distinct cultural regions of Guatemala -- the Spanish-speaking Oriente area, and the Quiche-speaking Indian Highlands (Occidente). Secondary analysis of the BVE data-set was, then, able to provide information relevant to all five of this study's research questions. Some additional data collection was undertaken in order to establish the validity of the original self-report measure of individual literacy used by the BVE Project. The results of this validity test indicated that the BVE literacy information was, indeed, appropriate for the purposes of the current study, and the main analyses presented in this report were conducted using only the original BVE data-set.

The major findings of the study are as follows:

1. Membership in a highly literate family is related to the increased use of modern agricultural practices. This is true regardless of whether or not the farmer is literate himself, and is true for farmers in both cultural regions of Guatemala.
2. In contrast to family literacy, individual literacy has no measurable relationship to increased use of modern farm practices. This is not to say that the individual's own literacy is of no use to him, but rather that an illiterate farmer with a literate family is not at a disadvantage to a farmer who is literate himself.
3. Membership in a literate village is not consistently related to change toward more modern agricultural practice. Farmers who reside in highly literate villages in the Oriente region of Guatemala are more likely than those who reside in less literate villages to adopt modern agricultural practices. The relationship does not, however, hold true for farmers in the Indian Highlands. Thus, the importance of the literacy of a Guatemalan farmer's village to his tendency toward behavior change appears to be dependent upon the cultural area in which he lives.
4. The importance of an individual's family's literacy to his adoption of agricultural practices does not appear to be dependent upon his age, the amount of land available to him for planting or the general living conditions in which he finds himself. While all of these background characteristics are related to both change in agricultural practice and literacy; they are not responsible for the relationships between the literacy variables and adoption of modern agricultural practices.

In summary, the findings from the current study indicate that while individual literacy has no consistent relationship to change in agricultural practices among traditional farmers, family literacy does seem to be an important factor in such change. Furthermore, it seems apparent that literacy of one's family members is related to tendency to accept new practices regardless of cultural differences, general living conditions of the family, land size and age. The group effect of literacy also holds true at the village level in the Spanish-speaking Oriente region but not in the Occidente Quiche-speaking area.

The findings from this study do not mean that an individual's own literacy skill is of no benefit to him in terms of his understanding and tendency to accept new agricultural practices. Rather, the findings suggest that while a farmer may acquire change oriented attitudes in the process of becoming

literate and therefore increase the likelihood that he will change his behavior in the direction of modernization, he is also likely to share these new found attitudes with his illiterate family members. It is the conclusion of this study, then, that while literacy does indeed help to "free the man from the bondage of perceptual reality" (Singh, 1962:36), the "wings" thus given to his imagination are capable of carrying both him and the members of his family to new heights. The most appropriate and useful measure of literacy then in understanding the changes that take place among peasant farmers is one which taps both the "freed imagination" of the literate member and the "wings" which he shares with his family and which his family shares with him.

CHAPTER I

THE PROBLEM

The major purpose of this study was to explore the relationship between an individual's membership in a literate family and his/her tendency to adopt modern agricultural practices. The current chapter presents the rationale, based on the results of past and current studies relevant to literacy and practice adoption, for the authors' contention that "group literacy" may be an important factor related to individual behavior change. The second chapter describes the data set from which the findings were drawn and outlines the methodology employed. Chapter III includes the major research findings and the final chapter proposes possible implications of such findings for agricultural improvement efforts in less developed countries.

Literacy and education have variously been proclaimed "the basic personal skill(s) that underlie the whole modernizing sequence" (Lerner 1958:64); "the primary catalyst(s) in promoting social change" (Micklin, 1969:441); and "the most important experience related to the acquisition of attitudinal modernity" (Sack, 1973:270). William Herzog stated, in a report on literacy training and modernization, that "it is precisely in the areas where illiteracy rates are highest.....that development lags farthest behind the rest of the world" (Herzog, 1967:2).

Such intuitive consensus on the importance of literacy to the process of development is supported by a large body of empirical research. Positive relationships between literacy and some measure of modernity have been reported by Waisanen and Kumata (1972); Alex Inkeles (1973); Hilda Golden (1955); William Herzog (1973); Wright, Rich and Allen (1967); Gerald Feaster (1968); and others. In fact, Rogers and Shoemaker (1971) reported 200 empirical studies which affirm the existence of a significant positive relationship between literacy and education and the knowledge and/or adoption of modern innovations.

While it is evident from the above that there is empirical support for the proposition that literacy and education are related to some aspects of modernization, consensus of research findings is far from complete. A number of research studies have discovered somewhat low relationships between individual literacy and tendency to adopt modern practices and speculate that a larger family unit i.e. family literacy or village level of development may be critical factors in the interpretation of these correlations. In addition to the 200 supportive studies, Rogers and Shoemaker (1971) listed 79 studies which do not support the proposition that literacy and modernization are related. Furthermore, John Fett (1971) expressed dissatisfaction with results of literacy/development studies and proposed that "although literacy consistently has been found to correlate with various indicators of modernization, these correlations generally explain only a small percentage of the variance, and further that "experimental designs that have included literacy have usually given disappointing results" (Fett, 1971: 359). Other authors including Herzog (1973); Moore (1974); Smelser and Lipset

(1966); and Kamerschen (1968) have also noted ambiguities in the relationship between literacy and various "modernization" variables.

A recent review of the literature and analysis by Villaume (1978) presents a pragmatic statement on the status of individual literacy and the adoption of agricultural innovations. Villaume was concerned primarily with an individual's reading ability and its relation to his adoption of agricultural innovation. From this approach he concluded "literacy has little causal effect on the adoption of agricultural innovations and much less than socio-economic opportunity or change agent contact."

The fact that there has been a great disparity in results in regard to the relationship between individual literacy and "modernization" variables may be partially due to the ways in which both literacy and "modernization" have been defined. Literacy has variously been measured by years of formal schooling (Waisanen and Kumata, 1972); self-reported level (Fett, 1971); functional literacy tests (Herzog, 1973; Wright, Rich, Allen, 1967); magazine reading (Waisanen and Kumata, 1972); and an almost endless array of variations on these models. Similarly, operationalization of the "modernization" variable has differed drastically from study to study. Fett (1971) and Rogers and Shoemaker (1971) have used adoption of new agricultural practices as indicators of individual modernity while Feaster (1968), Inkeles (1973), Waisanen and Kumata (1972), and Herzog (1973) used complex indices of social-psychological variables to test level of readiness for modernization. Wright, Rich, Allen (1967), in measuring similar attitudinal variables, employed "picture story tests" in which respondents were asked to describe what they saw in a series of drawings.

While such variation in operational definition undoubtedly accounts for part of the disparity in results, this report contends that some of the variation may also be due to the focus on individual rather than family or group literacy as the independent variable. Numerous studies have consistently shown the importance the family and village play in peasant life in developing societies. For these societies, individual literacy may not be the most effective measure. The use of individual literacy as an independent variable may, in fact, obscure the relationship between literacy and modernization in those social groups in which family or village literacy may really be the more appropriate measures. Proximity to other literates in the family or village may account for adoption of modern practices more meaningfully than the presence or absence of literacy skills in an individual.

A clearer picture of the importance of literacy to development in peasant societies may thus be gained by correlating an individual's membership in a literate group with his/her adoption of modern practices, Marion R. Brown (1970) after investigating the relationship between propensity to learn via communication media and the individual levels of literacy in rural Chile, reports that "information gain (is) not closely related to individual....education(and) literacy...." and suggests that "in calculating literacy rates for this purpose, the household is probably a more appropriate unit than the individual." Similarly, Howard Ray (1977:?) has reported that in developing techniques for presenting agricultural information to illiterate farmers "family literacy may be an added

factor important to determine the most appropriate way to...achieve maximum impact." Rich and Nesman (1976:Section I, page 2) have also noted the desirability of measuring the effects of family literacy on development, "since an illiterate head of household with a literate family member may have an equally good source of information" as does a literate respondent. Herzog (1968) included a measure of family literacy in analysis of the background characteristics related to innovative behavior; and found a significant positive correlation ($r=.24$) between having a family member able to read a newspaper and early adoption of innovative practices.

Deutschman (1963) in a study considering exposure to mass media and political knowledge suggested that literacy research should conceive of the family unit as a "receiver" adding further support for one of the dimensions of concern of the present study. Rogers and Herzog (1966) reinforced this broader view of literacy in the statement "illiterates are using print media by having literate family members or friends read to them." They pose this as one explanation of why correlations between individual functional literacy and mass media exposure are not higher. Again, in 1971, Fett in the study on mass media exposure and farm practice adoption in Southern Brazil reports "neither illiteracy nor lack of education make it impossible to reach farmers through mass media." Fett further states, "although I do not have the supportive data, I suspect this is another instance of dependent literacy in which someone in the family reads the material to the non-reader."

In relation to village or community impact, Bose (1961) reported that literacy has a positive effect on the percentage of farmers adopting new practices only when they do not participate in community activities as well. Furthermore, "there is a significant increase in the percentage of farmers adopting new practices associated with participation in community activities provided they are non-literate." While this does not specify the exact mechanism for the transmission of information, it would appear that participation in community activities for the non-literates provides contact with other literates who pass on the information to them. In this way, the village functions similarly to the family as a source of information for its members, the critical variable possibly being the general level of literacy in the community itself. Sandhu and Allen (1974) in reporting on village influence on Punjabi farm modernization said "village influence is more important than individual characteristics in modern farming....individual variables held constant, influence of the village characteristics remains unaffected and prominent." Furthermore, "villages high on adoption of agricultural innovations are high on other developmental characteristics; educational, commercial and overall development." This would appear to substantiate the interest of the present study in looking at the village as another meaningful unit in terms of overall adoption of new agricultural practices and general responsiveness to the modernization process.

Western man approaches a developing world from his own individualistic and often ethnocentric perspective. Based on the North American experience, we have assumed that modernization is an individual process, and that the modernization

of a country requires pulling individuals away from tradition. We further assert that some individual characteristics, social, psychological, and biological differentiate between those who are ready for this process and those who are not. Literacy has been proposed as one such characteristic because of its affect on individual attitudes and thought processes. Lerner (1958) proposed that literacy helps to develop and increase the capacity to empathize and to imagine oneself playing a different societal role. Therein, he feels, lies the propensity for modernization.

While literacy may very well produce this consequence on the cognitive structure of the individual, it may also create the propensity to modernize among illiterates who are in a literate milieu. Because of traditional ties and lack of a highly developed division of labor, peasant farmers are likely to share a rather strong collective conscience (Durkheim, 1933) and through this set of shared values and beliefs are likely to share the cognitive benefits of literacy. In addition, since farming in peasant cultures is a family enterprise, the direct benefits of literacy in terms of use of written information sources are also likely to be shared. The following general relationships are therefore hypothesized for the current study:

- Hypothesis 1: Membership in a literate family is significantly positively related to the individual's increased use of modern practices, regardless of the individual's own literacy.
- Hypothesis 2: Family literacy has a stronger positive relationship to increased use of modern practices than does individual literacy.
- Hypothesis 3: Membership in a literate village has a significant positive relationship to increased use of modern practices.
- Hypothesis 4: Membership in a literate village has a stronger positive relationship to increased use of modern practices than does individual literacy.
- Hypothesis 5: The relationship between group literacy (family or village) and increased use of modern practices is stronger for illiterate farmers than for those who are literate themselves.
- Hypothesis 6: The relationships between individual, family and village literacy and increased use of modern practices are not reduced to insignificance by the introduction of background variables as controls.
- Hypothesis 7: The relationships between individual, family and village literacy and increased use of modern practices are independent of the effects of experimental radio treatment conditions.

CHAPTER II

THE METHOD

For the purpose of analyzing the relationships posed in the preceding chapter, a secondary analysis of data previously collected as part of the Basic Village Education Project (BVE)¹ was made. The Basic Village Education Project was not designed as a field study of literacy, but, rather, as an experiment in communication. Preliminary exploration of the data gathered during the conduct of the BVE Project, including information on respondents' literacy, suggested, however, that further analysis of the data could help clarify some of the issues related to literacy and the adoption of modern agricultural practices. In addition to the basic BVE data-set, the current study utilizes information collected by the authors in a small-scale field study conducted with a sub-sample of the original BVE sample respondents. The purpose of this additional data collection effort was to ascertain whether or not the self-report literacy measure utilized by the BVE Project was valid enough to be used as a major variable in the current study. The results of the investigation, reported in a later section of this chapter, indicated that the BVE data on literacy was indeed appropriate for the purposes of this study.

The remainder of this chapter includes a description of the BVE target population; the original BVE experimental design and the portions of the design relevant to the current study; the BVE measurement instrument and the reliability and validity of the information collected with it; the operationalization of the major variables utilized in this study; and methods of analysis employed by the investigators.

BVE Target Population

The BVE Project was a multi-year panel study supported by AID through the Academy for Educational Development and administered by the Guatemalan Ministry of Education and was designed to:

- . determine the effectiveness and relative costs of different mixes of communications media, used to supplement the work of extension

¹The Basic Village Education Project was jointly funded by the Government of Guatemala and the United States Agency for International Development in accordance with terms of an agreement between the two governments. It was administered in Guatemala by the Guatemalan Ministry of Education in collaboration with the Ministries of Agriculture and Health. Foreign personnel and other technical assistance was provided by the Academy for Educational Development supported under contract no. AID/CM/1a-C-73-19 with the United States Agency for International Development. Responsibility for an independent evaluation of the Project rested with the University of South Florida through a sub-contract with the Academy for Educational Development.

agents (limited in number), in influencing change in agricultural practices and production among the Ladinos and Indians of rural Guatemala (Ray et al., 1974:1).

The target population of this experimental project was the illiterate or semi-literate sub-subsistence farmer of Guatemala. The primary communication medium used for the project was radio, and was chosen due to its accessibility to the peasant farmer. Agricultural information regarding modern farming practices was broadcast daily in the language indigenous to the area. Agriculture was chosen as the educational message over other possible content due to the availability of support services and the general acceptability of an agricultural education program to the target population.

In selecting a specific location for the Project, the Arnesberg and Niehoff (1971) characterization of the subsistence farm population was used. This characterization is delineated as follows:

1. They use a subsistence form of agriculture.
2. They live in a cluster of houses, from a few hundred to a few thousand people.
3. Have a greater self-sufficiency than farmers in industrial states but depend on cities for special goods.
4. Sell some surplus production for cash.
5. Are ambivalent towards the city in that they need goods but have fear of exploitation.
6. They are bound by traditional values and customs.
7. They are on the average, illiterate.
8. They have low levels of educational attainment.
9. They follow regional patterns of diet, home use of remedies, and use local practitioners.
10. Are not productive farmers in terms of the national economy.
(Nesman and Rich, 1975:7)

Based on census data, reconnaissance surveys and available literature, it was decided that farmers meeting these population characteristics could be found in rural Guatemala. Several experimental and control areas were selected in this region and a random sample was then drawn in each area from a list of farmers controlling from .5 to 12.0 manzanas (1 manzana is approximately 1.7 acres of arable land).

BVE Project Design and Sample

The BVE Project design was a quasi-experimental variant of a multi-factor, pretest-posttest-control group design (see Campbell and Stanley, 1963: designs #4 and #10). The sample was divided into three experimental groups which received varying communication treatments, and a control group which was treatment free. Since the experiment was longitudinal, the panel of respondents in each of the

areas received identical pre- and post-experimental tests designed primarily to measure treatment-related changes in knowledge, attitudes and behavior.²

The three experimental treatments were: 1) educational radio programming (R); 2) educational radio reinforced by small group meetings with a trained member of the local community - "monitor" (RM); and 3) radio programming, monitor meetings, and technical assistance from a professional field agronomist (RMA).

Pre- and post-testing in all three experimental areas and in the control area (C) was accomplished by means of a baseline (pre-test) and annual year-end (post-test) surveys which were administered in the form of individual interviews conducted by a team of trained local interviewers. The year-end survey was completed following each of the three years of experimental treatment (see Figure 1).

	BASELINE SURVEYS (pre-test)	FIRST YEAR-END SURVEYS (post-test)	SECOND YEAR-END SURVEYS (post-test)	FINAL YEAR-END SURVEYS (post-test)
1.	radio programs alone	radio programs alone	radio programs alone	
EXPERIMENTAL AREAS 2.	radio and monitor meetings	radio and monitor meetings	radio and monitor meetings	
3.	radio, monitor, and agronomist visits	radio, monitor, and agronomist visits	radio, monitor, and agronomist visits	
CONTROL AREA 4.	no treatment	no treatment	no treatment	

Figure 1. Basic design of BVE project.

²Due to restrictions placed on the design by the requirements of radio signal penetration, true random assignment of respondents to treatment groups was not possible. The design, then, in Campbell and Stanley's symbols would be approximately $\frac{R}{R} \frac{O_1}{O_3} \frac{X}{O_3} \frac{O_2}{O_4}$; with the dotted line representing random assignment within but not between treatment groups. Groups meeting the radio requirements were selected based on similarities on basic background characteristics, and respondents were chosen randomly from these groups. Despite these efforts, however, selection may be a source of invalidity, thereby excluding the design from the "true experimental" category.



Figure 2. Map of original treatment areas in Oriente and Occidente.

In addition to these major surveys, a series of brief interviews in rotating sub-samples of the respondents was conducted in order to supplement the information gathered in the annual interviews. Since only the major surveys will be utilized in the present study, further detail on the sub-sample interviews will not be discussed (see Basic Village Education Project, Final Report, 1978).

The original plan for the implementation of this design called for identical sets of experimental and control groups in two distinct areas of Guatemala - the Spanish-speaking southeastern section, and the Indian (Quiche-speaking) western highlands area. It was felt that cross-cultural data would thus be obtainable since the cultures of the two regions are quite different.

After a thorough study of both areas, the Quezada valley (see Figure 2) was chosen as the site for the three experimental groups and Yupiltepeque as the control group in the eastern (or Oriente) section. Momostenango and Chichicastenango were their western (Occidente) counterparts. In both the eastern and western sections, the control groups were chosen for their basic similarity to the experimental areas as well as their position outside of the area in which the radio signal carrying the treatment message could be clearly received (Rich, Nesman et al., 1976). Thus, the basic design was to be carried out in both the eastern lowlands and the western highlands of Guatemala (see Figure 3).

ORIENTE				OCCIDENTE					
(Spanish-speaking, southeastern section of Guatemala)				(Quiche-speaking, Indian highlands of Guatemala)					
EXPERIMENTAL AREAS (Quezada Valley)	1.	R	R	R	EXPERIMENTAL AREAS (Momostenango)	1.	R	R	R
	2.	RM	RM	RM		2.	RM	RM	RM
	3.	RMA	RMA	RMA		3.	RMA	RMA	RMA
CONTROL AREA (Yupiltepeque)	4.	C	C	C	CONTROL AREA (Chichicastenango)	4.	C	C	C

- R - Radio programs alone
- RM - Radio programs and monitor meetings
- RMA - Radio programs and monitor meetings and agronomist visits
- C - No treatment

Figure 3. Original design in two cultural areas.

Farmland in both the Oriente and Occidente regions is arid and population pressures on the available land are severe (Ray et al., 1976). Generally, farmers

in both areas control small plots of land (over 90% have less than 6 manzanas available for planting and over half have less than 3 manzanas) and continue to employ traditional farming methods despite very low resulting yields. Culturally, the Oriente region is predominantly "Ladino" in character which means that most of its inhabitants "have adopted certain aspects of western culture, ... speak Spanish as their first language," and lack the clan membership characteristic of their "Indian" counterparts (Ray et al., 1976:4). Inhabitants of the Occidente have retained the traditional dress, language and cultural traits of their Mayan heritage.

The baseline survey was administered in the experimental areas in Quezada and the Yupiltepeque control area in 1973 as planned; however, because of several problems associated with maintaining a program-free control area in which interviewing is conducted repeatedly without visible benefit to the respondents, the Oriente design was modified before the 1974 year-end survey was conducted. The modified design contains two experimental areas in the eastern section (Quezada and Yupiltepeque), each having all three of the treatment sub-areas (radio, radio-monitor, radio-monitor-agronomist), and a new control area in Ipala (see Figures 4 and 5). The Ipala control area was also changed from the original control area

	1973		1974		1975		1976		1977	
	Treat	Test	Treat	Test	Treat	Test	Treat	Test	Treat	Test
ORIENTE										
Quezada	---	BLS BLS BLS	R RM RMA	AS AS AS	R RM RMA	AS AS AS	R RM RMA	AS AS AS	---	---
Yupiltepeque	---	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										
Homostenango	---	---	---	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 (re pre-treatment measurement)

AS Annual Survey (re post-treatment measurements)

Figure 4. Final BVE evaluation design.

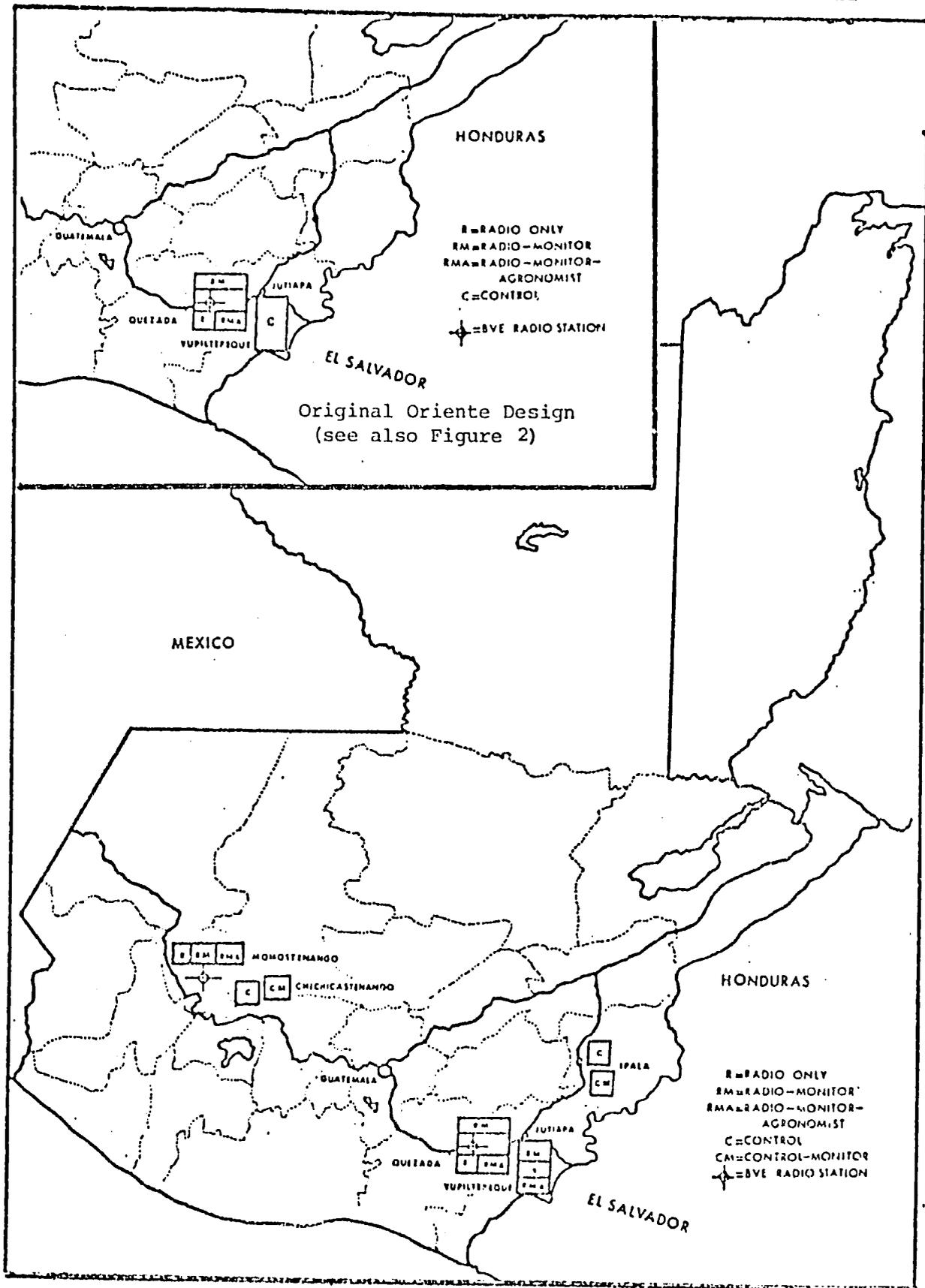


Figure 5. Map of final treatment areas in Oriente and Occidente.

design, and contains both a treatment-free control sub-area (C) and a radio-free area (M) which receives monitor meetings alone. The design in the Occidente was not altered from that presented in Figure 3. The start of radio programming was, however, delayed a year due to technical difficulties, and the full design was not implemented until 1975.

Due to some inconsistencies between the original 1973 survey and the baseline and year-end surveys administered in 1974, 1975, 1976 and 1977 (attributable to the process of questionnaire development), this study will utilize only data collected in 1974 and 1976 in the Oriente, and 1975 and 1977 in the Occidente. The 1974 survey will be treated as the baseline data for all areas of Oriente (even though Quezada had received a partial year of previous programming); and the 1975 survey will provide pre-test information for the Occidente. The 1976 and 1977 surveys will provide post-treatment information for Oriente and Occidente respectively.

BVE Measurement Instrument

The finalized measurement instrument used for the baseline survey was a 260 item interview schedule with questions covering both treatment-related variables and various socio-cultural variables (the interview schedule can be found in Appendix A). Items on the schedule were carefully selected and field-tested for content and suitable order (see Nesman, Rich et al., 1975 for detailed description of questionnaire preparation). The majority of the items were designed to measure level of and change in agricultural practices (the standard by which the Project's success was being measured); however, a number of questions covering general background characteristics such as age, education, literacy, family size, type of housing, mobility, risk perception, size of land holdings and amount of crop production were also included.

The year-end survey questionnaire is identical to the baseline interview schedule with one exception. Fortunately, for the purposes of this study, an additional question was included in the 1976 and 1977 surveys. The number of literate persons in the respondent's household was requested.

The interviews were conducted with a panel of 820 farmers in the Oriente and 543 in the Occidente. The sample size in the baseline surveys was slightly larger; however, only those farmers who were interviewed following the final program year (1976 in Oriente and 1977 in Occidente) are included in the present analyses because of the necessity of having complete data for each respondent.

In an attempt to estimate the general reliability of the measurement instrument, Pearson product-moment correlation coefficients (r) were computed between measures taken from the baseline and final year-end surveys of several background characteristics expected to remain fairly consistent year to year: age, number of years of schooling completed and number of children. Of these measures, only age can be expected to show high test-retest reliability since both years

of education and number of living children are amenable to random year-to-year fluctuation across the distribution of respondents. For example, respondents with relatively large families may not have added additional children during the two year project period and may well have been surpassed in size by smaller families having a new child during each of the two years covered by the experimental period. As expected, the correlation coefficient for the two measures of "age" in the Oriente was substantial ($r = .93^{***3}$) and indicates that respondents did answer at least this one question with a reasonable degree of reliability. In the Occidente, on the other hand, while the correlation between the two measures of age was also relatively high ($r = .88^{***}$) it was not high enough to eliminate concern over reliability in this sub-sample completely. It should be noted, however that the average reported age of respondents in Occidente, like that in Oriente, did increase by two years between the pre- and post-test surveys - a phenomenon not to be taken for granted in cultures in which exact chronological age is de-emphasized and birth records rarely kept.

Also in accordance with expectations, the test-retest reliability of the education and family size variables was considerably lower in both cultures than was that of the age variable. In the Oriente the correlation coefficient for the two measures of education was .76 ($p < .001$) while that for the measures of family size was .88 ($p < .001$). In the Occidente, correlation coefficients were lower than in the Oriente for both education ($r = .61^{***}$) and family size ($r = .66^{***}$) - indicating, again, that there may be a reliability problem in the Occidente sample and suggesting that Occidente results should be interpreted with caution.

While these findings indicate less than desirable reliability on basic background characteristics in the Occidente sample, the validity of the crucial agricultural variables used in this study (described in the following section) was carefully verified in the field at the time of the original BVE surveys and was reported by the interviewers to be satisfactory in both cultures. The validity of the literacy measure was verified by the authors in a subsequent field examination and will be described in detail in a later section of this chapter.

Measurement of Major Variables

The Dependent Variable: Change Toward More Modern Behavior

The major dependent variable, change toward more "modern" behavior, was operationalized by use of a composite index developed by the BVE Project staff as a measure of Project effectiveness. Since the content of the educational program being implemented by the Project was agricultural, the "more modern behavior"

³ Throughout the remainder of this paper "*" will represent p less than .05, "***" p less than .01, and "****" p less than .001 for the associated statistic. The significance of correlation coefficients for which direction has been predicted will be based on one-tailed probabilities while the significance of all other statistics will be based on two-tailed probabilities.

toward which the most change would be expected to occur in the experimental area is the package of improved agricultural techniques recommended by the program. Thus, "change" for the purposes of this study was defined as an increase in the level of agricultural technology as measured by an index of specific agricultural practices and served as the major dependent variable.

The interview schedule contained a large number of items pertaining to various agricultural practices (see Appendix A). Thirty-one of these items were selected as the practices which received major programming emphasis, and in which improvement should be expected between the baseline and year-end surveys. Response categories for each of the 31 practices were ranked from 1 to 5, in an approximation of an interval scale, by a panel of experts from the field (see Appendix B).

A 13-item composite index was then created based on these 31 practices some of which were combined into single items (see Appendix C). A farmer's pre-test practice level was determined by his score on the 13 item index (possible scores ranged from 0 to 65) in the baseline survey (1974 in Oriente - 1975 in Occidente), his post-test level from his score in the final year-end survey (1976 in Oriente, 1977 in Occidente) and his amount of change is defined by the difference between the two practice level scores (possible "change" scores range from -65 to 65). While the component items vary substantially in terms of expected impact on agricultural production, they were given equal emphasis in the educational programming transmitted to the respondents. For this reason, the amounts of change expected as a result of the BVE experimental program were reasonably similar for the 13 items since the amount of time necessary for the rejection of less productive practices would be expected to be longer than two years. Thus, for the purpose of measuring tendency to change in the direction of more modern agricultural techniques, each item was given equal weight in the index. Farmers were, however, not penalized for non-use of practices which were inappropriate for their particular crops. For example, farmers planting only corn were not expected to use fertilizer or insecticides on beans. (See BVE Final Report for a more complete description of the history and construction of the practice level index).

The internal consistency of the practice score index was assessed by means of a separate item-to-item/item-to-index correlation matrix for each culture (see Appendix D) of the pre-test practice scores. While the inter-item correlations are relatively weak, they are generally both positive and significant ($p < .05$). Moreover, the item-to-item index correlations are all both positive and significant in the Oriente sample, and most are moderately strong. With the exception of two items, the same is true for the Occidente sample as well.

Thus, the operationalized measure of "change" based on the respondent's baseline and final year-end scores on the 13 item index appeared internally consistent and was, therefore, used as a measure of "change toward more modern behavior" for the purposes of this study.

The Independent Variables: Individual Literacy, Family Literacy, and Village Literacy

Individual Literacy

Historically, individual literacy has been measured in one of two ways. The most common approach has been to ask the respondent whether or not he is literate.

In some instances such self-report definitions have included the ability to write as well as to read, but most often the focus has been exclusively on the respondent's ability to read the printed word (see, for instance, Fett, 1971). The second, but less frequently employed, method of literacy measurement has been the administration of actual field tests. Such measurement has ranged from simple checks involving the reading of phrase cards, to more extensive tests involving measures of comprehension as well as word recognition (see Herzog, 1973; Wright, Rich, Allen, 1967; Wilder, 1972). Other measures employed have included years of formal schooling (Waisanen and Kumata, 1972) and reported use of magazine and newspaper material (see Waisanen and Kumata, 1972).

The BVE interview schedules included the question "Do you know how to read and write?" (see Appendix A, question 255). Three possible response categories were provided: "no," "a little bit," and "yes." The individual literacy measure available for the over 1400 BVE respondents was, therefore, strictly self-report. In the early stages of the current study, the question of the validity of this self-report measure was raised. It was decided that since any adequate interpretation of the findings generated by the study would be predicated on such validity, a field test of the relationship between the BVE self-report measure and the respondents actual ability to read was necessary. The findings of this testing are reported in the following section.

Field validation of the self-report literacy measure. In order to assess the validity the original self-report literacy measure, a stratified random subsample of over 50 BVE respondents in each of the two cultural areas (Oriente and Occidente) was drawn. Respondents selected were asked to read agricultural posters similar to those utilized by the BVE program and to complete a simple literacy test previously administered in the Oriente region of Guatemala (Wright, Rich, Allen:1967).

The first stage of the sampling procedure was to randomly select a subsample of the villages in the Quezada area of Oriente and the Momostenango area of Occidente. Several of the originally selected villages had to be excluded due to inaccessability to interviewers but were replaced by alternates selected during the random draw. The villages thus chosen were: Potrerillos, Jocote, St. Gertrudis, Salitrillo, Don Diego, San Fernando and Tetunte in Quezada; and Paturubalá, Centro Conquixajá and Panca in Momostenango. The larger number of villages selected in the Quezada area was necessitated by the smaller populations of these villages relative to those of the Occidente villages.

In order to guarantee a sample of sufficient size for each of the BVE literacy categories (illiterate, semi-literate and literate), the respondents in the chosen villages were divided into the three categories based on their answers to question 255 in the baseline survey. A separate random sample (and list of alternates) was then drawn from each of the three categories in Quezada and later in Momostenango; thereby assuring an equal chance of selection for respondents within a given category in each area. For example, each literate farmer in the original Quezada sample had an equal chance of being part of the literacy survey.

Such sampling procedures were appropriate to our purposes since we were not attempting to establish literacy rates but were, rather, interested in being able to generalize the validity results to the entire BVE sample falling into the three literacy categories. From this final sample list, 54 subjects were tested in Oriente and 65 in the Occidente.

Since the field testing in Oriente in the previous BVE Project was conducted in Spanish, the language common to that area, literacy was also tested in Spanish. In the Occidente, the field interview concerning literacy testing was in Quiche, but the literacy test itself was in Spanish. The availability of a bilingual former resident of the Momostenango area made it possible to conduct this study in the highlands. A field investigator with extensive previous experience in the Quezada valley area was also available and able to supervise and carry out testing in the Ladino areas in a highly professional manner.

Since no standardized literacy test exists suitable for different cultural settings, it was necessary to utilize previously developed materials appropriate to Guatemala in the development of our measurement instrument. In a report issued in 1967 by Wright, Rich and Allen, a literacy test was described which provides testing for functional literacy through the use of silent reading and comprehension at a very simple level. The test shown in Figure 6a, Appendix E required three test readings to introduce the material to the subjects. The description of the test taken from the 1967 report is as follows:

"The test consists of seven sets of two sentences, the second sentence in each "set" designed to test comprehension of the first sentence. Sets 1 and 2 use vocabulary from Juan Book II; sets 3 and 4 employ vocabulary from Juan IV; sets 5 and 6 employ vocabulary from Juan VI. The first set at each vocabulary level is easier than the second set. The seventh set is a short paragraph from "Cuidado con las Moscas," one of the Pan American Series. (The Juan series was a specially developed series for teaching literacy in peasant communities in Guatemala). The first sentence of each set is complete. The second sentence lacks one word, three extra words are provided, one of which the subject must underline to complete the second sentence so that it will repeat the information in the first sentence of the set.

The reading and comprehension test progresses through 7 levels of difficulty, but requires no writing or spelling of words, only the skill to underline words for correct sentence completion."

Parallel tests were provided by the authors but were not necessary for the present test. Only Form A of the original battery was utilized (See Figure 6a, Appendix E).

In an attempt to make the literacy testing relevant to the daily life of the subject, sets of posters on agricultural information from the original BVE Project were first shown to each subject. Respondents were asked to read the agricultural information on the posters to the interviewer. (See Appendix E -- Figure 6b).

For the purpose of the analysis in this project, an operational definition of literacy was followed and subjects, based on their test score and observation, were classified in the following three groups:

1. Illiterate
2. Non-functional literate
3. Functional literate

These were clear cut categories requiring very little judgment on the part of the field examiner. The definition of these is as follows:

1. The illiterate could not identify nor pronounce a word.
2. The non-functional literate or semi-literate read words with little or no comprehension. He reads aloud very slowly, one word at a time and after the first reading could not tell what he had read. After a second reading and sometimes a third, he would struggle with the problem of selecting the correct answer. This process took an average of 20 to 25 minutes.
3. The functional literate read silently, completed the test within 2 to 4 minutes (sometimes within a minute), and underlined his answers rapidly and with easy comprehension.

In order to measure the respondent's self-reported level of literacy, the interview schedule (Figure 6c, Appendix E) was employed. In addition to requesting the respondent to indicate the extent of his and his household's reading ability, the schedule also requested other information on number of years of education, age, sex, whether the individual reads agricultural or other literature to the head of the family, and whether the individual discusses information from the BVE Project with the head of the family. This information was requested from the respondent regarding both his family and himself. This schedule also contained a measure of the respondent's reading ability of the BVE materials.

In the analyses which follow, three major sets of information have been related: the relationship between reported literacy, actual literacy based on operationalized test score and ability to read BVE materials. Our first analysis deals with the Oriente area of the Project.

Table 1 describes the relationship between the respondent's assessment of his own literacy during the baseline BVE survey and his demonstrated ability to read the BVE posters presented to him during the literacy test. As can be seen from the table these two measures of literacy are highly correlated ($r = .97$; $p < .0001$). In fact in only two cases does the self-report measure differ from the respondent's actual ability to read the simple agricultural information contained on the posters. In both of these cases the respondent reported being "a little bit literate" but was fully capable of handling the printed poster materials.

Table 1. Relationship between literacy reported in original BVE questionnaire and ability to read BVE materials: Oriente.

<u>Reported Literacy</u>	<u>Ability to Read BVE Materials</u>			<u>Total</u>
	<u>No</u>	<u>A Little</u>	<u>Yes</u>	
(1) No	27 (100%)	0 (0%)	0 (0%)	27 (51%)
(2) A little	0 (0%)	10 (100%)	2 (12%)	12 (22%)
(3) Yes	0 (0%)	0 (0%)	15 (88%)	15 (27%)
Total	27	10	17	54

$$\chi^2 = 95.44 \quad p < .0001$$

$$\text{Pearsons Correlation } r = .97 \quad p < .0001$$

Table 2 shows the relationship between the self-report measure and the more stringent field literacy test. Again, the two measures are highly correlated ($r = .88$; $p < .0001$). All 27 of the respondents categorized as illiterate by the literacy testing procedure reported themselves as such in the original BVE survey. Non-functional and functional literates (by test standards), however, were slightly less accurate in their assessments. Three of the 7 non-functional literates reporting being fully literate, while 8 of the 21 functional literates underestimated their own literacy by reporting being only "a little bit literate" and 1 reported no literacy skills at all. The results of the literacy test, as the results of

Table 2. Relationship between literacy reported in original BVE questionnaire and literacy category based on actual test score: Oriente.

<u>Reported Literacy</u>	<u>Actual Literacy Based on Test Score</u>			<u>Total</u>
	<u>Illiterate</u>	<u>Non-Functional Literate</u>	<u>Functional Literate</u>	
(1) No	27 (100%)	0 (0%)	1 (5%)	28 (51%)
(2) A little	0 (0%)	4 (57%)	8 (38%)	12 (22%)
(3) Yes	0 (0%)	3 (43%)	12 (57%)	15 (27%)
Total	27	7	21	55

$$\chi^2 = 52.4 \quad p < .0001$$

$$\text{Pearson } r = .84 \quad p < .0001$$

the poster test, indicate that most reporting errors were in the direction of underestimation of literacy skills and also that most errors involved the middle category of the self-report measure. In general then, with the exception of some confusion over the use of the term "a little bit literate," the Oriente respondents appear to be quite accurate in assessing their own literacy skills.

The Occidente results show a similar pattern but with a slightly higher rate of assessment errors. From Table 3 it can be seen that, as in the Oriente, there is a high correlation between ability to read the BVE poster materials and reported literacy ($\underline{r} = .88$; $p < .0001$). Only 1 illiterate respondent re-

Table 3. Relationship between literacy reported in original BVE questionnaire and ability to read BVE materials: Occidente.

<u>Reported Literacy</u>	<u>Ability to Read BVE Materials</u>			<u>Total</u>
	<u>No</u>	<u>A Little</u>	<u>Yes</u>	
(1) No	40 (98%)	0 (0%)	3 (15%)	43
(2) A little	1 (2%)	4 (100%)	0 (0%)	5
(3) Yes	0 (0%)	0 (0%)	17 (85%)	17
Total	41	4	20	65

$\chi^2 = 102.24$ $p < .0001$
 Pearson $r = .88$ $p < .0001$

ported any literacy skills at all, and he reported only "a little literacy," while 3 of the literate respondents severely underestimated their own skills.

As can be seen from Table 4, however, the Occidente results are also similar to those of the Oriente in that more assessment errors appear in relation to the more stringent literacy test ($\underline{r} = .73$; $p < .0001$). As in the Oriente sample, a good deal of confusion concerning the "a little bit literate" category is evident as well as some rather severe underestimation of literacy skills by those who, by test standards, are functionally literate. The major difference between the Oriente and Occidente results lies in the overestimation of literacy skills by illiterate respondents. Seven respondents who, by literacy test standards, are completely illiterate reported having some literacy skills. This more severe discrepancy as compared to the poster material results presented in Table 3 may be due to the bilingual nature of the Indian population. Occidente farmers may

Table 4. Relationship between literacy reported on original BVE questionnaire and literacy category based on actual test score: Occidente.

<u>Reported Literacy</u>	<u>Actual literacy Based on Test Score</u>			
	<u>Illiterate</u>	<u>Non-Functional</u>	<u>Functional</u>	<u>Total</u>
(1) No	51(88%)	1(20%)	0(0%)	52(65%)
(2) A little	1(2%)	2(40%)	4(23%)	7(9%)
(3) Yes	6(10%)	2(40%)	13(77%)	21(26%)
Total	58	5	17	80

$\chi^2 = 52.7$, $p < .0001$
 Pearson $r = .73$, $p < .0001$

well be able to read agricultural materials in Spanish and thus classify themselves as literate but be unable to read the more general non-agricultural content of the Juan Series literacy test. If such is the case, then for the purposes of this study, severe validity problems with the self-report measure are not indicated since farmers reporting themselves to be literate appear to at least be capable of reading materials directly related to the agricultural practices relevant to the study's dependent variable. These findings do suggest, however, (as did the reliability test results presented earlier) that the Occidente data collected by the BVE Project should at least be interpreted with caution.

In conclusion the results of the field validation study indicate that in both cultures, farmers' own estimations of their literacy are reasonably accurate. Although some reporting errors do occur in relation to the general literacy test, they are not frequent; they generally involve the middle category, "a little bit literate"; they are usually in the direction of an underestimation of literacy skills; and they are generally not found when the farmers' estimation of his skills is compared to his ability to read relevant agricultural materials. For these reasons, the original self-report literacy question was used as the individual literacy measure for the current study, but farmers reporting themselves "a little bit literate" were excluded from the analyses in order to further reduce the contamination of reporting errors.

Family Literacy

Family literacy as defined for the purposes of this study is the relative proportion of the respondent's family (household) that is literate. Since no direct measure of this proportion was available, some extrapolation was necessary

and was made on the basis of the respondent's answer to two questions; "How many children do you have?" and "How many members of your household know how to read and write?" (See Appendix A, questions 254 and 261). Based on information gathered in the process of the field validation study described in the previous section it was discovered that only 10% of the respondents had persons not part of their nuclear families living in the household and virtually all respondents had spouses living at home. For this reason each respondent was assigned a household size equal to the number of children (reported in question 254) plus two. The respondent's family literacy proportion was then determined by the ratio of number of literates (reported in question 261) to household size. Family literacy scores ranged from 0 to 1 in both cultures with an average score of .34 in the Oriente and .14 in the Occidente with a grand mean for the entire sample of .25.

Table 5 shows the general pattern of literacy within the households of respondents interviewed during the validation study. As can be seen from the table, family literacy in Oriente is predominantly a function of the literacy of the respondent, his spouse and his children over 12 years of age, while in the Occidente virtually all literate individuals are either heads of household or children over 12. Data collected during the survey also indicate that similar

Table 5. Literacy of household members.

	<u>Illiterate</u>	<u>Literate</u>	<u>A Little</u>	<u>Total</u>
<u>Oriente</u>				
Head of Household	30	16	9	55
Spouse	33	14	8	55
Child (12 and over)	56	121	46	223
Child (11 and under)	<u>74</u>	<u>12</u>	<u>8</u>	<u>94</u>
Total	193	163	71	427
<u>Occidente</u>				
Head of Household	59	14	3	76
Spouse	75	1	-	76
Child (12 and over)	93	37	10	140
Child (11 and under)	<u>131</u>	<u>5</u>	<u>4</u>	<u>140</u>
Total	358	57	17	432

patterns exist for the spouses and children of both literate and illiterate household heads. The family literacy variable in the Oriente, then, involves the literacy of both spouses and older children but involves only the literacy of older children in the Occidente sample.

For the purposes of the analyses presented in this report the family literacy measure was dichotomized into categories falling above and below the grand mean for the entire BVE sample. Supplementary analyses were also per-

formed using two alternative family literacy categories (totally illiterate vs. at least partially literate families) and using the entire continuous distribution of family literacy proportions. Results of these supplementary analyses are only included in the current report when they serve to clarify the results of the main analyses.

Village Literacy

Village literacy is similarly operationalized as the relative proportion of literates in the village in which the respondent lives. Accurate and current figures for the literacy and size of population in each village were not available, and the village literacy proportion had to be based on the figures for the BVE sample. As with family literacy, the village literacy proportion was a ratio of number of literates to the total number of people in the BVE sample in each village. Although this measure may not reflect the exact proportions of literates in the various villages, the proportion of literates among selected farmers is assumed to be representative of the proportion within the peasant population in that particular village since respondents in each village were randomly selected from a list of farmers having the characteristics of the peasant population. Thus, village literacy is included basically as a second measure of group literacy to provide an indication of the validity of the family literacy measure by corroborating the results found between the dependent variables and the family literacy index.

Measurement of Control Variables

Given the nature of the peasant population, one cannot expect to account for all of the variance in "change" by examining the respondent's literacy (his own or that of his group). Rogers and Shoemaker (1971) have identified over 30 variables related to change toward more modern behavior, each of which can be expected to affect the farmer's tendency to move in the direction of modernity. Our task, however, is to establish whether or not the apparent concomitant variation of literacy and "change" is real and exists independent of the effects of extraneous variables expected to be related to change in agricultural practice.

The elaborative analysis for this study involved tests for spuriousness, and analysis of the independent and conjoint influence of literacy and other independent variables on "change." Control variables for this analysis were of two types: general background characteristics related to both literacy (group and individual) and change in agricultural practice; and elements of the BVE Project which are by design related to change and may by accident be associated with literacy.

Background Characteristics

The general background variables were chosen on the basis of three criteria: 1) identified univariate and multivariate relationship to individual, family, and/or village literacy in the BVE sample (see Appendix G "Profiles of Literate Farmers, Families and Villages" for complete description of the results of a series of discriminant analyses); 2) identified univariate and multivariate relationship to "change" in agricultural behavior in the BVE sample (see Basic Village Education Final Report 1978); and 3) possible antecedent relationship to literacy

(individual and/or group). The background variables thus chosen were: 1) age; 2) total amount of land available for planting; and 3) general living conditions. These variables were chosen from a list of over 50 background characteristics, and while they certainly do not exhaust the extraneous variables possibly related to both literacy and change, they should provide more than adequate controls for possible spuriousness in the proposed relationships.

The following sections describe the measurement of the control variables and their relationships to the dependent and independent variables in some detail.

Age has consistently been shown to be negatively related to change toward more modern behavior. Rogers and Shoemaker (1971) list numerous studies in which "changers" are found to be younger than those less likely to change. In the BVE sample Indian farmers who made relatively large changes in their agricultural practices during the BVE program years were significantly younger than their colleagues who made fewer changes (see Basic Village Education Final Report, 1978).

Age has also been found to be negatively correlated with individual literacy (see Herzog, 1973). Literate farmers in the Oriente region of the BVE sample were an average of three years younger than their illiterate counterparts. The relationship is even more dramatic in the Indian areas where literate farmers are an average of 6 years younger than their illiterate neighbors. Furthermore, in both cultures age provided unique discriminability between literates and illiterates even when other significant background variables were controlled for.

Indian families in which there is little literacy also tend to be headed by older farmers. The reverse relationship holds for villages, however. The average age in the highly literate villages is significantly higher than in the less literate villages in Oriente and slightly so in Occidente as well (see Appendix G). Age, then may operate as an extraneous variable, promoting a spurious interpretation of the relationships between individual and family literacy and "change" while acting as a suppressor variable and thereby obscuring an actual relationship between village literacy and "change," and is therefore included as a control variable in these analyses.

Age was measured by question 252-253 (see Appendix A) in which respondents were asked to report their actual (not categorical) age in years. The respondents' age at the starting point of the experiment (1974 in Oriente and 1975 in Occidente) was used in the elaborative analysis.

Total amount of land available for planting. Size of farm unit has also been shown to be related to "change" in practice in agricultural societies (Rogers and Shoemaker, 1971). Social status has similarly been positively correlated with practice adoption, and landholding is one of the major indicators of social status in peasant societies (Smith 1953:391-394). In the BVE sample, farmers in Oriente who made relatively large changes in agricultural practice during the experiment had an average farm size of 3.4 manzanas while their less progressive neighbors had only 2.8 manzanas available to them at the beginning of the experiment.

The relationship between literacy and landholding in the BVE sample is somewhat ambiguous. While literate and illiterate heads of household do not differ significantly in either culture in terms of land available at the beginning of the experiment, heads of highly literate families do have substantially more land available to them in the Oriente than do farmers with less literate families. The two Occidente family literacy groups, however, show only a slight (and statistically insignificant) difference.

Despite the inconsistency in the relationships between the various types of literacy and landholding, "total amount of land available for planting" exhibits a strong enough relationship to family literacy in the Oriente to make its inclusion in the analysis as a control variable warranted.

Land holding was measured by calculating the sum of the amount of land reportedly owned (in manzanas), rented, worked communally, share-cropped and held by other arrangements (see Appendix B - questions 182, 183, 184, 185, 186). While the amounts of land held by these arrangements was simply reported by the respondent, interviewers drew maps of the reported plots and asked the respondents to check them for accuracy in size and location. By such means a relatively non-threatening validity check was made on the self-reported land-size measure.

General living conditions. In addition to land size, type of housing and source of essential utilities (i.e. fuel, light, water) are major indicators of social status in peasant communities. Such variables are also indicators of economic well-being since, in general, the more modern housing materials and energy sources are considerably more expensive than the traditional methods. Wealth and social status, as reflected in general living conditions, may very well act as intervening variables in the literacy-change relationship causing an apparent relationship between the two major variables which is actually a function of their joint relationship to wealth.

In the Oriente BVE sample, roof type, wall type and type of toilet facility available, all distinguish between farmers who made relatively large changes in agricultural practice and those who did not. High change farmers were more likely to have a roof made of material other than the traditional thatch; and walls made of material other than mudfill; high change farmers were also much more likely to have access to toilet facilities (see Basic Village Education Final Report, 1978).

Literate farmers, heads of highly literate households and farmers living in villages with relatively high literacy rates tend to have better roofs and/or walls; are more likely to get water from a well or pump rather than a stream; tend to obtain fuel from kerosene or propane as opposed to wood or charcoal and are more likely to have toilet facilities (see Appendix G). While the relationships between these variables and the various measures of literacy vary in strength from culture to culture and also vary somewhat with the type of literacy (individual, family or village), "roof type," "light source," "water source," and "existence of toilet facilities" seem to consistently discriminate between literacy groups. An index of "general living conditions" was therefore constructed based on these four variables.

Farmers' answers to each of the four questions (see Appendix A - questions 245, 249, 250 and 251) were dichotomized into categories reflecting the modernity and expense of the material or utility source. Respondents reporting any roof type other than thatch (i.e. tile, tile+metal, or corrugated metal, etc.) were given 1 point for roof-type. Similarly, farmers reporting the regular use of kerosene or propane as fuel were given 1 point for lighting; and farmers reporting water source other than a river or stream received 1 point for water-source. Toilet facilities were similarly coded "0" and "1" depending on the reported use of a latrine and/or flush toilet as opposed to the field.

Respondents' scores on the four variables were then added together giving a possible range of 6 (from 0 to 5) on the "living conditions index."

In summary, the background variables included in the elaborative analysis for this study were: "age," "total amount of land available for planting," and "general living conditions." Variables were chosen due to their ability to discriminate between high and low change farmers and between literate and illiterate farmers, families, and/or villages. An inspection of the profiles of literate farmers, families, and villages presented in Appendix G, reveals several discriminating variables not included in these analyses. Such variables have been deleted for one of two reasons: 1) high inter-item correlations with the three control variables described above, thereby making their inclusion as control variables superfluous, or 2) lack of relationship to the dependent variable (see Basic Village Education Final Report, 1978).

BVE Design

In addition to the above background characteristics, the BVE Project design itself may be the cause of misleading results in analyzing the relationship between literacy and "change." As described earlier, the BVE experiment was conducted in two distinct cultural areas of Guatemala. The importance of literacy skills may well vary in the two cultures. The market economy of the Indian highlands, differences in the value placed on literacy skills, or the complexity of the dual language system in the Occidente may well serve as factors which inhibit or increase the relationship between literacy and change. The possibility of such an interaction between culture and literacy (either group or individual) and change makes the inclusion of culture as a factor in the analysis design crucial.

The BVE treatment conditions themselves may also serve as extraneous variables in the literacy-change relationship. Although the areas receiving the various treatments (R, RM, RMA, M) and the control area (C) were carefully matched and individual literacy should not covary with treatment condition, matching on family literacy was not attempted. Family literacy, then, could covary by treatment condition, and since change is by design expected to covary with treatment, family literacy could be only spuriously related to "change." Moreover, even if literacy and treatment exert independently significant influences over "change," their conjoint (Rosenberg, 1968:160) or interactive influence may be greater than either of the independent effects. Thus, a farmer with a literate family in the

radio treatment area may have a propensity to change different both from a farmer with a literate family in a different treatment area and from an illiterate farmer receiving the same radio treatment condition due to a peculiar effect of literacy when combined with a radio treatment. The relationship between literacy (family and individual) and "change," will, then, be subjected to tests for spuriousness based on culture and treatment condition and for literacy/culture, literacy/treatment/interaction.

In summary, the elaboration analysis for this study will include the introduction of controls for background variables, culture, and treatment condition in the relationships between individual literacy and "change," and group literacy and "change."

Methods of Analysis

The basic design used in analyzing the differential effects of individual, family and village literacy on development was a four-way analysis of variance with culture (Oriente vs. Occidente), village literacy, family literacy and individual literacy as the factors and amount of improvement (i.e. change in the recommended direction) in agricultural practice as the dependent variable. By such means the effects of the various types of literacy on change were assessed independently of each other and of the differences between the two cultural groups.

For the purpose of the main analysis and most of the elaborative analysis, family literacy was dichotomized into categories falling above and below the grand mean of 25% for the two cultures. Village literacy was similarly dichotomized into villages having at least 30% literacy and those having less than 30% literacy. However, in order to be sure that valuable information concerning the effects of family literacy was not lost in the dichotomizing process several subsequent ANOVA's were performed using individual literacy as the only factor and introducing the full continuous range of family literacy proportions as a covariate in the design. A similar analysis was also performed using the raw number of literate family members as the family literacy measure in order to be sure that the definition of family literacy as a proportion did not artificially define some families as more literate than others simply as an artifact of differences in family size. The results of these analyses are reported where they aid in interpreting the results of the main analyses presented in the following chapter.

Due to a significant and robust negative correlation between initial practice score and amount of change, change scores were adjusted for pre-treatment practice score by the introduction of initial practice score as a covariate in the design. (It should be noted that while this adjustment of change scores for starting point is a somewhat unusual procedure it produces statistical results identical to the standard practice of adjusting post-test scores for pre-test scores.)

In order to produce separate and orthogonal variance components for the intercorrelated literacy variables a regression approach to the ANOVA (in which

main effects and interactions are simultaneously processed and each is adjusted for all others) was used in addition to the classic ANOVA design. Results of the regression approach essentially replicated those of the classic approach, indicating that correlation with the interaction terms was not problematic. The findings reported here are, for the sake of clarity, limited to the results obtained by the more straight forward classic ANOVA.

Subsequent analyses of variance were performed for individual factors for which significant interaction effects made interpretation of main effects impossible.

Background control variables were introduced into the design (both singularly and in combination) as covariates along with initial practice scores once the main analysis had been completed. Similarly, BVE treatment condition was added to the basic design as a fifth factor in order to control for its independent effect and interactive effect on the change variable.

In summary, the hypotheses identified in the previous chapter were tested by means of the following analyses: 1) a 4-way ANOVA in which the dichotomous variables culture, individual literacy, family literacy, and village literacy are the factors; change in practice score is the dependent variable and is adjusted for starting point by the introduction of baseline practice score as a covariate; 2) subsequent tests for the source of significant interaction; 3) the introduction of a series of background variables as covariates; and 4) the inclusion of a fifth factor, treatment condition, in order to assess the independent effects of literacy and the educational communication treatments.

CHAPTER III

THE FINDINGS

The results of testing the seven hypotheses listed in Chapter I are presented in the current chapter. The first section of the chapter describes the findings of the main analysis used to test hypotheses 1-5 while the second section outlines the elaboration analysis and responds to hypotheses 6 and 7.

The Main Analysis

Statistical results of the main 4-way ANOVA are presented in Table 7 and will be discussed in terms of their relationship to the various hypotheses.

Hypothesis 1: Membership in a literate family is significantly positively related to the individual's increased use of modern practices, regardless of the individual's own literacy.

As can be seen from Tables 6 and 7, the first hypothesis was supported by our findings. The average change score for families having less than 25% of their members literate was 2.77 while the average amount of change in agricultural practice accomplished by families with 25% or more of their members literate was 4.99 (See Table 6). Table 7 shows an F ratio of 32.63 for the main effect for family literacy indicating that the apparent difference between the two groups is substantially greater than chance variation would have produced. The findings further indicate that while the two cultures differ substantially in terms of

Table 6. Average change scores for literates and illiterates from partially and highly literate families - Total sample (Oriente and Occidente combined).

		<u>Total Sample</u>		
		<u>Family Literacy</u>		<u>Total</u>
<u>Individual Literacy</u>		<u>Lo</u> *	<u>Hi</u> **	
Illiterate	\bar{X}	2.38	5.03	3.49
	N	619	267	886
Literate	\bar{X}	2.43	4.94	4.14
	N	107	231	338
<u>Total</u>	\bar{X}	2.77	4.99	3.67
	N	726	498	1224

*"Lo" refers to families in which less than 25% of the members are literate.

** "Hi" refers to families in which 25% or more of the members are literate.

Table 7. Differential effects of culture, and individual, family and village literacy on change in agricultural practice:* Analysis of variance results.**

<u>Source</u>	<u>df</u>	<u>Sum of Squares</u>	<u>Mean Squares</u>	<u>F Ratio</u>	<u>F Prob.</u>
<u>Main effects</u>					
Culture	1	136.17	136.17	5.28	<.05
Individual Literacy	1	26.19	26.19	1.02	NS
Family literacy	1	840.67	840.67	32.63	<.001
Village literacy	1	34.55	34.55	1.34	NS
<u>Covariate effects</u>					
Initial Practice Score	1	8390.77	8390.77	325.66	<.001
<u>Interactions</u>					
<u>2-way</u>					
Culture by Individual lit.	1	1.01	1.01	0.04	NS
Culture by Family lit.	1	40.85	40.85	1.59	NS
Culture by Village Lit.	1	384.72	384.72	14.93	<.001
Individual Lit by Family Lit.	1	16.73	16.73	0.65	NS
Individual Lit by Village Lit.	1	61.87	61.87	2.40	NS
Family Lit. by Village Lit.	1	73.88	73.88	2.87	NS
<u>3-way***</u>	4	258.74	64.69	2.51	<.05
<u>4-way***</u>	1	33.37	33.37	1.30	NS
<u>Error Variance</u>	1207	31098.52	25.76		

*Change in practice is highly correlated with initial practice score (see Nesman, Rich Rivers, Basic Village Education Project Final Report 1978). Initial practice score has therefore been controlled for by its introduction into the design as a covariate.

** The current tables presents the results of a classic ANOVA design. Results of a regression approach to the ANOVA yielded essentially identical results with one important exception - the main effect for culture was reduced to insignificance when adjusted for the culture by village literacy interaction.

*** None of the individual 3-way or higher interactions were significant and are thus deleted from the current table.

average amount of change (\bar{X} Oriente = 4.85, \bar{X} Occidente = 1.88; see Table 8) and that the main effect for culture is, therefore, significant ($F = 5.28, p < .05$); the effect of family literacy on change does not differ drastically in the two cultures. Table 8 shows that the average change scores for respondents from

Table 8. Average change scores for literates and illiterates from partially and highly literate families - controlling for culture.

	Culture						<u>Total</u>
	Oriente <u>Family Literacy</u>			Occidente <u>Family Literacy</u>			
	<u>Lo</u> *	<u>Hi</u> **	<u>Total</u>	<u>Lo</u> *	<u>Hi</u> **	<u>Total</u>	
<u>Individual Literacy</u>							
<u>Illiterate</u>	\bar{X} 4.27	5.53	4.79	1.50	3.21	1.76	3.49
	N 298	210	508	321	57	378	886
<u>Literate</u>	\bar{X} 3.30	5.37	5.00	1.86	3.03	2.33	4.14
	N 42	188	230	65	43	108	338
<u>Total</u>	\bar{X} 4.15	5.45	4.85	1.56	3.13	1.88	3.67
	N 340	398	738	386	100	486	1224

* "Lo" refers to families in which less than 25% of the members are literate.

** "Hi" refers to families in which 25% or more of the members are literate.

highly literate families are over one point higher than those of respondents from less literate families in both cultures. The F ratio for the two-way interaction between family literacy and culture is quite low ($F = 1.59$) and is no greater than would be expected by chance. Family literacy, then, has a substantial and statistically significant relationship to average change score which is consistent across the two cultural groups and is independent of cultural variation in amount of change.

The findings also indicate that while there are slight differences in the family literacy/change relationship between literate farmers and their illiterate

counterparts (see discussion under hypothesis 5), the interaction between family and individual literacy in affecting change scores is negligible ($F = 0.65$) and insignificant.

Tables 9 and 10 show, further, that the findings are not substantially different when the full range of family literacy proportions are used as an independent variable. As can be seen from Table 9, when family literacy is introduced as a covariate (using the continuous distribution of family literacy proportions)

Table 9. Effects of family literacy using the continuous range of family literacy proportions as the independent variable: Oriente.

<u>Source</u>	<u>df</u>	<u>Sum of Squares</u>	<u>Mean Squares</u>	<u>F Ratio</u>	<u>F Prob.</u>
<u>Main effects</u>					
Individual literacy	1	17.11	17.11	0.60	NS
<u>Covariate effects</u>					
Initial practice score	1	5123.20	5123.20	179.54	<.001
Family literacy proportions	1	972.98	972.98	34.10	<.001
<u>Error Variance</u>	714	20374.49	28.54		

its relationship to change in practice remains high ($F = 34.10$, $p < .001$) and statistically significant. Table 10 shows similar results for the Occidente where the covariate effect for family literacy obtained a somewhat lower but still significant F ration of 14.22 ($p < .001$). Similar results were obtained when the

Table 10. Effect of family literacy using the continuous range of family literacy proportions as the independent variable. Occidente

<u>Source</u>	<u>df</u>	<u>Sum of Squares</u>	<u>Mean Squares</u>	<u>F Ratio</u>	<u>F Prob.</u>
<u>Main effects</u>					
Individual literacy	1	3.11	3.11	0.14	NS
<u>Covariate effects</u>					
Initial practice score	1	2076.55	2076.55	95.18	<.001
Family literacy proportions	1	310.14	310.14	14.22	<.001
<u>Error Variance</u>	481	10493.74	21.82		

raw number of literates in the respondent's household was used as the measure of family literacy and again introduced as a covariate. Tables 11 and 12 present the results of these analyses and show that while the family literacy effect is lower in both cultures using this measure (due to the confounding effect of family size which is negatively associated with change in practice) it remains statistically significant.

Table 11. Effects of family literacy using the total number of literate household members as the independent variable: Oriente.

<u>Source</u>	<u>df</u>	<u>Sum of Squares</u>	<u>Mean Squares</u>	<u>F Ratio</u>	<u>F Prob.</u>
<u>Main effects</u>					
Individual literacy	1	58.35	.58.35	2.03	NS
<u>Covariate effects</u>					
Initial practice score	1	5444.96	5444.96	189.23	< .001
Number of literates in the household	1	862.44	862.44	29.97	< .001
<u>Error Variance</u>	734	21120.73	28.77		

Table 12. Effects of family literacy using the total number of literate household members as the independent variable: Occidente.

<u>Source</u>	<u>df</u>	<u>Sum of Squares</u>	<u>Mean Squares</u>	<u>F Ratio</u>	<u>F Prob.</u>
<u>Main effects</u>					
Individual literacy	1	.75	.75	.03	NS
<u>Covariate effects</u>					
Initial practice score	1	2167.42	2167.42	97.46	< .001
Number of literates in the household	1	182.73	182.73	8.22	< .01
<u>Error Variance</u>	482	10718.88	22.24		

In summary, our analysis indicates that membership in a highly literate family is significantly positively related to increased use of modern agricultural practices, regardless of the individual's own literacy and of the cultural region in which he lives. Considerable support is therefore lent to hypothesis 1.

Hypothesis 2: Family literacy has a stronger positive relationship to increased use of modern practices than does individual literacy.

Hypothesis 2 is also supported by our findings. The marginal row totals for individual literacy in Table 6 show that the average amounts of change accomplished by literates and illiterates differ only slightly (\bar{X} literates = 4.14, \bar{X} illiterates = 3.49) for the total sample. The F-ratio for the individual literacy main effect presented in Table 7 indicates further that this slight difference is no greater than would be predicted on the basis of chance variation ($F = 1.02$). The individual cells in Table 6 show that even the slight observed difference between the two literacy groups is probably due to the correlation between individual and family literacy since the difference virtually disappears when family literacy is controlled for.

Once again, cultural variation has no substantial effect on the individual literacy change relationship. Differences between individual literates and illiterates are slight in both cultures and are reduced still further when family literacy is held constant. The interaction between individual literacy and culture, like that between family literacy and culture, is virtually non-existent ($F = 0.04$). In summary, since individual literacy has no significant relationship to increased use of modern agricultural practice, further testing of the relative strength of the family literacy/change vs. individual literacy/change relationship is unnecessary.

Hypothesis 3: Membership in a literate village has a significant positive relationship to increased use of modern practices.

Unequivocal support for hypothesis number three was not lent by our findings. The main effect for village literacy produced an insignificant F ratio of 1.34 (see Table 7) for the total sample difference in change between respondents in highly vs. less highly literate villages ($X_{Lo} = 3.10$, $X_{Hi} = 4.35$, see Table 13).
Table 13. Average change score for literates and illiterates from partially and highly literate villages - total sample (Oriente and Occidente combined).

		<u>Total Sample</u>		
		<u>Village</u>	<u>Literacy</u>	
		<u>Lo *</u>	<u>Hi **</u>	<u>Total</u>
<u>Individual Literacy</u>				
<u>Illiterate</u>	\bar{X}	2.87	4.59	3.49
	N	565	321	886
<u>Literate</u>	\bar{X}	4.41	4.03	4.14
	N	101	237	338
<u>Total</u>	\bar{X}	3.10	4.35	3.67
	N	666	558	1224

**"Lo" refers to villages having less than 30% of their members literate
***"Hi" refers to villages having 30% or more of their members literate

However, the two-way culture by village literacy interaction was substantial ($F = 14.93$) and statistically significant ($p < .001$) (see Table 13) indicating that the village literacy effect is different in the two cultures. An examination of Table 14 shows that the source of the interaction lies in the difference between the two cultures in terms of the relationship between village literacy and change. In the Oriente sample, respondents from villages with low literacy

Table 14. Average change scores for literates and illiterates from partially and highly literate villages - controlling for culture.

	Culture						Total
	Oriente			Occidente			
	Village Literacy			Village Literacy			
	Lo*	Hi**	Total	Lo*	Hi**	Total	
<u>Individual Literacy</u>							
<u>Illiterate</u>	4.28	5.29	4.79	1.72	1.90	1.76	3.49
	253	255	508	312	66	378	886
<u>Literate</u>	4.97	5.00	5.00	3.89	0.88	2.33	4.14
	49	181	230	52	56	108	338
<u>Total</u>	4.40	5.17	4.85	2.03	1.43	1.88	3.67
	302	436	738	364	122	486	1224

*"Lo" refers to villages having less than 30% of their members literate.

**"Hi" refers to villages having 30% or more of their members literate.

proportions accomplished less change ($\bar{X}_{Lo} = 4.40$) than did their neighbors in highly literate villages ($\bar{X}_{Hi} = 5.17$). The reverse was true in the Indian areas in which respondents from the highly literate villages had a lower average change score ($\bar{X}_{Hi} = 1.43$) than did farmers from less literate communities ($\bar{X}_{Lo} = 2.03$). Subsequent tests in the form of a one-way analysis of variance in change scores (adjusted for initial practice score) by village literacy for each culture were performed in order to ascertain whether or not the observed relationships in the two cultures were significant. Table 15 presents the results for Oriente, and shows that respondents from highly literate villages did experience significantly more change than did those from less literate villages ($F = 13.08$, $p < .001$). Table 16 indicates that the negative relationship in the Occidente region is also stronger than would be expected by chance ($F = 5.30$, $p < .05$).

Table 15. Analysis of variance in change* by village literacy - Oriente,

<u>Source</u>	<u>df</u>	<u>Sum of Squares</u>	<u>Mean Squares</u>	<u>F Ratio</u>	<u>F Prob.</u>
Village Literacy	1	385.39	385.39	13.08	<.001
Initial Practice Score	1	4656.38	4656.38	158.04	<.001
<u>Error Variance</u>	735	21655.68	29.46		

* Change in practice is highly correlated with initial practice score (see Nesman, Rich, Rivers, Basic Village Education Project Final Report, 1978). Initial practice score has therefore been controlled for by its introduction into the design as a covariate.

Table 16. Analysis of variance in change* by village literacy - Occidente,

<u>Source</u>	<u>df</u>	<u>Sum of Squares</u>	<u>Mean Squares</u>	<u>F Ratio</u>	<u>F Prob.</u>
Village Literacy	1	118.44	118.44	5.30	<.05
Initial Practice Score	1	2146.18	2146.18	96.12	<.001
<u>Error Variance</u>	483	10783.93	22.33		

* Change in practice is highly correlated with initial practice score (see Nesman, Rich, Rivers, Basic Village Education Project Final Report, 1978). Initial practice score has therefore been controlled for by its introduction into the design as a covariate

In summary, the hypothesized positive relationship between village literacy and change in agricultural behavior, unlike that between family literacy and such change, is not independent of culture. The hypothesized relationship holds only for the Oriente region and is reversed in the Indian sample.

Hypothesis 4: Membership in a literate village has a stronger positive relationship to use of modern practices than does individual literacy.

As for hypothesis number three, hypothesis number four is only supported by the Oriente findings. In the Oriente sample, individual literacy has no significant effect on the amount of change in agricultural practice experienced by the respondent while membership in a literate village has a fairly substantial effect. The hypothesis is not, however, supported by the findings for the Occidente sample since neither individual nor village literacy has a significant positive relationship to change. Hypothesis 4 is, therefore (like Hypothesis 3), not unequivocally supported by the findings.

It should be noted, however, that these somewhat ambiguous findings related to village literacy may be an artifact of the village literacy measure itself. As noted in the previous chapter, the BVE data set did not contain information on the total number of literates residing in the individual's community. Village literacy proportions had to be calculated on the basis of the number of literate farmers (not children and/or spouses) included in the BVE sample in each village. Further research designed specifically to test Hypotheses 3 and 4 is definitely needed and seems warranted by the Oriente results presented in the previous section.

Hypothesis 5: The relationship between group literacy (family or village) and increased use of modern practices is stronger for illiterate farmers than for those who are literate themselves.

Hypothesis 5 must be rejected on the basis of our findings. Table 7 shows that interaction between individual literacy and family literacy in affecting change scores is low ($F = 0.65$) and is not significantly greater than would be expected by chance. A further inspection of Table 6 shows that for both individual literates and illiterates, members of highly literate families average a little over 2.5 points higher on the change index than do members of less literate families. Individual literates from highly literate families have an average change score of 4.94 while literates from less literate families average 2.43 on the change index. Similarly, illiterates from highly literate families average 5.03 on the index while illiterates from less literate families average only 2.38. Furthermore, this lack of interaction between individual and family literacy is consistent across cultures. Table 8 shows that in both Oriente and Occidente the difference between family literacy categories in terms of amount of change in agricultural practice is virtually the same for individual literates and illiterates.

Results for the village literacy measure are not as straight-forward. Due to the significant village literacy/culture interaction described under hypothesis 3, the two cultures must be considered separately. In the Oriente, the difference between village literacy groups is greater for illiterates than for literates as

hypothesized (see Table 14). Illiterate farmers from highly literate villages achieved an average change score of 5.29 while illiterate farmers from less literate villages averaged only 4.28 on the index. Literate farmers from the two groups had much more similar change scores ($\bar{X}_{Hi} = 5.00$, $\bar{X}_{Lo} = 4.97$). The cell sizes for the literates in the Oriente are very unbalanced, however, and no clear support for the hypothesized relationship can be offered even by the Oriente data. In the Occidente, no support is lent to the hypothesis since a positive relationship between village literacy and change is not found at all.

In summary, the relationship between group literacy (family and village) and increased use of modern agricultural practices is not consistently stronger for illiterate farmers than for their literate counterparts.

In conclusion, results of the main analysis presented in Table 7 indicate: 1) that membership in a literate family is consistently related to increased use of modern agricultural practices in both cultural areas of Guatemala; 2) that membership in a literate village is also related to increased use of such practices in the Oriente region but not in the Occidente region of Guatemala; and 3) that the individual literacy of the respondent does not have a substantial effect on his own tendency to adopt new agricultural techniques in either of the two regions. Based on these analyses it is clear that the most powerful literacy variable in predicting readiness for adoption of new farm practices is the literacy of the individual's family.

In the next section the same relationship will be explored with the addition of the control variables as covariates in the design in order to determine whether or not family literacy remains an important variable in predicting change toward more modern agricultural behavior.

The Elaboration Analysis

Hypothesis 6: The relationship between individual, family and village literacy and increased use of modern practices are not substantially changed by the introduction of selected background characteristics as control variables.

As described in Chapter II, three background variables were chosen for introduction into the analysis as controls: 1) age of respondent at the start of the experiment; 2) general living conditions of the respondent at the start of the experiment; and 3) total amount of land available to the respondent for planting. Control variables were introduced into the analysis singularly and in combination and their separate and combined effects on the various literacy change relationships are described below.

Age. As can be seen from Table 17, age of respondent had a significant effect on change in practice score ($F = 9.03$, $p < .01$). Younger farmers were more likely to make changes in their agricultural practices than were their older col-

Table 17. Differential effects of culture, and individual, family and village literacy on change in agricultural practice* - controlling for age.**

<u>Source</u>	<u>df</u>	<u>Sum of Squares</u>	<u>Mean Squares</u>	<u>F Ratio</u>	<u>F Prob.</u>
<u>Main effects</u>					
Culture	1	177.28	177.28	6.94	<.01
Individual Literacy	1	6.41	6.41	0.25	NS
Family Literacy	1	833.66	833.66	32.65	<.001
Village Literacy	1	58.69	58.69	2.30	NS
<u>Covariate effects</u>					
Initial Practice Score	1	8375.92	8375.92	328.07	<.001
Age	1	230.56	230.56	9.03	<.01
<u>Interactions</u>					
<u>2-way</u>					
Culture by Individual Lit.	1	0.04	0.04	0.00	NS
Culture by Family Lit.	1	43.63	43.63	1.71	NS
Culture by Village Lit.	1	387.19	387.19	15.66	<.001
Individual Lit. by Family Lit.	1	10.68	10.68	0.42	NS
Individual Lit. by Village Lit.	1	66.76	66.76	2.62	NS
Family Lit. by Village Lit.	1	57.02	57.02	2.23	NS
<u>3-way</u>					
Culture by Individual Lit. by Family Lit.	1	50.98	50.98	1.99	NS
Culture by Individual Lit. by Village Lit.	1	70.21	70.21	2.75	NS
Culture by Fam. Lit. by Village Lit.	1	109.17	109.17	4.28	<.05
Individual Lit. by Fam. Lit. by Village Lit.	1	12.39	12.39	0.48	NS
<u>4-way***</u>					
	1	34.99	34.99	1.37	NS
<u>Error Variance</u>	1206	30790.04	25.53		

*Change in practice is highly correlated with initial practice score (see Nesman, Rich, Rivers, Basic Village Education Project Final Report, 1978). Initial practice score has therefore been controlled for by its introduction into the design as a covariate.

**The current table presents the results of a classic ANOVA design. Results of a regression approach to the ANOVA yielded essentially identical results with one important exception - the main effect for culture was reduced to insignificance when adjusted for the culture by village literacy interaction.

***None of the individual 4-way interactions were significant and are thus deleted from the current table.

leagues. Controlling for age did not, however, substantially alter the original zero-order relationships involved in the main analysis. The main effect for culture remained low but statistically significant ($F_0 = 5.28$, $p < .05$; $F_1 = 6.94$, $p < .01$). The main effect for individual literacy, on the other hand, remained virtually non-existent ($F_0 = 1.02$; $F_1 = 0.25$). Family literacy remained strongly related to change across both cultures ($F_0 = 32.63$, $p < .001$; $F_1 = 32.65$, $p < .001$), while the results for village literacy remained contingent upon culture. Controlling for age, then, did not substantially alter the relationships described in the previous section.

General Living Conditions. Controlling for the wealth of the respondents, as measured by his general standard of living (i.e. housing type and utility source), produced similar results (see Table 18). The main effect of culture increased slightly and remained significant ($F_0 = 5.28$, $p < .04$; $F_1 = 11.17$, $p < .001$); the main effect of individual literacy remained slight and insignificant ($F_0 = 1.02$; $F_1 = 0.46$); the main effect for family literacy was reduced slightly but remained strong and much higher than can be accounted for by chance variation ($F_0 = 32.63$, $p < .001$; $F_1 = 27.20$, $p < .001$); and the effect of village literacy continued to interact with culture producing a non-significant and also uninterpretable main effect. The original relationships between the literacy variables and change were, then, not effected by partialling out the effects of the farmer's general living conditions.

Total amount of Land Available for Planting. Table 19 presents the results of controlling for land holding. As can be seen from the table, amount of available land is strongly related to the farmers tendency to change to more modern farm practices ($F = 67.53$, $p < .001$). Controlling for land size reduced the main effect for culture to insignificance ($F_0 = 5.28$, $p < .05$; $F_1 = 0.10$), but did not affect the literacy/change relationships. Individual literacy remained unrelated to change ($F_0 = 1.02$, $F_1 = 1.65$) while family literacy remained strongly related ($F_0 = 32.63$, $p < .001$; $F_1 = 25.14$, $p < .001$) and village literacy remained related only in the Oriente region.

In summary, then, controlling for the separate effects of age, general living conditions and land size did not alter the findings of the main analysis. Table 20 indicates further that the combined effects of the three covariates also failed to alter the original relationships substantially. As can be seen from the table, of the background characteristics, "total amount of land available for planting" was most strongly related to the dependent variable and was followed by "age" and the "general living condition" variable. The table further shows that the F ratios for all three of the background variables were higher than that for the family literacy variable. Such results indicate that the selected background characteristics are related to change in agricultural behavior but that the family literacy/change relationship is independent of such effects.⁴

⁴A multiple regression analysis performed on the data produced similar results but are not presented here for the sake of brevity.

Table 18. Differential effects of culture, and individual, family and village literacy on change in agricultural practice* - controlling for general living conditions.**

<u>Source</u>	<u>df</u>	<u>Sum of Squares</u>	<u>Mean Squares</u>	<u>F Ratio</u>	<u>F Prob.</u>
<u>Main effects</u>					
Culture	1	283.07	283.07	11.17	<.001
Individual Literacy	1	11.74	11.74	0.46	NS
Family Literacy	1	689.35	689.35	27.20	<.001
Village Literacy	1	31.42	31.42	1.24	NS
<u>Covariate effects</u>					
Initial Practice Score	2	8916.09	4458.04	175.90	<.001
General Living Conditions	1	8908.33	8908.33	351.49	<.001
<u>Interactions</u>					
<u>2-way</u>					
Culture by Individual Lit.	1	0.74	0.74	0.03	NS
Culture by Family Lit.	1	31.87	31.87	1.26	NS
Culture by Village Lit.	1	373.71	373.71	14.74	<.001
Individual Lit. by Family Lit.	1	10.25	10.25	0.40	NS
Individual Lit. by Village Lit.	1	69.69	69.69	2.75	NS
Family Lit. by Village Lit.	1	87.23	87.23	3.44	NS
<u>3-way***</u>					
	4	226.04	56.51	2.23	NS
<u>4-way***</u>					
	1	23.50	23.50	0.93	NS
<u>Error Variance</u>	1206	30565.64	25.34		

*Change in practice is highly correlated with initial practice score (see Nesman, Rich, Rivers, Basic Village Education Project Final Report, 1978). Initial practice score has therefore been controlled for by its introduction into the design as a covariate.

**The current table presents the results of a classic ANOVA design. Results of a regression approach to the ANOVA yielded essentially identical results with one important exception - the main effect for culture was reduced to insignificance when adjusted for the culture by village literacy interaction.

***None of the individual 3-way or higher interactions were significant and are thus deleted from the current table.

Table 19. Differential effects of culture, and individual, family and village literacy on change in agricultural practice *- controlling for total amount of land.**

<u>Source</u>	<u>df</u>	<u>Sum of Squares</u>	<u>Mean Squares</u>	<u>F Ratio</u>	<u>F Prob.</u>
<u>Main effects</u>					
Culture	1	2.65	2.65	0.10	NS
Individual literacy	1	41.45	41.45	1.65	NS
Family Literacy	1	631.55	631.55	25.14	<.001
Village Literacy	1	26.34	26.34	1.05	NS
<u>Covariate effects</u>					
Initial Practice Score	1	9208.82	9208.82	366.62	<.001
Total amount of land	1	1696.17	1696.17	67.53	<.001
<u>Interactions</u>					
<u>2-way</u>	6	673.86	112.31	4.47	<.001
Culture by Individual Lit.	1	1.20	1.20	0.05	NS
Culture by Family Lit.	1	25.67	25.67	1.02	NS
Culture by Village Lit.	1	419.68	419.68	16.71	<.001
Individual Lit. by Family Lit.	1	28.21	28.21	1.12	NS
Individual Lit. by Village Lit.	1	76.35	76.35	3.04	NS
Family Lit. by Village Lit.	1	93.34	93.34	3.72	<.05
<u>3-way***</u>	4	228.06	57.02	2.27	NS
<u>4-way***</u>	1	29.27	29.27	1.16	NS
<u>Error Variance</u>	1206	30292.35	25.12		

*Change in practice is highly correlated with initial practice score (see Nesman, Rich, Rivers, Basic Village Education Project Final Report, 1978). Initial practice score has therefore been controlled for by its introduction into the design as a covariate.

**The current tables present the results of a classic ANOVA design. Results of a regression approach to the ANOVA yielded essentially identical results with one important exception - the main effect for culture was reduced to insignificance when adjusted for the culture by village literacy interaction.

***None of the individual 3-way or higher interactions were significant and are thus deleted from the current table.

Table 20. Differential effects of culture, and individual, family and village literacy on change in agricultural practice* - controlling for age, total amount of land, and general living conditions.**

<u>Source</u>	<u>df</u>	<u>Sum of Squares</u>	<u>Mean Squares</u>	<u>F Ratio</u>	<u>F Prob.</u>
<u>Main effects</u>					
Culture	1	14.23	14.23	0.59	NS
Individual Literacy	1	1.71	1.71	0.07	NS
Family Literacy	1	483.72	483.72	19.91	<.001
Village Literacy	1	54.53	54.53	2.24	NS
<u>Covariate effects</u>					
Initial Practice Score	1	9896.73	9896.73	407.35	<.001
Age	1	683.19	683.19	28.12	<.001
Total Amount of Land	1	2180.80	2180.80	89.76	<.001
General Living Conditions	1	576.10	576.10	23.71	<.001
<u>Interactions</u>					
<u>2-way</u>					
Culture by Individual Lit	1	0.03	0.03	0.00	NS
Culture by Family Lit.	1	20.45	20.45	0.84	NS
Culture by Village Lit.	1	416.72	416.72	17.15	<.001
Individual Lit. by Family Lit.	1	11.83	11.83	0.49	NS
Individual Lit. by Village Lit.	1	94.68	94.68	3.89	<.05
Family Lit. by Village Lit.	1	80.77	80.77	3.32	NS
<u>3-way***</u>					
	4	198.35	49.59	2.04	NS
<u>4-way***</u>					
	1	22.01	22.01	.91	NS
<u>Error Variance</u>					

*Change in practice is highly correlated with initial practice score (see Nesman, Rich, Rivers, Basic Village Education Project Final Report, 1978). Initial practice score has therefore been controlled for by its introduction into the design as a covariate.

**The current table presents the results of a classic ANOVA design. Results of a regression approach to the ANOVA yielded essentially identical results with one important exception - the main effect for culture was reduced to insignificance when adjusted for the culture by village literacy interaction.

***None of the individual 3-way or higher interactions were significant and are thus deleted from the current table.

While these background variables do not exhaust the list of characteristics which could possibly intervene in the family literacy/change relationship, they were carefully chosen on the basis of their univariate and multivariate relationships to the major variables from a list of over 50 background characteristics. Controlling for these variables should then give a good indication of whether or not the literacy/change relationship is spurious. Hypothesis number 6 is thereby supported and family literacy remains the most viable predictor of change in agricultural behavior among the three measures of literacy.

Hypothesis 7: The relationship between individual, family and village literacy and increased use of modern practices are independent of the effects of experimental radio treatment conditions.

Hypothesis 7 was supported by our findings. Table 21 shows that the main effects for culture and the literacy variables were not substantially affected by the addition of treatment condition to the design. The main effect for culture was reduced slightly ($F_0 = 5.28, p < .05$; $F_1 = 4.69, p < .05$) but remained significant. The main effect for individual literacy remained very weak ($F_0 = 1.02$; $F_1 = 1.51$) and insignificant while the main effect for

Table 21. **Differential effects of BVE treatment, culture, individual, family and village literacy on change in agricultural practice.*

<u>Source</u>	<u>df</u>	<u>Sum of Squares</u>	<u>Mean Squares</u>	<u>F Ratio</u>	<u>F Prob.</u>
<u>Main effects</u>					
Treatment	4	619.49	154.87	5.99	<.001
Culture	1	121.30	121.30	4.69	<.05
Individual Literacy	1	39.07	39.07	1.51	NS
Family Literacy	1	766.04	766.04	29.64	<.001
Village Literacy	1	1.61	1.61	0.06	NS
<u>Error Variance</u>	1214	31378.27	24.85		

*Change in practice is highly correlated with initial practice score (see Nesman, Rich, Rivers, Basic Village Education Project Final Report, 1978). Initial practice score has therefore been controlled for by its introduction into the design as a covariate.

**The current table presents the results of a classic ANOVA design. Results of a regression approach to the ANOVA yielded essentially identical results with one important exception - the main effect for culture was reduced to insignificance when adjusted for the culture by village literacy interaction.

family literacy remained strong ($F_0 = 32.63$; $F_1 = 29.64$). Village literacy continued to have no significant effect across cultures. Due to empty cells in the village literacy by treatment design the interactions between main effects could not be analyzed.

The introduction of BVE treatment into the design, then, had no major effect on the literacy/change relationships. Family literacy continued to have an important impact on change toward more modern behavior regardless of the respondents' membership in a particular experimental treatment group.

In conclusion, results of the current study indicate that while individual literacy has no consistent relationship to change toward more modern agricultural behavior, family literacy has a positive and consistent relationship to such change. Furthermore, the literacy of one's family appears to affect tendency to accept new practices regardless of cultural differences, availability of non-print agricultural material, general living conditions of the family, land size and age. This group effect of literacy extends to the village in the Oriente region of Guatemala but does not do so in the Occidente.

Such findings do not mean that an individual's own literacy is of no benefit to him in terms of increasing his tendency toward accepting new agricultural practices. Rather, the findings suggest that while a farmer may acquire change-oriented attitudes in the process of becoming literate, thereby increasing the likelihood that he will change his behavior in the direction of "modernization," he is also likely to share these new-found attitudes with his illiterate family members. Measurement of individual literacy under such circumstances does not tap the propensity to modernize which the farmer gains by virtue of attitudes shared with him by his literate companions, and thus obscures the importance of literacy in encouraging change toward more modern behavior. It is the conclusion of this study that while literacy does indeed help to "free man from the bondage of perceptual reality" (Singh, 1962:36), the "wings" thus given to his imagination are capable of carrying both him and the members of his family. The most appropriate and useful measure of literacy, then, is one which taps both the "freed imagination" of the literate member and the "wings" which he shares with his family.

CHAPTER IV

OVERVIEW: SUMMARY AND IMPLICATIONS

The purpose of this study has been to investigate the differential effects of individual and group literacy on change in agricultural behavior. It was hypothesized that while individual literacy would have some statistically significant effect on "change," family and village literacy (i.e., the amount of literacy surrounding the agricultural decision-maker) would have a stronger relationship to change in agricultural behavior than would the farmer's own ability to read. The relevance of this hypothesis to international development efforts is based on a number of factors including the following:

1. There is a large group of people classified as "peasant farmers" which is currently using traditional agricultural methods (over two-thirds of the population in some areas of the world).
2. Agricultural productivity among these traditional farmers is generally low, and has been shown to be related to both the agricultural techniques utilized and the impoverished conditions under which they live.
3. In most less developed countries, this large agricultural sector is unable to provide sufficient food for itself much less for the growing urban and manufacturing sectors of the country. This fact is a severe deterrent to international development since insufficient food is available to support the relatively large non-agricultural sectors necessary for industrialization.
4. Efforts to alleviate this food shortage depend, at least in part, on the successful communication of new information, skills and attitudes to peasant farmers so that traditional agricultural technology can be modified and production thereby increased.
5. Written material is important in the communication process--particularly where very technical information and skills are to be imparted to the farmer. Literacy is, of course, an essential skill if written materials are to be utilized in the communication process.
6. Literacy is not only an important skill for the direct communication of technical information, but is also related to a favorable attitude toward change and an openness to new ideas and techniques (see Singh, 1962; Micklin, 1969; and Sack, 1973). Literacy, then, may increase the probability that a peasant farmer will accept and act on new information communicated to him through non-print media such as radio or television.

7. In spite of the need for written materials and the importance of literacy in the acquisition of attitudinal modernity, there appears to be an inability to reach large numbers of peasant farmers (especially heads of household) with literacy programs. The present number of illiterates in the world is greater than it was thirty years ago when literacy programs were initiated throughout the world. The world population has increased faster than the number of literates so that although the number of literates may have increased, the number of illiterates has increased even faster. It is unlikely that a significant impact on the current generation of agricultural decision-makers can be made by literacy programs in the near future.

Thus, it is the authors' contention that it is crucial for those interested in promoting international development to know as much as possible about the role of literacy in promoting the adoption of modern farm practices; and that it is especially important to understand the part which the "sharing" of literacy skills among family members plays in that role. The "sharing" factor has not been adequately addressed in the current body of research literature, and this study was, therefore, designed as a first step in the investigation of the effect of "shared" literacy on a farmer's agricultural behavior.

It was discovered from the findings reported in the previous chapters that in both the Ladino and Indian cultures of Guatemala, family literacy has a relationship to change in agricultural behavior which is relatively strong and is independent of other factors; that village literacy has a similar relationship to such change only in the Oriente (Ladino) region; and that individual literacy has no statistically significant relationship to "change" in either culture.

Such findings do not mean that an individual's own literacy skills are of no benefit to his understanding of and tendency to accept new agricultural practices. Rather, the findings suggest that while a farmer may acquire change oriented attitudes in the process of becoming literate, and therefore increase the likelihood that he will change his agricultural behavior, he is also likely to share these new-found attitudes with his illiterate family members. Such sharing may, then, result in an illiterate head of household (who has acquired an openness to new ideas from his literate children and/or spouse) accepting and acting on agricultural advice from a radio education program such as BVE.

It was therefore concluded that the effect of literacy on change is probably both an individual and a group function: that a farmer's propensity to change his behavior is enhanced by certain attitudes and skills, the acquisition of which may result from either his own or his family's literacy. Several implications for development, both theoretical and pragmatic, are suggested by these findings: from a theoretical perspective, support is lent for the concept of a group effect through which values and attitudes are shared by members of a family. Moreover, if the benefits of literacy are thus shared, other characteristics which have traditionally been analyzed

in terms of individual variables may also have more predictive ability if they are considered as group characteristics. Additionally, the fact that the group literacy/change relationship may account for some of the conflicting results in the literature pertaining to literacy and behavior change. Literacy (and other characteristics similarly shared) may thus be more strongly and consistently related than the results of studies in this area have indicated.

In a more practical vein, if the benefits of literacy accrued to the literate are shared with his family, then even in areas with low literacy rates, the distribution of written materials may not be an exercise in futility. In fact, if ideas and information are shared in this manner, the production of high quality printed material in the content areas of agriculture, health, nutrition and family planning should perhaps assume a top priority for funding in developing areas.

The findings also have implications for the funding of literacy programs themselves. The practicality of future expenditures on literacy programs is, at least in part, judged on the basis of the empirical evidence, or lack thereof, of the impact of literacy on development. The relationship between family literacy and the individual's modernity could be a confounding factor in the individual literacy research causing at least part of the confusion in the research literature. The results of the current study which indicates that literacy does have an impact on change but that its benefits are a group rather than an individual phenomenon should make the viability of future expenditures on literacy programs more readily assessable.

In addition to clarifying the value of literacy programs in encouraging development, the findings of this study should help to pinpoint the appropriate target audience for such programs. If the literacy of school aged children has an impact on their parents' decisions in the area of agriculture as our findings indicate, then primary education is likely to have immediate impact on the present generation of decision-makers in addition to the future generational effects often predicted for such programs. Such findings should be useful in decisions regarding the allocation of resources to non-formal adult vs. formal primary education programs.

The current findings should also have implications beyond those for literacy programs themselves. Where resources are limited, it is often crucial to place development programs in regions in which they will have the greatest impact. Predictions of readiness for modernization have often been made on the basis of (among other factors) individual literacy rates in an area. Such predictors may be more accurately based on the number of literate (or highly literate) households in the target area.

Knowledge of the process of sharing new skills and attitudes within the family also helps to clarify the role of women and children in the development process. Findings from the current study indicate that women and children may be important links in the transmitting of new information that could increase agricultural production among traditional farmers. This is one area where further research could be carried on: what are the characteristics of

the literate members of the family and which member would be most likely to be the best transmitter of new knowledge. The present study gives strong indication that the family unit, in many cases the wife and often the children, are the possessors of the literacy skill that is not possessed by the farmer himself. These individuals then become important links in the acquisition of new information and the later adoption of new agricultural techniques.

Finally, if the benefits of literacy are shared, so may be the other factors usually thought to be purely individual characteristics. The process of modernization in the developing world may not be a process of identifying and cultivating the "modernized" man but, rather, the "modernized" family, tribe or village--a possibility which suggests that development programs should be aimed at the primary group rather than exclusively at its individual members.

In conclusion, results of this study only begin to scratch the surface of the question of the effects of family literacy on modernization. The findings do suggest, however, that the group effects of literacy in the developing world may be a topic well worth the attention of both researchers and developers interested in determining whether or not literacy is indeed the basic "skill that underlies the whole modernizing sequence" (Lerner, 1958:64).

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APPENDIX A
Interview Schedule

APPENDIX A

INTERVIEW SCHEDULE

- 1 -
10. Identifying information
 11. Attitude and cooperation of interviewee
 1. Poor
 2. Not bad
 3. Good
 12. Number of visits

1. First	4. Fourth
2. Second	5. More
3. Third	
 13. Are you a farmer?
 0. No answer
 1. No
 2. Yes
 14. Do you make the decisions about planting, fertilizing, cultivating, and harvesting of your crops?
 0. No answer
 1. No
 2. Yes with others
 3. Yes alone
 15. How do you prepare the land for your crops?

0. No answer	3. Cleans with machete and hoe
1. Does nothing	4. Cleans and plows once
2. Burns off	5. Cleans and plows twice or more
 16. How do you turn the soil for planting?

0. No answer	3. Only with oxen
1. All by hand	4. With oxen and tractor
2. By hand and some use of oxen	5. All with tractor

25. What type of corn seed did you use last year?
- | | |
|-----------------------------------|--------------------------------------|
| 0. No answer | 4. Selected, native seed |
| 1. Doesn't know | 5. Null |
| 2. Hybrid from a previous harvest | 6. New, treated, improved, certified |
| 3. Unselected native seed | 7. New, treated, hybrid |
26. What type of corn seed did you use this year?
- | | |
|---------------------------------|--------------------------------------|
| 0. No answer | 4. Selected, native seed |
| 1. Doesn't know | 5. Null |
| 2. Hybrid from previous harvest | 6. New, treated, improved, certified |
| 3. Unselected, native seed | 7. New, treated, hybrid |
27. What type of corn seed do you think is the best?
- | | |
|---------------------------------|--------------------------------------|
| 0. No answer | 4. Selected, native seed |
| 1. Doesn't know | 5. Null |
| 2. Hybrid from previous harvest | 6. New, treated, improved, certified |
| 3. Unselected, native seed | 7. New, treated, hybrid |
28. What type of bean seed did you use last year?
- | | |
|------------------|------------------------------|
| 0. No answer | 3. Unselected native |
| 1. Did not plant | 4. Selected from own harvest |
| 2. Doesn't know | 5. New, improved seed |
29. What type of bean seed did you use this year?
- | | |
|------------------|------------------------------|
| 0. No answer | 3. Unselected native |
| 1. Did not plant | 4. Selected from own harvest |
| 2. Doesn't know | 5. New, improved seed |
30. What type of bean seed do you think is the best?
- | | |
|------------------|------------------------------|
| 0. No answer | 3. Unselected native |
| 1. Did not plant | 4. Selected from own harvest |
| 2. Doesn't know | 5. New, improved seed |
31. What type of sorghum did you use last year?
- | | |
|---------------------------------------|------------------------|
| 0. No answer | 4. Unselected native |
| 1. Did not plant | 5. Selected native |
| 2. Doesn't know | 6. Certified |
| 3. Hybrid selected from previous crop | 7. New treated, hybrid |
32. What type of sorghum seed did you use this year?
- | | |
|---------------------------------------|-----------------------|
| 0. No answer | 4. Unselected native |
| 1. Did not plant | 5. Selected native |
| 2. Doesn't know | 6. Certified |
| 3. Hybrid selected from previous crop | 7. New treated hybrid |

33. What type of sorghum seed do you think is best?
- | | |
|---------------------------------------|-----------------------|
| 0. No answer | 4. Unselected native |
| 1. Did not plant | 5. Selected native |
| 2. Doesn't know | 6. Certified |
| 3. Hybrid selected form previous crop | 7. New treated hybrid |
34. If you selected your corn seed this year, how did you do it?
- | | |
|------------------------------------|--|
| 0. No answer | 5. Central grain, small or average ear |
| 1. Did not plant | 6. All grain, largest ears |
| 2. Did not select from own harvest | 7. Central grain, largest ears |
| 3. All grain, any ear | 8. Central grain, largest ears best stalks |
| 4. All grain, small or average ear | |
35. If you selected your bean seed this year, how did you do it?
- | | |
|------------------------------------|---|
| 0. No answer | 5. Best grain, after hand threshing |
| 1. Did not plant | 6. Best vines, any pod |
| 2. Did not select from own harvest | 7. Largest grain, best pods, best vines |
| 3. All grain, any vine | |
| 4. Best pods, any vine | |
36. If you selected your sorghum seed this year, how did you do it?
- | | |
|--------------------------------------|---|
| 0. No answer | 5. Best stalks, any head |
| 1. Did not plant | 6. Best head, any stalks |
| 2. Did not select from own harvest | 7. Best grains, best heads, best stalks |
| 3. All grains, any head | |
| 4. Best grains, after hand threshing | |
37. Do you think there is any danger planting new seed?
- | |
|------------------------------|
| 0. No answer |
| 1. Doesn't know |
| 2. Yes, it lowers production |
| 3. Yes, it doesn't grow here |
| 4. No danger |
38. How many cuerdas did you plant this year in your first crop of corn?
- | | |
|--------------------------|----------------|
| 0. No answer | 5. 1.5-1.9 mz. |
| 1. Did not plant | 6. 2.0-2.4 mz. |
| 2. Less than 0.5 manzana | 7. 2.5-2.9 mz. |
| 3. 0.5-0.9 mz. | 8. 3.0-3.4 mz. |
| 4. 1.0-1.4 mz. | 9. 3.5 or more |

39. How many cuerdas did you plant this year in your first crop of beans?
- | | |
|--------------------------|----------------|
| 0. No answer | 5. 1.5-1.9 mz |
| 1. Did not plant | 6. 2.0-2.4 mz |
| 2. Less than 0.5 manzana | 7. 2.5-2.9 mz |
| 3. 0.5-0.9 mz | 8. 3.0-3.4 mz |
| 4. 1.0-1.4 mz | 9. 3.5 or more |
40. How many cuerdas did you plant this year in your first crop of sorghum?
- | | |
|-------------------------|----------------|
| 0. No answer | 5. 1.5-1.9 mz |
| 1. Did not plant | 6. 2.0-2.4 mz |
| 2. Less than .5 manzana | 7. 2.5-2.9 mz |
| 3. 0.5-0.9 mz | 8. 3.0-3.4 mz |
| 4. 1.0-1.4 mz | 9. 3.5 or more |
41. How many cuerdas did you plant this year in your first crop of rice?
- | | |
|---------------------|----------------|
| 0. No answer | 5. 1.5-1.9 mz |
| 1. Did not plant | 6. 2.0-2.4 mz |
| 2. Less than 0.5 mz | 7. 2.5-2.9 mz |
| 3. 0.5-0.9 mz | 8. 3.0-3.4 mz |
| 4. 1.0-1.4 mz | 9. 3.5 or more |
42. How many cuerdas did you plant this year in your first crop of wheat?
- | | |
|--------------------|----------------|
| 0. No answer | 5. 1.5-1.9 mz |
| 1. Did not plant | 6. 2.0-2.4 mz |
| 2. Less than .5 mz | 7. 2.5-2.9 mz |
| 3. 0.5-0.9 mz | 8. 3.0-3.4 mz |
| 4. 1.0-1.4 mz | 9. 3.5 or more |
43. How many cuerdas did you plant this year in your first crop of potatoes?
- | | |
|---------------------|----------------|
| 0. No answer | 5. 1.5-1.9 mz |
| 1. Did not plant | 6. 2.0-2.4 mz |
| 2. Less than 0.5 mz | 7. 2.5-2.9 mz |
| 3. 0.5-0.9 mz | 8. 3.0-3.4 mz |
| 4. 1.0-1.4 mz | 9. 3.5 or more |
44. How many cuerdas did you plant this year in your first crop of horsebeans?
- | | |
|---------------------|----------------|
| 0. No answer | 5. 1.5-1.9 mz |
| 1. Did not plant | 6. 2.0-2.4 mz |
| 2. Less than 0.5 mz | 7. 2.5-2.9 mz |
| 3. 0.5-0.9 mz | 8. 3.0-3.4 mz |
| 4. 1.0-1.4 mz | 9. 3.5 or more |

- | | | | |
|----|--------------------|----|-------------------|
| 0. | No answer | 5. | 10-14.9 cwt/mz |
| 1. | Did not plant | 6. | 15-19.9 cwt/mz |
| 2. | Nothing | 7. | 20-24.9 cwt/mz |
| 3. | Less than 5 cwt/mz | 8. | 25-29.9 cwt/mz |
| 4. | 5-9.9 cwt/mz | 9. | 30 cwt/mz or more |
52. How many cuerdas did you plant this year in your second crop of corn?
- | | | | |
|----|------------------|----|-------------|
| 0. | No answer | 5. | 1.5-1.9 mz |
| 1. | Did not plant | 6. | 2.0-2.4 mz |
| 2. | Less than 0.5 mz | 7. | 2.5-2.9 mz |
| 3. | 0.5-0.9 mz | 8. | 3.0-3.4 mz |
| 4. | 1.0-1.4 mz | 9. | 3.5 or more |
53. How many cuerdas did you plant this year in your second crop of beans?
- | | | | |
|----|------------------|----|-------------|
| 0. | No answer | 5. | 1.5-1.9 mz |
| 1. | Did not plant | 6. | 2.0-2.4 mz |
| 2. | Less than 0.5 mz | 7. | 2.5-2.9 mz |
| 3. | 0.5-0.9 mz | 8. | 3.0-3.4 mz |
| 4. | 1.0-1.4 mz | 9. | 3.5 or more |
54. How many cuerdas did you plant this year in your second crop of sorghum?
- | | | | |
|----|------------------|----|-------------|
| 0. | No answer | 5. | 1.5-1.9 mz |
| 1. | Did not plant | 6. | 2.0-2.4 mz |
| 2. | Less than 0.5 mz | 7. | 2.5-2.9 mz |
| 3. | 0.5-0.9 mz | 8. | 3.0-3.4 mz |
| 4. | 1.0-1.4 mz | 9. | 3.5 or more |
55. How many hundredweight of corn did you or will you harvest this year in your second crop?
- | | | | |
|----|---------------------|----|-------------------|
| 0. | No answer | 5. | 10-14.9 cwt/mz |
| 1. | Did not plant | 6. | 15-19.9 cwt/mz |
| 2. | Nothing | 7. | 20-24.9 cwt/mz |
| 3. | Less than 5 cwt/mz. | 8. | 25-29.9 cwt/mz |
| 4. | 5-9.9 cwt/mz | 9. | 30 cwt/mz or more |
56. How many hundredweight of beans did you or will you harvest this year in your second crop?
- | | | | |
|----|--------------------|----|-------------------|
| 0. | No answer | 5. | 10-14.9 cwt/mz |
| 1. | Did not plant | 6. | 15-19.9 cwt/mz |
| 2. | Nothing | 7. | 20-24.9 cwt/mz |
| 3. | Less than 5 cwt/mz | 8. | 25-29.9 cwt/mz |
| 4. | 5-9.9 cwt/mz | 9. | 30 cwt/mz or more |
57. How many hundredweight of sorghum did you or will you harvest this year in your second crop?

- | | | | |
|----|--------------------|----|-------------------|
| 0. | No answer | 5. | 10-14.9 cwt/mz |
| 1. | Did not plant | 6. | 15-19.9 cwt/mz |
| 2. | Nothing | 7. | 20-24.9 cwt/mz |
| 3. | Less than 5 cwt/mz | 8. | 25-29.9 cwt/mz |
| 4. | 5-9.9 cwt/mz | 9. | 30 cwt/mz or more |
58. How many cuerdas did you plant last year in your first crop of corn?
- | | | | |
|----|------------------|----|-------------|
| 0. | No answer | 5. | 1.5-1.9 mz. |
| 1. | Did not plant | 6. | 2.0-2.4 mz |
| 2. | Less than 0.5 mz | 7. | 2.5-2.9 mz |
| 3. | 0.5-0.9 mz | 8. | 3.0-3.4 mz |
| 4. | 1.0-1.4 mz | 9. | 3.5 or more |
59. How many cuerdas did you plant last year in your first crop of beans?
- | | | | |
|----|------------------|----|-------------|
| 0. | No answer | 5. | 1.5-1.9 mz |
| 1. | Did not plant | 6. | 2.0-2.4 mz |
| 2. | Less than 0.5 mz | 7. | 2.5-2.9 mz |
| 3. | 0.5-0.9 mz | 8. | 3.0-3.4 mz |
| 4. | 1.0-1.4 mz | 9. | 3.5 or more |
60. How many cuerdas did you plant last year in your first crop of sorghum?
- | | | | |
|----|------------------|----|-------------|
| 0. | No answer | 5. | 1.5-1.9 mz |
| 1. | Did not plant | 6. | 2.0-2.4 mz |
| 2. | Less than 0.5 mz | 7. | 2.5-2.9 mz |
| 3. | 0.5-0.9 mz | 8. | 3.0-3.4 mz |
| 4. | 1.0-1.4 mz | 9. | 3.5 or more |
61. How many cuerdas did you plant last year in your first crop of rice?
- | | | | |
|----|------------------|----|-------------|
| 0. | No answer | 5. | 1.5-1.9 mz |
| 1. | Did not plant | 6. | 2.0-2.4 mz |
| 2. | Less than 0.5 mz | 7. | 2.5-2.9 mz |
| 3. | 0.5-0.9 mz | 8. | 3.0-3.4 mz |
| 4. | 1.0-1.4 mz | 9. | 3.5 or more |
62. How many cuerdas did you plant last year in your first crop of wheat?
- | | | | |
|----|------------------|----|-------------|
| 0. | No answer | 5. | 1.5-1.9 mz |
| 1. | Did not plant | 6. | 2.0-2.4 mz |
| 2. | Less than 0.5 mz | 7. | 2.5-2.9 mz |
| 3. | 0.5-0.9 mz | 8. | 3.0-3.4 mz |
| 4. | 1.0-1.4 mz | 9. | 3.5 or more |
63. How many cuerdas did you plant last year in your first crop of potatoes?

- | | | | |
|----|------------------|----|-------------|
| 0. | No answer | 5. | 1.5-1.9 mz |
| 1. | Did not plant | 6. | 2.0-2.4 mz |
| 2. | Less than 0.5 mz | 7. | 2.5-2.9 mz |
| 3. | 0.5-0.9 mz | 8. | 3.0-3.4 mz |
| 4. | 1.0-1.4 mz | 9. | 3.5 or more |
64. How many cuerdas did you plant last year in your first crop of horsebeans?
- | | | | |
|----|------------------|----|-------------|
| 0. | No answer | 5. | 1.5-1.9 mz |
| 1. | Did not plant | 6. | 2.0-2.4 mz |
| 2. | Less than 0.5 mz | 7. | 2.5-2.9 mz |
| 3. | 0.5-0.9 mz | 8. | 3.0-3.4 mz |
| 4. | 1.0-1.4 mz | 9. | 3.5 or more |
65. How many hundredweight did you harvest last year from your first crop of corn?
- | | | | |
|----|--------------------|----|-------------------|
| 0. | No answer | 5. | 10-14.9 cwt/mz |
| 1. | Did not plant | 6. | 15-19.9 cwt/mz |
| 2. | Nothing | 7. | 20-24.9 cwt/mz |
| 3. | Less than 5 cwt/mz | 8. | 25-29.9 cwt/mz |
| 4. | 5-9.9 cwt/mz | 9. | 30 cwt/mz or more |
66. How many hundredweight did you harvest last year from your first crop of beans?
- | | | | |
|----|--------------------|----|-------------------|
| 0. | No answer | 5. | 10-14.9 cwt/mz |
| 1. | Did not plant | 6. | 15-19.9 cwt/mz |
| 2. | Nothing | 7. | 20-24.9 cwt/mz |
| 3. | Less than 5 cwt/mz | 8. | 25-29.9 cwt/mz |
| 4. | 5-9.9 cwt/mz | 9. | 30 cwt/mz or more |
67. How many hundredweight did you harvest last year from your first crop of sorghum?
- | | | | |
|----|--------------------|----|-------------------|
| 0. | No answer | 5. | 10-14.9 cwt/mz |
| 1. | Did not plant | 6. | 15-19.9 cwt/mz |
| 2. | Nothing | 7. | 20-24.9 cwt/mz |
| 3. | Less than 5 cwt/mz | 8. | 25-29.9 cwt/mz |
| 4. | 5-9.9 cwt/mz | 9. | 30 cwt/mz or more |
68. How many hundredweight did you harvest last year from your first crop of rice?
- | | | | |
|----|--------------------|----|-------------------|
| 0. | No answer | 5. | 10-14.9 cwt/mz |
| 1. | Did not plant | 6. | 15-19.9 cwt/mz |
| 2. | Nothing | 7. | 20-24.9 cwt/mz |
| 3. | Less than 5 cwt/mz | 8. | 25-29.9 cwt/mz |
| 4. | 5-9.9 cwt/mz | 9. | 30 or more cwt/mz |

69. How many hundredweight did you harvest last year from your first crop of wheat?
- | | |
|-----------------------|----------------------|
| 0. No answer | 5. 10-14.9 cwt/mz |
| 1. Did not plant | 6. 15-19.9 cwt/mz |
| 2. Nothing | 7. 20-24.9 cwt/mz |
| 3. Less than 5 cwt/mz | 8. 25-29.9 cwt/mz |
| 4. 5-9.9 cwt/mz | 9. 30 or more cwt/mz |
70. How many hundredweight did you harvest last year from your first crop of potatoes?
- | | |
|-----------------------|----------------------|
| 0. No answer | 5. 10-14.9 cwt/mz |
| 1. Did not plant | 6. 15-19.9 cwt/mz |
| 2. Nothing | 7. 20-24.9 cwt/mz |
| 3. Less than 5 cwt/mz | 8. 25-29.9 cwt/mz |
| 4. 5-9.9 cwt/mz | 9. 30 or more cwt/mz |
71. How many hundredweight did you harvest last year from your first crop of horsebeans?
- | | |
|-----------------------|----------------------|
| 0. No answer | 5. 10-14.9 cwt/mz |
| 1. Did not plant | 6. 15-19.9 cwt/mz |
| 2. Nothing | 7. 20-24.9 cwt/mz |
| 3. Less than 5 cwt/mz | 8. 25-29.9 cwt/mz |
| 4. 5-9.9 cwt/mz | 9. 30 or more cwt/mz |
72. How many cuerdas did you plant last year in your second crop of corn?
- | | |
|---------------------|-------------------|
| 0. No answer | 5. 1.5-1.9 mz |
| 1. Did not plant | 6. 2.0-2.4 mz |
| 2. Less than 0.5 mz | 7. 2.5-2.9 mz |
| 3. 0.5-0.9 mz | 8. 3.0-3.4 mz |
| 4. 1.0-1.4 mz | 9. 3.5 mz or more |
73. How many cuerdas did you plant last year in your second crop of beans?
- | | |
|---------------------|-------------------|
| 0. No answer | 5. 1.5-1.9 mz |
| 1. Did not plant | 6. 2.0-2.4 mz |
| 2. Less than 0.5 mz | 7. 2.5-2.9 mz |
| 3. 0.5-0.9 mz | 8. 3.0-3.4 mz |
| 4. 1.0-1.4 mz | 9. 3.5 mz or more |
74. How many cuerdas did you plant last year in your second crop of sorghum?
- | | |
|---------------------|-------------------|
| 0. No answer | 5. 1.5-1.9 mz |
| 1. Did not plant | 6. 2.0-2.4 mz |
| 2. Less than 0.5 mz | 7. 2.5-2.9 mz |
| 3. 0.5-0.9 mz | 8. 3.0-3.4 mz |
| 4. 1.0-1.4 mz | 9. 3.5 mz or more |
75. How many hundredweight did you harvest last year in your second crop of corn?

- | | | | |
|----|--------------------|----|-------------------|
| 0. | No answer | 5. | 10-14.9 cwt/mz |
| 1. | Did not plant | 6. | 15-19.9 cwt/mz |
| 2. | Nothing | 7. | 20-24.9 cwt/mz |
| 3. | Less than 5 cwt/mz | 8. | 25-29.9 cwt/mz |
| 4. | 5-9.9 cwt/mz | 9. | 30 or more cwt/mz |
76. How many hundredweight did you harvest last year in your second crop of beans?
- | | | | |
|----|--------------------|----|-------------------|
| 0. | No answer | 5. | 10-14.9 cwt/mz |
| 1. | Did not plant | 6. | 15-19.9 cwt/mz |
| 2. | Nothing | 7. | 20-24.9 cwt/mz |
| 3. | Less than 5 cwt/mz | 8. | 25-29.9 cwt/mz |
| 4. | 5-9.9 cwt/mz | 9. | 30 or more cwt/mz |
77. How many hundredweight did you harvest last year in your second crop of sorghum?
- | | | | |
|----|--------------------|----|-------------------|
| 0. | No answer | 5. | 10-14.9 cwt/mz |
| 1. | Did not plant | 6. | 15-19.9 cwt/mz |
| 2. | Nothing | 7. | 20-24.9 cwt/mz |
| 3. | Less than 5 cwt/mz | 8. | 25-29.9 cwt/mz |
| 4. | 5-9.9 cwt/mz | 9. | 30 or more cwt/mz |
- 78-
- 84 Identifying information
85. What has been your best crop of corn?
- | | | | |
|----|--------------------|----|-------------------|
| 0. | No answer | 5. | 10-14.9 cwt/mz |
| 1. | Did not plant | 6. | 15-19.9 cwt/mz |
| 2. | Nothing | 7. | 20-24.9 cwt/mz |
| 3. | Less than 5 cwt/mz | 8. | 25-29.9 cwt/mz |
| 4. | 5-9.9 cwt/mz | 9. | 30 cwt/mz or more |
86. What has been your best crop of beans?
- | | | | |
|----|--------------------|----|-------------------|
| 0. | No answer | 5. | 10-14.9 cwt/mz |
| 1. | Did not plant | 6. | 15-19.9 cwt/mz |
| 2. | Nothing | 7. | 20-24.9 cwt/mz |
| 3. | Less than 5 cwt/mz | 8. | 25-29.9 cwt/mz |
| 4. | 5-9.9 cwt/mz | 9. | 30 cwt/mz or more |
87. What has been your best crop of sorghum?
- | | | | |
|----|--------------------|----|-------------------|
| 0. | No answer | 5. | 10-14.9 cwt/mz |
| 1. | Did not plant | 6. | 15-19.9 cwt/mz |
| 2. | Nothing | 7. | 20-24.9 cwt/mz |
| 3. | Less than 5 cwt/mz | 8. | 25-29.9 cwt/mz |
| 4. | 5-9.9 cwt/mz | 9. | 30 cwt/mz or more |
88. What has been your poorest crop of corn?
- | | | | |
|----|--------------------|----|-------------------|
| 0. | No answer | 5. | 10-14.9 cwt/mz |
| 1. | Did not plant | 6. | 15-19.9 cwt/mz |
| 2. | Nothing | 7. | 20-24.9 cwt/mz |
| 3. | Less than 5 cwt/mz | 8. | 25-29.9 cwt/mz |
| 4. | 5-9.9 cwt/mz | 9. | 30 cwt/mz or more |

89. What has been your poorest crop of beans?
- | | |
|-----------------------|----------------------|
| 0. No answer | 5. 10-14.9 cwt/mz |
| 1. Did not plant | 6. 15-19.9 cwt/mz |
| 2. Nothing | 7. 20-24.9 cwt/mz |
| 3. Less than 5 cwt/mz | 8. 25-29.9 cwt/mz |
| 4. 5-9.9 cwt/mz | 9. 30 cwt/mz or more |
90. What has been your poorest crop of sorghum?
- | | |
|-----------------------|----------------------|
| 0. No answer | 5. 10-14.9 cwt/mz |
| 1. Did not plant | 6. 15-19.9 cwt/mz |
| 2. Nothing | 7. 20-24.9 cwt/mz |
| 3. Less than 5 cwt/mz | 8. 25-29.9 cwt/mz |
| 4. 5-9.9 cwt/mz | 9. 30 cwt/mz or more |
91. How many seeds do you plant for each hill of corn?
- | | |
|------------------|-----------------------|
| 0. No answer | 4. Three seeds |
| 1. Did not plant | 5. Four seeds or more |
| 2. One seed | 6. A handful |
| 3. Two seeds | |
92. How many seeds do you plant for each hill of beans?
- | | |
|------------------|-----------------------|
| 0. No answer | 4. Three seeds |
| 1. Did not plant | 5. Four seeds or more |
| 2. One seed | 6. A handful |
| 3. Two seeds | |
93. How many seeds do you plant for each hill of sorghum?
- | | |
|------------------|-----------------------|
| 0. No answer | 4. Three seeds |
| 1. Did not plant | 5. Four seeds or more |
| 2. One seed | 6. A handful |
| 3. Two seeds | |
94. What crops do you plant in association?
- | | |
|----------------------------------|---|
| 0. No Answer | 5. Beans, sorghum |
| 1. Does not plant in association | 6. Corn with sorghum/Corn with beans |
| 2. Corn, beans, sorghum | 7. Corn, horsebean, beans |
| 3. Corn, sorghum | 8. Corn with sorghum/sorghum with beans |
| 4. Corn, beans | 9. Other |
95. When you plant in association with corn, (first planting) do you plant all of the seeds in the same row or not?
0. No answer
 1. Only planted corn
 2. Does not plant in association with corn
 3. Plants all in the same row
 4. Plants the crops in different rows
 5. Plants both in the same and in different rows

96. Did you plant a second crop this year?
0. No answer
 1. No, did not plant a second crop?
 2. Yes, only corn
 3. Yes, only beans
 4. Yes, only sorghum
 5. Yes, corn, beans and sorghum
 6. Yes, corn and beans
 7. Yes, corn and sorghum
 8. Yes, sorghum and beans
97. Do you have problems with insects in your crops?
0. No answer
 1. Always has problems
 2. Only this year
 3. This year does not have problems
 4. Never has problems
98. Which insects cause you problems? How many?
- | | |
|----------------|------------------|
| 0. No answer | 5. Four |
| 1. None | 6. Five |
| 2. Only one | 7. Six |
| 3. Two insects | 8. Seven |
| 4. Three | 9. Eight or more |
99. Which insecticides did you use to control insects? How many?
- | | |
|-------------------------------|-----------------|
| 0. No answer | 4. Two |
| 1. Doesn't know what they are | 5. Three |
| 2. None | 6. Four |
| 3. Only one | 7. Five or more |
100. How many insecticides do you know?
- | | |
|-------------------------------|----------|
| 0. No answer | 4. Two |
| 1. Doesn't know what they are | 5. Three |
| 2. None | 6. Four |
| 3. One | 7. Five |
101. Do you think there is any danger to your crops using insecticides?
- | | |
|---|----------------------------|
| 0. No answer | 3. It's bad for the plants |
| 1. Doesn't know | 4. It's bad for the soil |
| 2. One must borrow money and may lose his harvest | 5. No danger |
102. If you fertilized your first crop at seeding, what type of fertilizer did you use?
- | | |
|---------------------------------|-------------------------|
| 0. No answer | 3. Nitrogen |
| 1. Did not fertilize at seeding | 4. Organic |
| 2. Doesn't know | 5. Nitrogen/phosphorous |
| | 6. Complete |

103. If you fertilized your first crop just before flowering what kind of fertilizer did you use?
- | | |
|---------------------------------------|-------------------------|
| 0. No answer | 3. Complete |
| 1. Did not fertilize before flowering | 4. Organic |
| 2. Doesn't know | 5. Nitrogen/phosphorous |
| | 6. Nitrogen |
104. Which chemical fertilizers do you know?
- | | |
|--------------|----------------|
| 0. No answer | 4. Three |
| 1. None | 5. Four |
| 2. One | 6. Five |
| 3. Two | 7. Six or more |
105. How did you apply the fertilizer on your plants?
- | | |
|----------------------|--------------|
| 0. No answer | 3. Broadcast |
| 1. Doesn't know | 4. In bands |
| 2. Did not fertilize | 5. By hill |
106. How much fertilizer do you think is good to use?
- | | |
|-----------------------|---------------------|
| 0. No answer | 4. 3-4 cwt/mz |
| 1. Doesn't know | 5. 5-6 cwt/mz |
| 2. Less than 1 cwt/mz | 6. 7 or more cwt/mz |
| 3. 1-2 cwt/mz | |
107. Do you think there is any danger in the use of fertilizers?
- | |
|-------------------------|
| 0. No answer |
| 1. Doesn't know |
| 2. It damages the crops |
| 3. It damages the soil |
| 4. No danger |
108. Have you heard anything new about fertilizer this year?
- | |
|----------------|
| 0. No answer |
| 1. Nothing new |
| 2. Yes |
109. Where did this idea come from?
- | | |
|--------------------------|---------------------------|
| 0. No answer | 5. Saw it somewhere else |
| 1. Nothing new | 6. Salesman |
| 2. Friends and neighbors | 7. Radio |
| 3. Agronomist | 8. Monitor from the radio |
| 4. More than one source | 9. Other |
110. Did you use organic fertilizer on your crops?
- | | |
|-----------------|-----------------------|
| 0. No answer | 3. Yes, crop residue |
| 1. Did not use | 4. Yes, leaves |
| 2. Yes, garbage | 5. Yes, animal manure |

111. How much fertilizer did you use last year on your first crop of corn planted alone?
- | | |
|-------------------------|-------------------------|
| 0. No answer | 5. 1.1-1.5 cwt/mz |
| 1. Did not plant | 6. 1.6-2.0 cwt/mz |
| 2. Did not fertilize | 7. 2.1-2.5 cwt/mz |
| 3. Less than 0.5 cwt/mz | 8. 2.6-3.0 cwt/mz |
| 4. 0.5 - 1.0 cwt/mz | 9. More than 3.0 cwt/mz |
112. How much fertilizer did you use last year on your first crop of corn planted in association?
- | | |
|-------------------------|-------------------------|
| 0. No answer | 5. 1.1-1.5 cwt/mz |
| 1. Did not plant | 6. 1.6-2.0 cwt/mz |
| 2. Did not fertilize | 7. 2.1-2.5 cwt/mz |
| 3. Less than 0.5 cwt/mz | 8. 2.6-3.0 cwt/mz |
| 4. 0.5-1.0 cwt/mz | 9. More than 3.0 cwt/mz |
113. How much fertilizer did you use last year on your first crop of sorghum planted alone?
- | | |
|-------------------------|-------------------------|
| 0. No answer | 5. 1.1-1.5 cwt/mz |
| 1. Did not plant | 6. 1.6-2.0 cwt/mz |
| 2. Did not fertilize | 7. 2.1-2.5 cwt/mz |
| 3. Less than 0.5 cwt/mz | 8. 2.6-3.0 cwt/mz |
| 4. 0.5-1.0 cwt/mz | 9. More than 3.0 cwt/mz |
114. How much chemical fertilizer did you use this year when seeding your first crop of corn planted alone?
- | | |
|---------------------------------|-------------------------|
| 0. No answer | 5. 1.1-1.5 cwt/mz |
| 1. Did not plant | 6. 1.6-2.0 cwt/mz |
| 2. Did not fertilize at seeding | 7. 2.1-2.5 cwt/mz |
| 3. Less than 0.5 cwt/mz | 8. 2.6-3.0 cwt/mz |
| 4. 0.5 - 1.0 cwt/mz | 9. More than 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 | 5. 1.1-1.5 cwt/mz |
| 1. Did not plant | 6. 1.6-2.0 cwt/mz |
| 2. Did not fertilize at seeding | 7. 2.1-2.5 cwt/mz |
| 3. Less than 0.5 cwt/mz | 8. 2.6-3.0 cwt/mz |
| 4. 0.5-1.0 cwt/mz | 9. More than 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 | 5. 1.1-1.5 cwt/mz |
| 1. Did not plant | 6. 1.6-2.0 cwt/mz |
| 2. Did not fertilize at seeding | 7. 2.1-2.5 cwt/mz |
| 3. Less than 0.5 cwt/mz | 8. 2.6-3.0 cwt/mz |
| 4. 0.5-1.0 cwt/mz | 9. More than 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 | 5. 1.0-1.5 cwt/mz |
| 1. Did not plant | 6. 1.6-2.0 cwt/mz |
| 2. Did not fertilize at seeding | 7. 2.1-2.5 cwt/mz |
| 3. Less than 0.5 cwt/mz | 8. 2.6-3.0 cwt/mz |
| 4. 0.5 - 1.0 cwt/mz | 9. More than 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 | 5. 1.1-1.5 cwt/mz |
| 1. Did not plant | 6. 1.6-2.0 cwt/mz |
| 2. Did not fertilize at seeding | 7. 2.1-2.5 cwt/mz |
| 3. Less than 0.5 cwt/mz | 8. 2.6-3.0 cwt/mz |
| 4. 0.5-1.0 cwt/mz | 9. More than 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 | 5. 1.1-1.5 cwt/mz |
| 1. Did not plant | 6. 1.6-2.0 cwt/mz |
| 2. Did not fertilize at seeding | 7. 2.1-2.5 cwt/mz |
| 3. Less than 0.5 cwt/mz | 8. 2.6-3.0 cwt/mz |
| 4. 0.5-1.0 cwt/mz | 9. More than 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 | 5. 1.1-1.5 cwt/mz |
| 1. Did not plant | 6. 1.6-2.0 cwt/mz |
| 2. Did not fertilize at seeding | 7. 2.1-2.5 cwt/mz |
| 3. Less than 0.5 cwt/mz | 8. 2.6-3.0 cwt/mz |
| 4. 0.5-1.0 cwt/mz | 9. More than 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 | 5. 1.1-1.5 cwt/mz |
| 1. Did not plant | 6. 1.6-2.0 cwt/mz |
| 2. Did not fertilize at seeding | 7. 2.1-2.5 cwt/mz |
| 3. Less than 0.5 cwt/mz | 8. 2.6-3.0 cwt/mz |
| 4. 0.5-1.0 cwt/mz | 9. More than 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 | 5. 1.1-1.5 cwt/mz |
| 1. Did not plant | 6. 1.6-2.0 cwt/mz |
| 2. Did not apply at flowering | 7. 2.1-2.5 cwt/mz |
| 3. Less than 0.5 cwt/mz | 8. 2.6-3.0 cwt/mz |
| 4. 0.5-1.0 cwt/mz | 9. More than 3 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 | 5. 1.1-1.5 cwt/mz |
| 1. Did not plant | 6. 1.6-2.0 cwt/mz |
| 2. Did not apply at flowering | 7. 2.1-2.5 cwt/mz |
| 3. Less than 0.5 cwt/mz | 8. 2.6-3.0 cwt/mz |
| 4. 0.5-1.0 cwt/mz | 9. More than 3 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 | 5. 1.1-1.5 cwt/mz |
| 1. Did not plant | 6. 1.6-2.0 cwt/mz |
| 2. Did not apply at flowering | 7. 2.1-2.5 cwt/mz |
| 3. Less than 0.5 cwt/mz | 8. 2.6-3.0 cwt/mz |
| 4. 0.5-1.0 cwt/mz | 9. More than 3 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 | 5. 1.1-1.5 cwt/mz |
| 1. Did not plant | 6. 1.6-2.0 cwt/mz |
| 2. Did not apply at flowering | 7. 2.1-2.5 cwt/mz |
| 3. Less than 0.5 cwt/m | 8. 2.6-3.0 cwt/mz |
| 4. 0.5-1.0 cwt/mz | 9. More than 3 cwt/mz |
126. How much chemical fertilizer did you apply this year at flowering on your first crop of beans associated with sorghum?
- | | |
|-------------------------------|-----------------------|
| 0. No answer | 5. 1.1-1.5 cwt/mz |
| 1. Did not plant | 6. 1.6-2.0 cwt/mz |
| 2. Did not apply at flowering | 7. 2.1-2.5 cwt/mz |
| 3. Less than 0.5 cwt/mz | 8. 2.6-3.0 cwt/mz |
| 4. 0.5-1.0 cwt/mz | 9. More than 3 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 | 5. 1.1-1.5 cwt/mz |
| 1. Did not plant | 6. 1.6-2.0 cwt/mz |
| 2. Did not apply at flowering | 7. 2.1-2.5 cwt/mz |
| 3. Less than 0.5 cwt/mz | 8. 2.6-3.0 cwt/mz |
| 4. 0.5-1.0 cwt/mz | 9. More than 3 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 | 5. 1.1-1.5 cwt/mz |
| 1. Did not plant | 6. 1.6-2.0 cwt/mz |
| 2. Did not apply at flowering | 7. 2.1-2.5 cwt/mz |
| 3. Less than 0.5 cwt/mz | 8. 2.6-3.0 cwt/mz |
| 4. 0.5-1.0 cwt/mz | 9. More than 3 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 | 5. 1.1-1.5 cwt/mz |
| 1. Did not plant | 6. 1.6-2.0 cwt/mz |
| 2. Did not apply at flowering | 7. 2.1-2.5 cwt/mz |
| 3. Less than 0.5 cwt/mz | 8. 2.6-3.0 cwt/mz |
| 4. 0.5-1.0 cwt/mz | 9. More than 3 cwt/mz |
130. Did you fertilize your second crop this year?
0. No answer
 1. Did not plant second crop
 2. Did not fertilize second crop
 3. Yes, same as first crop
 4. Yes, same way as first but more fertilizer
 5. Yes, same as first crop but less fertilizer
 6. Yes, differently than first crop but same amount of fertilizer.
 7. Yes, differently than first crop and more fertilizer
 8. Yes, differently than first crop and less fertilizer
 9. Did not fertilize first crop, only second crop
131. Did you hill your corn?
0. No answer
 1. Did not plant
 2. Doesn't know
 3. Did not hill
 4. Did hill
132. Are weeds a problem in your crops?
- | | |
|--------------------------------|-----------------------------|
| 0. No answer | 3. Sometimes has problems |
| 1. Does not have weed problems | 4. Rarely has problems |
| 2. Doesn't know | 5. Yes, always has problems |
133. Which (how many) weeds cause you problems?
- | | |
|--------------|----------------|
| 0. No answer | 4. Three |
| 1. None | 5. Four |
| 2. One | 6. Five |
| 3. Two | 7. Six or more |
134. Did you use an herbicide to control weeds?
0. No answer
 1. Doesn't know what they are
 2. Doesn't have weed problems
 3. Has weed problems but did not use
 4. Yes, used herbicides
135. How many herbicides do you know?
- | | |
|-------------------------------|-----------------|
| 0. No answer | 4. Two |
| 1. Doesn't know what they are | 5. Three |
| 2. None | 6. Four |
| 3. Only one | 7. Five or more |

136. Do you think there is any danger in using herbicide?
- | | |
|--------------------------|----------------------------|
| 0. No answer | 3. It's bad for the plants |
| 1. Doesn't know | 4. It's bad for the soil |
| 2. One must borrow money | 5. There is no danger |
137. Do you have problems with disease in your crops?
- | | |
|-----------------------|--------------------------------|
| 0. No answer | 3. This year has no problems |
| 1. Null | 4. Only this year has problems |
| 2. Never has problems | 5. Always has problems |
138. Which plant diseases do you know? (How many?)
- | | |
|--------------|----------|
| 0. No answer | 5. Four |
| 1. None | 6. Five |
| 2. Only one | 7. Six |
| 3. Two | 8. Seven |
| 4. Three | |
139. Did you use fungicides to control disease on your crops?
- | | |
|-------------------------------|---------------------------------|
| 0. No answer | 3. Does not have problems |
| 1. Doesn't know what they are | 4. Has problems but did not use |
| 2. Did not plant | 5. Yes, used fungicide |
140. Which fungicides do you know to control plant disease? (How many?)
- | | |
|-------------------------------|-------------|
| 0. No answer | 3. Only one |
| 1. Doesn't know what they are | 4. Two |
| 2. None | 5. Three |
141. Do you think there is any danger in using fungicide on your crops?
- | | |
|---|----------------------------|
| 0. No answer | 3. It's bad for the plants |
| 1. Doesn't know | 4. It's bad for the soil |
| 2. One must borrow money or lose the crop | 5. There is no danger |
142. Do you destroy the crop residues after the last crop of the year?
- | | |
|--|---------------------------------------|
| 0. No answer | 3. Burns the crop residues |
| 1. Does not clean field | 4. Buries the crop residues |
| 2. Cleans but does not destroy crop residues | 5. Uses crop residues to make compost |
143. When the rains erode hills and gullies on your land, what do you do?
- | | |
|---|--|
| 0. No answer | 5. Places branches or crop residue |
| 1. Rains do not erode hills and gullies | 6. Plants grasses |
| 2. Does nothing | 7. Cuts drainage ditches |
| 3. Doesn't know | 8. Uses stones to slow or divert water |
| 4. Places stakes | |
144. What do you do to prevent erosion of your soil on sloping land?
- | | |
|-------------------------------|--|
| 0. No answer | 3. Builds diversions or plants living barriers |
| 1. Does not have steep parcel | 4. Plants on contour |
| 2. Does nothing | 5. Plants on contour and builds barriers |

145. How much of your corn harvest did you sell (will you sell) this year?
- | | |
|--------------------|---------------------|
| 0. No Answer | 5. About one-fourth |
| 1. Did not plant | 6. About half |
| 2. Doesn't know | 7. More than half |
| 3. None | 8. All of it |
| 4. About one-tenth | |
146. How much of your bean harvest did you sell (will you sell) this year?
- | | |
|--------------------|---------------------|
| 0. No answer | 5. About one-fourth |
| 1. Did not plant | 6. About half |
| 2. Doesn't know | 7. More than half |
| 3. None | 8. All of it |
| 4. About one-tenth | |
147. How much of your sorghum harvest did you sell (will you sell) this year?
- | | |
|--------------------|---------------------|
| 0. No answer | 5. About one-fourth |
| 1. Did not plant | 6. About half |
| 2. Doesn't know | 7. More than half |
| 3. None | 8. All of it |
| 4. About one-tenth | |
148. If you sold your corn, to whom was it sold?
- | | |
|------------------|--------------------------------|
| 0. No answer | 4. In a store in the community |
| 1. Did not plant | 5. To truckers |
| 2. Did not sell | 6. To INDECA |
| 3. To a neighbor | 7. In town |
149. If you sold your beans, to whom did you sell?
- | | |
|------------------|--------------------------------|
| 0. No answer | 4. In a store in the community |
| 1. Did not plant | 5. To truckers |
| 2. Did not sell | 6. To INDECA |
| 3. To a neighbor | 7. In town |
150. If you sold your sorghum, to whom did you sell?
- | | |
|------------------|--------------------------------|
| 0. No answer | 4. In a store in the community |
| 1. Did not plant | 5. To truckers |
| 2. Did not sell | 6. To INDECA |
| 3. To a neighbor | 7. In town |
151. Where do you store your corn until it is sold or used by you or your family?
- | | |
|-------------------|-------------------------|
| 0. No answer | 5. In wooded boxes |
| 1. Did not plant | 6. In tin cans |
| 2. Does not store | 7. In metal drums |
| 3. In ears | 8. In household granary |
| 4. In sacks | |

152. Where do you store your beans until they are sold or used by you or your family?
- | | |
|-------------------|-------------------------|
| 0. No answer | 5. In wooden boxes |
| 1. Did not plant | 6. In tin cans |
| 2. Does not store | 7. In metal drums |
| 3. Null | 8. In household granary |
| 4. In sacks | |
153. Where do you store your sorghum until it is sold or used by you or your family?
- | | |
|-------------------|-------------------------|
| 0. No answer | 5. In wooden boxes |
| 1. Did not plant | 6. In tin cans |
| 2. Does not store | 7. In metal drums |
| 3. In ears | 8. In household granary |
| 4. In sacks | |
154. Where do you store your wheat until it is sold or used by you or your family?
- | | |
|-------------------|-------------------------|
| 0. No answer | 5. In wooden boxes |
| 1. Did not plant | 6. In tin cans |
| 2. Does not store | 7. In metal drums |
| 3. Null | 8. In household granary |
| 4. In sacks | |
155. Where do you store your potatoes until they are sold or used by you or your family?
- | | |
|-------------------|-------------------------|
| 0. No answer | 5. In wooden boxes |
| 1. Did not plant | 6. In tin cans |
| 2. Does not store | 7. In metal drums |
| 3. Null | 8. In household granary |
| 4. In sacks | |
156. Where do you store your horsebeans until they are sold or used by you or your family?
- | | |
|-------------------|-------------------------|
| 0. No answer | 5. In wooden boxes |
| 1. Did not plant | 6. In tin cans |
| 2. Does not store | 7. In metal drums |
| 3. Null | 8. In household granary |
| 4. In sacks | |
157. Where do you store your rice until it is sold or used by you or your family?
- | | |
|-------------------|-------------------------|
| 0. No answer | 5. In wooden boxes |
| 1. Did not plant | 6. In tin cans |
| 2. Does not store | 7. In metal drums |
| 3. Null | 8. In household granary |
| 4. In sacks | |
165. Did you buy corn this year before the harvest?

0. No answer
 1. Yes, for seed and for food
 2. Yes, for food
 3. Yes, for seed
 4. No, did not buy
166. Did you buy beans this year before the harvest?
 0. No answer
 1. Yes, for seed and for food
 2. Yes, for food
 3. Yes, for seed
 4. No, did not buy
167. Did you buy sorghum this year before the harvest?
 0. No answer
 1. Yes, for seed and for food
 2. Yes, for food
 3. Yes, for seed
 4. No, did not buy
168. How do you learn about current grain prices?
 0. No answer
 1. Does not inform himself
 2. In the town
 3. Through neighbors
 4. By radio
 5. By newspaper
 6. By neighbors and radio
 7. By neighbors, radio and in the town
 8. Through merchants and truckers
 9. From INDECA
169. Did you borrow money for your crops this year? Where?
 0. No answer
 1. Did not borrow
 2. From family
 3. From a friend
 4. From a usurer
 5. From BANDESA
 6. From a private bank
 7. From the cooperative
 8. Private entity (Penny Foundation, Care, Etc)
170. Is it difficult for you to obtain a loan?
 0. No answer
 1. Doesn't know
 2. Very difficult
 3. Somewhat difficult
 4. Not very difficult
 5. Easy
171. Do you think there is any danger in borrowing money for your crops?
 0. No answer
 1. Doesn't know
 2. Yes, great risk
 3. Yes, a little risk
 4. No, no risk
172. Have you changed your manner of planting in the last few years?
 0. No answer
 1. No
 2. Yes

173. Who advised you to make these changes?
- | | |
|--------------------------|--------------------------|
| 0. No answer | 5. Saw it somewhere else |
| 1. Did not make changes | 6. Salesman |
| 2. Friends and Neighbors | 7. Radio |
| 3. Agronomist | 8. Monitor from Radio |
| 4. More than one source | 9. Other |
174. Have any agricultural technicians visited your community recently?
- | | |
|-----------------|---------------------------|
| 0. No answer | 3. Yes, a few times |
| 1. Doesn't know | 4. Yes, a number of times |
| 2. No | 5. Yes, many times. |
175. Did you speak personally with him?
- | |
|-------------------------------|
| 0. No answer |
| 1. Did not visit |
| 2. No |
| 3. Only heard about a meeting |
| 4. Yes, a little |
176. Did they help you or your neighbors with your agricultural problems?
- | | |
|------------------|----------------------|
| 0. No answer | 3. No |
| 1. Did not visit | 4. Yes, a little |
| 2. Doesn't know | 5. Yes, a great deal |
177. With whom did these technicians work?
- | | |
|---|----------------------------------|
| 0. No answer | 5. BANDESA |
| 1. Did not visit | 6. Agricultural promoter, MINAG |
| 2. Doesn't know | 7. Agriculture extension service |
| 3. Private institution/
Penny Foundation | 8. Cooperative |
| 4. Private bank | 9. BVE |
178. Do you consider it important than an agronomist visit your community? From which institutions?
- | | |
|-------------------------|---------------------------------|
| 0. No answer | 5. BANDESA |
| 1. No | 6. Agricultural Promoter, MINAG |
| 2. Doesn't know | 7. Extension agency, MINAG |
| 3. Yes, (not specified) | 8. BVE |
| 4. Private bank | 9. Penny Foundation |
179. At what time of the year should the technician visit?
- | | |
|------------------------|---|
| 0. No answer | 5. In the growing season |
| 1. Doesn't know | 6. During the harvest |
| 2. Never | 7. After the harvest |
| 3. Before planting | 8. Periodically during the entire cropping season |
| 4. During the planting | |

180. When you wish to discuss an agricultural problem or other important thing in your community, for whom do you look?
0. No answer
 1. No one
 2. Categorical title
 3. Specific name
181. How many parcels do you have?
0. No answer
 1. One
 2. Two
 3. Three
 4. Four
 5. Five or more
182. How many cuerdas or manzanas that you own do you have to plant this year?
0. No answer
 1. Has none
 2. Less than 1 mz
 3. 1-2.9 mz
 4. 3-4.9 mz
 5. 5-6.9 mz
 6. 7-8.9 mz
 7. 9-10.9 mz
 8. 11-12.9 mz
 9. 13 or more mz
183. How many cuerdas or manzanas do you have to plant this year that are rented?
0. No answer
 1. Has none
 2. Less than 1 mz
 3. 1-2.9 mz
 4. 3-4.9 mz
 5. 5-6.9 mz
 6. 7-8.9 mz
 7. 9-10.9 mz
 8. 11-12.9 mz
 9. 13 or more mz
184. How many cuerdas or manzanas do you have to plant this year that are communal?
0. No answer
 1. Has none
 2. Less than 1 mz
 3. 1-2.9 mz
 4. 3-4.9 mz
 5. 5-6.9 mz
 6. 7-8.9 mz
 7. 9-10.9 mz
 8. 11-12.9 mz
 9. 13 or more mz
185. How many cuerdas or manzanas do you have to plant this year that you sharecrop?
0. No answer
 1. Has none
 2. Less than 1 mz
 3. 1-2.9 mz
 4. 3-4.9 mz
 5. 5-6.9 mz
 6. 7-8.9 mz
 7. 9-10.9 mz
 8. 11-12.9 mz
 9. 13 or more mz
186. How many cuerdas or manzanas do you have to plant this year that you have through other arrangements?
0. No answer
 1. Has none
 2. Less than 1 mz
 3. 1-2.9 mz
 4. 3-4.9 mz
 5. 5-6.9 mz
 6. 7-8.9 mz
 7. 9-10.9 mz
 8. 11-12.9 mz
 9. 13 or more mz

187. How do you compare your land with that of your neighbors?
 0. No answer
 1. Doesn't know
 2. Worse
 3. The same
 4. Better
188. Do you have any parcels that don't produce as well as the others you work? Why?
 0. No answer
 1. Doesn't know
 2. All produce about the same
 3. Too wet
 4. Very broken
 5. Many stones
 6. Land is tired, needs fertilizer
189. What do you think you can do to improve these parcels?
 0. No answer
 1. Nothing
 2. Plant other crops
 3. Use fertilizer
 4. Drain them
 5. Irrigate them
 6. Plant the edges
 7. Plant in other periods
 8. Use a tractor
190. Do you have any horses?
 0. No answer
 1. No
 2. Yes, one
 3. Yes, two
 4. Yes, three
 5. Yes, four or more
191. Do you have any mules?
 0. No answer
 1. No
 2. Yes, one
 3. Yes, two
 4. Yes, three
 5. Yes, four or more
192. Do you have any cows?
 0. No answer
 1. No
 2. Yes, one
 3. Yes, two
 4. Yes, three
 5. Yes, four or more
193. Do you have any goats?
 0. No answer
 1. No
 2. Yes, one
 3. Yes, two
 4. Yes, three
 5. Yes, four or more
194. Do you have any oxen?
 0. No answer
 1. No
 2. Yes, one
 3. Yes, two
 4. Yes, three
 5. Yes, four or more
195. How much of your time do you spend on other jobs?
 0. No answer
 1. Has no other jobs
 2. Spends some weeks on the coast
 3. One day a week
 4. Half time daily
 5. Most of my time
 6. It's variable

196. Aside from working your crops, what other work do you do?
- | | |
|-------------------|-----------------------|
| 0. No answer | 4. Driver |
| 1. A farmer only | 5. Salesman, merchant |
| 2. Other jobs | 6. Teacher |
| 3. Skilled worker | |
197. How much is the daily wage here without food?
- | | |
|-----------------|--------------------|
| 0. No answer | 5. 80-89¢ a day |
| 1. 40-49¢ a day | 6. 90-99¢ a day |
| 2. 50-59¢ a day | 7. 100-109¢ a day |
| 3. 60-69¢ a day | 8. 110-119¢ a day |
| 4. 70-79¢ a day | 9. 120 -more a day |
198. How much do you think a good worker should earn per day without food?
- | | |
|-----------------|-------------------|
| 0. No answer | 5. 80-89¢ a day |
| 1. 40-49¢ a day | 6. 90-99¢ a day |
| 2. 50-59¢ a day | 7. 100-109¢ a day |
| 3. 60-69¢ a day | 8. 110-119¢ a day |
| 4. 70-79¢ a day | 9. 120-more a day |
199. Do you think it is important to have money?
0. No answer
 1. I don't believe so
 2. Possibly yes
 3. Yes, it's important
200. Which is more important to you, friends or money?
0. No answer.
 1. Friends
 2. Doesn't know
 3. Both
 4. Money
201. Is it possible that a young man can advance himself as a farmer?
0. No answer
 1. No, he can not
 2. Doesn't know
 3. Yes, he can
202. Where do you obtain good advice for your agricultural work? From the Radio?
0. No answer
 1. Doesn't know
 2. No
 3. Yes
203. Where do you obtain good advice for your agricultural work? From newspaper or magazine?
0. No answer
 1. Doesn't know
 2. No
 3. Yes

204. Where do you obtain good advice for your agricultural work?
From another source?
0. No answer
1. Doesn't know
2. No
3. Yes
205. Where do you obtain good advice for your agricultural work?
From an agronomist?
0. No answer
1. Doesn't know
2. No
3. Yes
206. Where do you obtain good advice for your agricultural work?
From a store?
0. No answer
1. Doesn't know
2. No
3. Yes
207. Where do you obtain good advice for your agricultural work?
From friends and neighbors?
0. No answer
1. Doesn't know
2. No
3. Yes
208. How do you obtain information from the newspaper?
0. No answer
1. Does not obtain information from newspaper
2. From a friend
3. From family
4. Reads it himself
209. Are you accustomed to sending and receiving letters? How often?
0. No answer
1. Never
2. A few times a year
3. Each month
4. Each week
210. Are you accustomed to listening to the radio? Whose is it?
0. No answer
1. Does not listen
2. In the store
3. A friend
4. A family member
5. His own
211. How many hours a day do you listen to radio?

- | | | | |
|----|--------------------|----|--------------|
| 0. | No answer | 4. | Now and then |
| 1. | Does not listen | 5. | Two hours |
| 2. | Less than one hour | 6. | 3 - 4 hours |
| 3. | One hour | 7. | All day |
212. At what time do you listen to radio? Early in the morning?
0. No answer
 1. Doesn't listen
 2. Sometimes
 3. Always
213. At what time do you listen to radio? Mid-Day?
0. No answer
 1. Doesn't listen
 2. Sometimes
 3. Always
214. At what time do you listen to radio? Afternoon?
0. No answer
 1. Doesn't listen
 2. Sometimes
 3. Always
215. At what time do you listen to radio? At night?
0. No answer
 1. Doesn't listen
 2. Sometimes
 3. Always
216. Are there members of your family who listen to the radio early in the morning and tell you what they heard?
0. No answer
 1. Doesn't know
 2. They don't listen
 3. Sometimes listen
 4. Always listen
217. Are there members of your family who listen to the radio at mid-day and tell you what they heard?
0. No answer
 1. Doesn't know
 2. They don't listen
 3. Sometimes listen
 4. Always listen
218. Are there members of your family who listen to the radio in the afternoon and tell you what they heard?
0. No answer
 1. Doesn't know
 2. They don't listen
 3. Sometimes listen
 4. Always listen

219. Are there members of your family who listen to the radio at night and tell you what they heard?
0. No answer
 1. Doesn't know
 2. They don't listen
 3. Sometimes listen
 4. Always listen
220. What kind of program do you like the best?
- | | |
|-------------------|-------------------------|
| 0. No answer | 4. News |
| 1. Doesn't listen | 5. Educational programs |
| 2. Music | 6. Other |
| 3. Soap operas | |
221. Do you belong to any organized group?
0. No answer
 1. No
 2. Before I did, but not now
 3. Yes, only one
 4. Yes, more than one
222. Do you think it important to meet with your family, friends and neighbors to discuss agricultural affairs or other community problems?
0. No answer
 1. Little importance
 2. Somewhat important
 3. Very important
223. How often do you visit closest municipality (to visit or buy)?
- | | |
|--------------|-----------------------|
| 0. No answer | 3. A few times a year |
| 1. Never | 4. Once a month |
| 2. Seldom | 5. Weekly |
224. How often do you visit closest department capital (to visit or buy)?
- | | |
|--------------|-----------------------|
| 0. No answer | 3. A few times a year |
| 1. Never | 4. Once a month |
| 2. Seldom | 5. Weekly |
225. How often do you visit Guatemala City?
- | | |
|--------------|-----------------------|
| 0. No answer | 3. A few times a year |
| 1. Never | 4. Once a month |
| 2. Seldom | 5. Weekly |
226. When are you accustomed to go to the coast and work?
- | | |
|-----------------------------|------------------------|
| 0. No answer | 5. Four months a year |
| 1. Does not go to the coast | 6. Five months a year |
| 2. Just one month a year | 7. Six months a year |
| 3. Two months a year | 8. Seven months a year |
| 4. Three months a year | |

234. Besides tortillas, beans and coffee, how often do you eat cheese?
0. No answer
 1. Does not eat it
 2. Sometimes
 3. Weekly
 4. Daily
235. Besides tortillas, beans and coffee, how often do you eat milk?
0. No answer
 1. Does not eat it
 2. Sometimes
 3. Weekly
 4. Daily
236. Besides tortillas, beans and coffee, how often do you eat incaparina?
0. No answer
 1. Does not eat it
 2. Sometimes
 3. Weekly
 4. Daily
237. Do you own your house?
0. No answer
 1. Comes with the land
 2. Rented
 3. Loaned
 4. Owned
245. What kind of roof does your house have?
0. No answer
 1. Thatch
 2. Tile
 3. Tile and corrugated metal
 4. Corrugated metal
246. What kinds of walls does your house have?
0. No answer
 1. Mud fill
 2. Adobe bricks
 3. Wood
 4. Brick
247. What kinds of floors does your house have?
0. No answer
 1. Earth
 2. Cement slab
 3. Cement tile
 4. Clay tile

248. What fuel do you use to cook with?
0. No answer
 1. Wood
 2. Charcoal
 3. Kerosene
 4. Propane
249. What do you use for lighting?
0. No answer
 1. Wood(torch pine)
 2. Candles
 3. Kerosene
 4. Propane
 5. Electricity
250. Where do you get your water?
0. No answer
 1. River or stream
 2. Neighbors well
 3. Community well
 4. Own well
 5. Public Fountain(faucet)
 6. Own faucet
251. What kind of toilet do you have?
0. No answer
 1. None - in the field
 2. Latrine
 3. Flush toilet
- 252-
253. How old are you (actual age)?
0. No answer
 1. Less than 20 years
 2. 20-29 years
 3. 30-39 years
 4. 40-49 years
 5. 50-59 years
 6. 60-69 years
 7. 70-79 years
 8. 80-89 years
 9. 90-99 years
254. How many children do you have?
0. No answer
 1. None
 2. One
 3. Two
 4. Three
 5. Four
 6. Five
 7. Six
 8. Seven
 9. Eight or more
255. Do you know how to read and write?
0. No answer
 1. No
 2. A little bit
 3. Yes
256. Did you attend school? Until which grade?
0. No answer
 1. Did not go
 2. None(did not pass first)
 3. First
 4. Second
 5. Third
 6. Fourth
 7. Fifth
 8. Sixth
 9. More than sixth

257. Do you believe that the principal reason for going to school is to earn more money?
0. No answer
 1. I don't believe so
 2. Don't know
 3. Yes
258. Until what grade do you think your children should attend school?
- | | |
|-------------------------------|----------------|
| 0. No answer | 5. Third |
| 1. Nothing(should not attend) | 6. Fourth |
| 2. None | 7. Fifth |
| 3. First | 8. Sixth |
| 4. Second | 9. Above sixth |
259. Did you plant a parcel this year that you did not plant in previous years?
0. No answer
 1. Did not plant new parcel
 2. Null
 3. Yes, planted new parcel
260. What did you use this parcel for before?
0. No answer
 1. Did not plant new parcel
 2. Does not know what it was used for
 3. It was planted by another farmer until this year
 4. It was planted in previous years but it was left to rest until this year
 5. Was never planted - it was a pasture
 6. Was never planted - it was forest or mountainous land
261. How many people in your home know how to read and write?
- | | |
|--------------|------------------|
| 0. No answer | 5. Four |
| 1. None | 6. Five |
| 2. One | 7. Six |
| 3. Two | 8. Seven |
| 4. Three | 9. Eight or more |

APPENDIX B

Scoring Procedure for the Agricultural Practices

Included in the Practice Level Index

APPENDIX B

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

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
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

APPENDIX C**List of Items Comprising the Practice Level Index**

APPENDIX C

LIST OF ITEMS COMPRISING PRACTICE LEVEL INDEX *

<u>Item #</u>	<u>Variable #(s)</u>	
1	15	How do 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 do you plant in association?
4	99	Which insecticides did you use to control insects? How many?
5	102	If you fertilized your first crop at seeding, what <u>type</u> of fertilizer did you use?
6	114-121	<u>Amount</u> of chemical fertilizer used at seeding? (Sum and average non-zero values)
7	103	If you fertilized your first crop at flowering, what <u>type</u> of fertilizer did you use?
8	122-129	<u>Amount</u> of chemical fertilizer used at flowering? (Sum and average non-zero values)
9	134	Did you use herbicide to control weeds?
10	139	Did you use fungicides to control disease on your crops?
11	142	Do you destroy crop residues after the last crop of the year?
12	151,152,153	Where do you store (corn/beans/sorghum) until it is used by you and your family? (Sum and average non-zero values)

* See Ray, Rich, Nesman et al., (1977).

<u>Item #</u>	<u>Variable #(s)</u>	
13	169	Did you borrow money for your crops? Where?

APPENDIX D

Practice Index Consistency

Table 22. Practice level index correlation^a matrix for the Oriente.

Item															
1															
2	-.01														
	(820) ^b														
3	.06	.03													
	(803)	(803)													
4	.18***	.01	-.01												
	(820)	(820)	(803)												
5	.19***	.01	.08*	.22***											
	(819)	(819)	(802)	(819)											
6	.20***	.01	.06	.20***	.83***										
	(819)	(819)	(802)	(819)	(818)										
7	.21***	.01	.14***	.22***	.36***	.41***									
	(819)	(819)	(802)	(819)	(819)	(818)									
8	.28***	.03	.09**	.26***	.29***	.37***	-.78***								
	(819)	(819)	(802)	(819)	(818)	(818)	(818)								
9	-.02	.05	.11***	.01	.01	-.00	.04	.03							
	(820)	(820)	(803)	(820)	(819)	(819)	(819)	(819)							
10	.07*	.02	.02	.12***	.13***	.11***	.13***	.17***	.35***						
	(814)	(814)	(797)	(814)	(813)	(813)	(813)	(813)	(814)						
11	.05	-.13***	-.00	.03	.04	.04	.02	-.01	.02	.13***					
	(819)	(819)	(802)	(819)	(818)	(818)	(818)	(818)	(819)	(813)					
12	.03	.15***	.02	.04	.07*	.07*	.06*	.11***	.10***	.09**	-.04				
	(820)	(820)	(803)	(820)	(819)	(819)	(819)	(819)	(820)	(814)	(819)				
13	.20	.01	.16	.07	.15	.26*	.33**	.33***	.11	.15	.01	.02			
	(64)	(64)	(63)	(64)	(64)	(63)	(64)	(64)	(64)	(64)	(64)	(64)			
Prac.	.34***	.11***	.34***	.45***	.60***	.60***	.62***	.60***	.29***	.37***	.24***	.26***	.52***		
	(820)	(820)	(803)	(820)	(819)	(819)	(819)	(819)	(820)	(814)	(819)	(820)	(64)		
74	Item	Item	Item	Item	Item	Item	Item	Item	Item	Item	Item	Item	Item	Prac.	
	1	2	3	4	5	6	7	8	9	10	11	12	13	74	

^aCorrelations based on Pearson product-moment correlation coefficients.

^bNumbers of cases based on pair-wise deletion of missing data.

* p is less than .05 based on one-tailed probability

** p is less than .01 based on one-tailed probability

*** p is less than .001 based on one-tailed probability

Table 23. Practice level index correlation^a matrix for the Occidente.

Item														
1														
2	-.20***													
	(543)													
3	-.07*	-.03												
	(543)	(543)												
4	.12**	-.02	-.10*											
	(543)	(543)	(543)											
5	.07	.06	.05	.14***										
	(543)	(543)	(543)	(543)										
6	-.00	.03	-.01	.22***	.27***									
	(543)	(543)	(543)	(543)	(543)									
7	.02	-.03	-.09*	.14***	.12**	.05								
	(543)	(543)	(543)	(543)	(543)	(543)								
8	-.00	.07	.12**	-.02	.03	-.06	.25***							
	(543)	(543)	(543)	(543)	(543)	(543)	(543)							
9	-.00	-.01	-.10*	.04	-.04	.06	.06	-.01						
	(543)	(543)	(543)	(543)	(543)	(543)	(543)	(543)						
10	-.05	.04	-.06	.02	-.07*	.01	.08*	.06	.40***					
	(543)	(543)	(543)	(543)	(543)	(543)	(543)	(543)	(543)					
11	-.08*	-.02	-.03	.06	-.05	-.04	.06	-.12**	.03	.04				
	(543)	(543)	(543)	(543)	(543)	(543)	(543)	(543)	(543)	(543)				
12	-.01	-.02	-.00	-.07	-.11**	-.02	.01	.07	.02	.07	.02			
	(543)	(543)	(543)	(543)	(543)	(543)	(543)	(543)	(543)	(543)	(543)			
13	-.00	-.08	-.09	.13**	.04	.15***	.12**	.06	.09*	.02	-.05	.01		
	(543)	(543)	(543)	(543)	(543)	(543)	(543)	(543)	(543)	(543)	(543)	(543)		
Prac.	.04	.04	.29***	.41***	.40***	.34***	.45***	.49***	.36***	.40***	.13**	.09*	.34***	
	(543)	(543)	(543)	(543)	(543)	(543)	(543)	(543)	(543)	(543)	(543)	(543)	(543)	
75	Item	Item	Item	Item	Item	Item	Item	Item	Item	Item	Item	Item	Item	Prac.
	1	2	3	4	5	6	7	8	9	10	11	12	13	74

^aCorrelations based on Pearson product-moment correlation coefficients.

^bNumbers of cases based on pair-wise deletion of missing data.

* p is less than .05 based on one-tailed probability

** p is less than .01 based on one-tailed probability

***p is less than .001 based on one-tailed probability

APPENDIX E**Materials Used in the Field Validation Study**

1. El pato tiene patas.

El pato tiene

saco patas pozo

2. El saco de Juan es de lana.

Juan tiene un saco de

madera lazo lana

3. Juan tiene un coco en su mano.

En su mano, Juan tiene un

pato coco casa

1. El adobe de las paredes es de barro.

El adobe se hace de

madera barro teja

2. La casa tiene puertas de madera.

En la casa son de madera

los libros las puertas las paredes

3. Para lavar la ropa, Elena usa agua de pozo.

El agua que usa Elena para lavar es de

pozo vaso lago

4. Las manos se lavan bien con agua y jabón.

Hay que lavarse las manos con agua y

sal jabón cebolla

5. Guatemala es una ciudad linda y hermosa.

Guatemala es una linda

rosa mujer ciudad

6. La vida del campo es más tranquila que en la ciudad.

Más tranquila que en la ciudad es la vida en

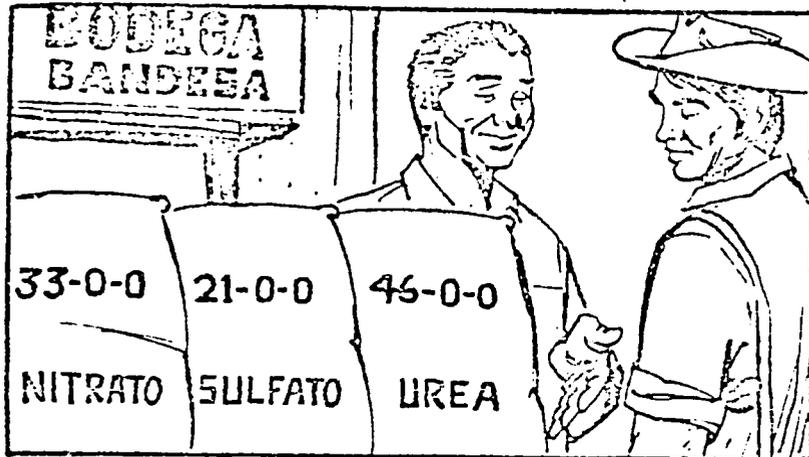
el pueblo el campo la capital

7. Debe tenerse cuidado con las moscas. Recogen con sus patas, microbios de enfermedades graves, como la tifoidea. Se paran en nuestras comidas y dejan allí los microbios que nos enferman.

Las moscas conducen microbios de la

viruela gripe tifoidea

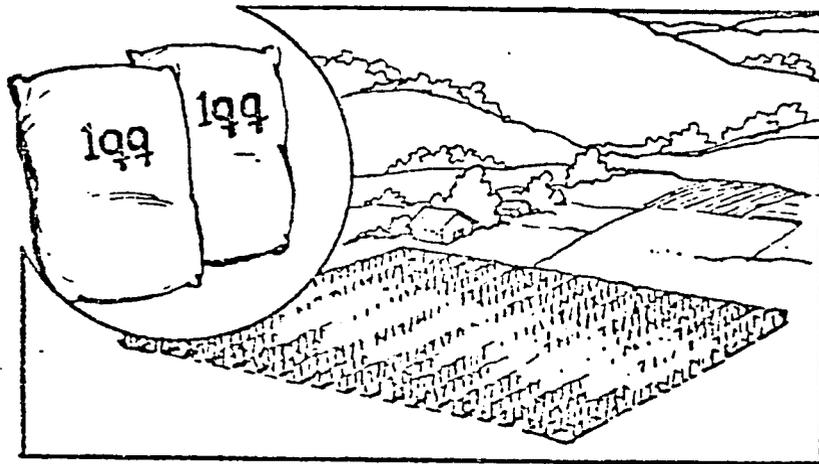
Figure 6a. Literacy Test.



EN LA SEGUNDA FERTILIZACIÓN
USAR ABONOS NITROGENADOS.



APLICAR UNA PUÑADA POR
CADA TRES MATAS.



PARA UNA MANZANA SE NECESITAN
DOS QUINTALES.



MANUEL ABONA CON UREA.

Figure 6b. Example of type of BVE poster material used in literacy testing.

- 1. ID#
- 2. NOMBRE
- 3. ALDEA
- 4. EDAD

Lea material agrícola al jefe de la familia
 Lea otro material al jefe de la familia
 Discuta información de EBR con jefe de la familia

Miembro de la familia	Escolaridad (años de escuela cumplido)	Sabe leer			Edad	Sexo	Lea material agrícola al jefe de la familia	Lea otro material al jefe de la familia	Discuta información de EBR con jefe de la familia
		No	Algo	Si					
Entrevistado									
Esposa									
Hijos: 1									
2									
3									
4									
5									
6									
7									
8									
9									
10									
Otros Personas que viven en la casa:									
Hermana									
Hermano									
Padre									
Madre									
Otro: _____									

5. Puede leer los materiales de EBR	No	Algo	Si
1.	—	—	—
2.	—	—	—
3.	—	—	—

Figure 6c. Field questionnaire used in conjunction with literacy testing.

APPENDIX F**Relationship of School Attendance to Literacy**

Table 24. Crosstabulation of literacy by school attendance.

<u>Literacy</u>	<u>School Attendance^a</u>		<u>Total</u>
	<u>Oriente</u>		
	<u>Did not attend</u>	<u>Did attend</u>	
Non-literate	84.7%	10.4%	62.0%
Literate	15.3%	89.6%	38.0%
Total	100.0% (569)	100.0% (251)	100.0% (820)

$\chi^2 = 405.32; df = 1; p < .00001; c = .58$

<u>Literacy</u>	<u>Occidente</u>		<u>Total</u>
	<u>Did not attend</u>	<u>Did attend</u>	
	Non-literate	91.9%	
Literate	8.1%	96.2%	22.2%
Total	100.0% (378)	100.0% (108)	100.0% (486)

$\chi^2 = 288.75; df = 1, p < .00001, c = .61$

^a See question 256 - Appendix A.

APPENDIX G

Profiles of Literate Farmers, Families and Villages

PART I

Profile of a Literate Farmer

Individual literacy has long been assumed to be "block-booked" with a number of variables such as "economic well-being," "general life style characteristics," "attitudes toward modernity and risk taking," and other background variables. Identification of such variables is important to the current study for two reasons. First, variables which are related to both literacy and adoption and which are antecedent to both literacy and adoption may account for an apparent though spurious, relationship between two major variables. Second, a clear profile of the literate peasant farmer and his unique characteristics in relation to his illiterate colleagues will aid in interpreting the findings of our main analysis.

The purpose of the current section is, therefore, to develop profiles of the literate farmers in both the Oriente and the Occidente regions of Guatemala. Findings are based on the results of two discriminant analyses* (one for each cultural group) which identify the sets of background characteristics which maximally distinguish between the literate and illiterate farmers in the two regions.

Data for the analyses were drawn from the baseline survey in each region (1974 in Oriente, 1975 in Occidente). Variables included in the analyses fall into three major categories: 1) general lifestyle characteristics. 2) modern attitude variables and 3) other background characteristics. All non-continuous variables (i.e. those for which responses fall into discrete categories such as "thatch," "tile," and "metal" for roof type) were dichotomized either into categories falling above and below the median response for the entire sample or,

*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 this report 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 items ability to discriminate between categories - not corrected for the items correlation with other variables in the function); d) the multivariate partial F for each item (corrected for the items 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),

where appropriate, into conceptually meaningful groups (in "sees risk" and "doesn't see risk"). The means reported for such dichotomized variables can, therefore, be interpreted as percentages of respondents falling into the designated dichotomous category.

The following is a summary of the results in the Oriente region (see Table 25):

A. General life-style characteristics

1. Economic Indicator Variables

a. Land size: Literate farmers in Oriente do not hold appreciably more land than do their illiterate counterparts. Both groups of farmers have slightly over 3 manzanas of land available to them for planting. However, they do vary on the number of parcels into which their land is divided. Illiterates farm a mean of 2.24 parcels as compared to 2.48 parcels of the literates.

b. Land tenure arrangements: Similarly, literate and illiterate farmers in the Oriente do not differ significantly with respect to land ownership. Over 50% of the farmers in both groups own most of the land they farm, while around 30% rent most of their land.

c. Animal ownership: Literate farmers do, however, tend to own slightly more farm animals than do their illiterate neighbors. The difference between the two groups, while statistically significant, is quite small (literate farmers own an average of 2.10 animals while illiterate farmers own 1.67).

d. Total revenue from corn and bean crops: The total cash value of the major crops harvested by literate and illiterate farmers also fail to be significantly different for the two groups. Illiterate farmers yield crops with an average cash value of \$369.48/year and literate farmers produce crops worth \$401.06. While the difference between average crop value seems to indicate that illiterate farmers earn less, within group variability in the illiterate category is extreme ($SD=372.11$), and indicates that there is little consistency among illiterate farmers in terms of crop earnings, and thus that literates do not have a categorical advantage over their illiterate neighbors.

Crop production for the two Ladino groups also fails to be significantly different. Illiterates produce a mean of 20.2 quintales of corn (2.99 of beans) compared to 22.90 for literates (8.57 of beans).

e. Crop sales: While the two groups in the Oriente area are similar in the area of crop production, they do differ significantly in crop sales. A much more significant percentage of literate farmers (26%) sell part of their corn crop as compared with their illiterate neighbors (16%). Similarly, 76% of literates sell part of their bean crop as compared with their counterparts' 66%.

2. Economic Indicator Variables: Level of Living

a. Housetype: While there is virtually no difference between literate and illiterate farmers in terms of house ownership (over 95% in both groups own their own house), literate farmers tend to have higher quality housing. Seventy-six percent of the literate farmers, as opposed to 61% of illiterate farmers, have roofs made of tile or metal, and 74% of literates as opposed to 58% of illiterates, have houses with adobe, wood or brick walls.

b. Lighting, water and toilet facilities: Similarly, literate farmers are more likely to use kerosene, propane or electricity for cooking and lighting (95% for literates vs. 88% for illiterates), are much more likely to have toilet facilities (only 4% of illiterates vs. 11% of literates). The groups do not differ significantly with respect to source of water, however.

c. Radio ownership and listenership: Radio ownership is significantly more common among literate farmers. Sixty-four percent of the literate group own a radio while only half of the illiterate farmers are radio owners. Over 86% of both groups report listening to the radio regularly, however, and there is no significant difference between the groups.

d. Diet: The diet patterns of the two groups are clearly different. Literate farmers have appreciably more varied diets than do their illiterate counterparts. An inspection of the Univariate F ratios shows clearly that literate farmers are more likely to include bread, lard, rice, vegetables, meat, cheese and milk in their weekly diets than are illiterate farmers. In fact, on only two diet items do significant differences fail to emerge: use of plantains and incaparina.* Very little use of these two items is reported by either group.

B. Modern Attitude Variables

1. Risk Perception: Literates and illiterates in the Oriente do not differ significantly with respect to perception of risk in use of new agricultural practices. Most farmers in both groups see no risk in the use of new seed, insecticide, or fertilizer, while just over 50% of the farmers in both groups see no risk in the use of herbicides, and fungicides. Literates are, however, significantly less likely to perceive of the use of credit as risky.

2. Attitude toward money: Both literates and illiterates feel that money is important with slightly more emphasis placed on money by the literate farmer. The literate farmer is considerably more likely than the illiterate farmer to value money over friends (25% of literate vs 18% of illiterates feel that money is more important than friends) and to see monetary gain as the main motive for education (86% for literates vs 77% of illiterates report money as their main educational motive). These findings combined with the perception of risk in credit use reported above, indicate that the literate farmer is considerably more money oriented than is his illiterate neighbor.

*Incaparina is a vegetable based protein supplement that was developed by the Nutritional Institute of Central America and Panama (INCAP) and is now commercially marketed throughout Guatemala.

3. Educational aspirations: Literate farmers desire significantly more education for their children than do illiterate farmers. Literate farmers aspire to an average of 4.44 years of education for their children, while illiterate farmers report an average of 5.43 years as desirable.

C. Other Background Variables

1. Age: There is a slightly significant difference between the two groups with an average age of 43.2 for the illiterates and 40.4 for the literate farmer.

2. Mobility: The literate farmer reports more visits to Guatemala City than the illiterate farmer; however there is no significant difference between the two groups in frequency of visits to the nearest municipality and the department capital.

3. Other work: There is no difference between the two groups in terms of work as a teacher, merchant, driver, etc. Only 1% of both groups are employed in these areas. Neither is there a difference in where they work, as roughly a third of both groups work away from the farm.

4. Group membership: About 12% of the illiterate farmers belong to an organized group. A significantly larger percentage of the literates (23%) belong to an organized group.

5. Attitudes toward seeking agricultural advice: While there is no significant difference between the two groups in their response to a general question about agriculture and information, there is a significant difference between the groups when asked if they feel meeting with friends and neighbors about agricultural matters is important. More literates (86%) feel that this is important than do illiterates (78%).

6. Perception of relative well being: Few respondents of either group feel that their land is worse than their neighbors (10% of illiterates, 7% of literates). Further, few of either group feel that their family has more health problems than others (13% of illiterates, 11% of literates). In neither case are the differences significant.

7. Family size: There is no significant difference in family size for the two groups.

8. Correspondence: Understandably, significantly more literate farmers (67%) in the Oriente receive letters than their illiterate counterparts. (A surprising number (47%) of illiterates receive them also).

The following section summarizes the results for the Occidente region (see Table 26):

A. General life-style characteristics

1. Economic indicator variables

a. Land size: There is little difference in the amount of land available

to literate and illiterate farmers in Occidente. Both groups have slightly more than 1.5 manzanas available for use. Land availability does differ considerably between regions, however, as the Occidente farmer has half the available land of his counterpart in Oriente. Although the amount of land available to the two groups is virtually the same, its relative concentration varies significantly. The literate farmer's land is divided into 1.60 parcels while the illiterate's land consists of 1.40 parcels.

b. Land tenure arrangements: Although the Occidente farmer has less land available, virtually all of it is owned. For both illiterates and literates, owned land makes up 99% of the total available. This compares to 54% and 59% respectively for illiterates and literates in Oriente.

c. Animal ownership: In further contrast to those farmers in Oriente, Occidente farmers do not differ significantly in the number of animals they own.

d. Total potential revenue from corn and bean crops: There is no significant difference in the total potential cash value of corn and beans for literate and illiterate farmers in Occidente. The total value of these crops does differ from that of the Oriente farmers with those in Occidente receiving less than half as much. Further, an examination of the standard deviations for both regions reveals that there is considerably less variation of potential income in the Occidente groups. Mean production of corn and beans is not significantly different for the two Indian groups. Illiterates produce a mean of 17.81 and 1.71 quintales of corn and beans respectively. Similarly, a mean of 17.28 (corn) and 1.95 (beans) quintales are produced by Occidente literates.

e. Crop sales: As is the case with crop production, the percentage of those selling part of their crops does not vary significantly for the two groups. A mean of 2% of illiterates sell part of their corn crop, (5% for literates) while 5% sell part of the bean crop (8% for literates).

2. Economic indicator variables: level of living

a. House type: As is the case in Oriente, the vast majority of both groups in Occidente own their own houses. Ninety-nine percent of both literate and illiterate farmers in this area are homeowners. The two groups in Occidente do differ from those in Oriente in that illiterates tend to have superior housing. Illiterates have significantly fewer thatch roofs (84% non-thatched roofs as opposed to 73% for literates), and are slightly more likely to have houses with walls of adobe, wood or brick.

Further, the mean percentages for non-thatched roofs and non-mudfilled walls for literates and illiterates reveals that Occidente farmers generally, are more likely to have better housing than those in Oriente. For example, 90% of the houses of Occidente illiterates have better than mudfilled walls as compared with 74% and 58% for literates and illiterates respectively in Oriente.

b. Lighting, water and toilet facilities: While there is no difference in the types of fuel used by the two Occidente groups, literates and illiterates

do differ significantly in their water sources and access to toilet facilities. In contrast to the Ladino group, literates in Occidente are significantly more likely to obtain their water from sources other than rivers or streams (92% as opposed to 79% for illiterates). In addition, they are three times more likely, as are literates in Oriente, to have toilet facilities than illiterates. Although there is no difference between the two regions in fuel usage and toilet facilities, members of the Occidente group are much more likely to obtain their water from wells or faucets than those in Oriente (92% for literates in Occidente as opposed to 53% for the comparable Oriente group).

c. Radio ownership and listenership: Both radio ownership and listenership are significantly more prevalent among literate Indian farmers. The two cultures are similar in that there are, in both groups, more listeners than owners of radios. However, they differ on the variable of listenership. While a higher percentage of both Oriente groups are radio listeners (86% for illiterates and 87% for literates), the Occidente groups are, in contrast to those in Oriente, significantly different with respect to listenership, with 58% of literates listening, in contrast to 43% of illiterates.

d. Diet: There is no statistically significant variation in diet between the two Occidente groups. This is in contrast to the Oriente group where the only food stuffs, the consumption of which the two groups do not differ significantly on, are plantains and incaparina.

B. Modern attitude variables

1. Risk perception: In respect to the perception of risk in new agricultural practices, the Occidente groups are, for no variables, significantly different. As in Oriente, the only variable on which a statistically significant difference between groups in relation to risk perception is noted, is credit. Literates are more than twice as likely to see no risk in credit as are illiterates (9% for literates, 4% for illiterates).

2. Attitude toward money: Virtually all respondents in Occidente perceive of money as important. In addition, considerably more than half of both groups feel that money is more important than friends. The two Occidente groups do differ significantly, however, in their perception of the potential monetary value of education. Seventy-three percent of literates report money as their chief educational motive, as opposed to 46% for illiterates.

3. Educational aspirations: As is true of the Oriente group, literate farmers in Occidente desire significantly more education for their children than do illiterates; 3.70 for illiterates and 4.81 for literates.

C. Other background characteristics

1. Age: Literate farmers in Occidente are considerably younger than their illiterate counterparts, with a difference of 6.02 in mean ages ($p < .0001$); while this is also true for the Ladino groups, the difference and significance in the Occidente area is much greater.

2. Mobility: In the area of mobility illiterates in Occidente differ significantly from literates on only one variable. Illiterates are slightly more than half as likely to visit Guatemala City occasionally during the year. The groups do differ on visits to either the nearest municipality or the capitol, however.

3. Other work: In contrast to farmers in Oriente, the two Occidente groups vary significantly on the variable of literacy with respect to non-farm work. More than twice as many literates (28%) work as teachers, merchants or drivers (11% for illiterates). The two groups do not differ significantly on their place of work with slightly more than 30% of both groups working away from the farm.

4. Chances for advancement as a farmer: Both groups (89% for literates and 83% for illiterates) report high expectations of chances for advancement as a farmer.

5. Group membership: A similarly small number of both groups belong to organized groups (6% and 7% for illiterates and literates respectively) which is in contrast to the Oriente area where the literate group reported significantly more organized activity.

6. Attitude toward seeking agricultural advice: While the barest majority of both Indian groups (illiterates 51% and literates 59%) feel that meeting with friends and neighbors about agricultural matters is important, they differ significantly in making agricultural decisions. Fewer literates (95% as opposed to 99% for illiterates) make agricultural decisions alone. Despite this difference, however, the vast majority of both groups seek no outside help in making these decisions.

7. Perception of relative well being: Both groups in this region have high relative perceptions of the quality of their land. Among illiterates, only 3% (4% for literates) feel that their land is worse than their neighbors. Further, the groups do not vary significantly on their family's health status. Only 2% (6% for illiterates) of the Occidente literates feel that their family has more health problems than others.

8. Family size: There is no appreciable difference in family size for the two groups. Illiterates have a mean of 3.58 children as compared to the literates 3.29.

9. Correspondence: The two groups do understandably differ significantly on receiving letters, with literates receiving slightly less than four times as many letters as illiterates.

Table 25. Difference between illiterate and literate farmers in Oriente in terms of background characteristics: results of discriminant analysis.

Background Items	Illiterate		Literate		Univariate F Ratio	Significance of F ratio
	\bar{X}	SD	\bar{X}	SD		
Makes agricultural decisions alone	.96	.18	.94	.23	1.75	NS
Sees no risk in use of new seed	.85	.36	.86	.35	.08	NS
Sees no risk in insecticide use	.74	.44	.79	.41	2.19	NS
Sees no risk in fertilizer use	.85	.36	.86	.34	.44	NS
Sees no risk in herbicide use	.60	.49	.60	.49	.01	NS
Sees no risk in fungicide use	.51	.50	.51	.50	.00	NS
Sells part of corn crop	.16	.36	.26	.44	12.05	<.001
Sells part of bean crop	.66	.47	.76	.42	7.52	<.01
Sees no risk in use of credit	.22	.42	.32	.47	8.32	<.01
Seeks advice on agricultural matters	.38	.49	.45	.50	3.07	NS
Number of parcels into which land is divided	2.24	1.13	2.48	1.14	7.06	<.01
Percent of landholdings owned	.54	.44	.59	.43	1.84	NS
Percent of landholdings rented	.33	.42	.28	.40	1.66	NS
Total amount of land available for planting	3.28	1.93	3.56	2.10	3.14	NS
Feels his land is worse than his neighbors	.10	.30	.07	.26	1.62	NS

Background Items	Illiterate		Literate		Univariate F Ratio	Significance of F Ratio
	<u>X</u>	SD	<u>X</u>	SD		
Number of animals owned	1.67	2.25	2.10	2.57	5.15	<.05
Works away from the farm	.36	.48	.31	.46	1.82	NS
Works as a skilled worker (teacher, merchant, driver)	.01	.08	.01	.09	.18	NS
Perceives of money as important	.92	.28	.97	.17	7.42	<.01
Feels that money is more important than friends	.18	.38	.26	.44	7.26	<.01
Sees chances of advancement in farming	.93	.25	.94	.24	.10	NS
Receives letters	.46	.50	.67	.47	29.99	<.0001
Owns a radio	.50	.50	.64	.48	13.34	<.001
Listens to a radio	.86	.35	.87	.32	1.13	NS
Belongs to an organized group	.12	.32	.23	.42	16.38	<.001
Feels that meeting with friends & neighbors about agricultural matters is important	.78	.41	.86	.34	6.89	<.01
Visits nearest municipality at least a few times a year	.94	.24	.96	.20	.93	NS
Visits department capital at least a few times a year	.76	.43	.81	.39	2.96	NS
Visits Guatemala City at least a few times a year	.30	.46	.41	.49	8.96	<.01
Feels that family has more health problems than others	.13	.34	.11	.31	.78	NS
Includes bread in weekly diet	.44	.50	.60	.50	18.57	<.0001
Includes lard in weekly diet	.45	.50	.55	.50	6.25	<.05

Background Items	Illiterate		Literate		Univariate F Ratio	Significance of F Ratio
	\bar{X}	SD	\bar{X}	SD		
Includes plantains in weekly diet	.06	.24	.09	.28	1.39	NS
Includes rice in weekly diet	.37	.48	.46	.50	5.97	<.05
Includes vegetables in weekly diet	.34	.48	.49	.50	14.14	<.001
Includes meat in weekly diet	.31	.46	.43	.50	10.78	<.01
Includes cheese in weekly diet	.64	.48	.74	.44	6.86	<.01
Includes milk in weekly diet	.49	.50	.63	.48	11.91	<.001
Includes incaparina in weekly diet	.18	.38	.17	.38	.00	NS
Owens own house	.95	.22	.96	.20	.20	NS
Has better than thatch roof on house	.61	.49	.76	.42	17.68	<.0001
Has better than mud- fill walls	.58	.50	.74	.44	19.29	<.0001
Uses fuel other than wood or candles for lighting	.88	.33	.95	.21	9.89	<.01
Gets water from other than river or stream (i.e. well or faucet)	.54	.50	.53	.50	.05	NS
Has toilet facilities	.04	.18	.11	.32	17.36	<.0001
Number of children	4.38	2.62	3.98	2.51	3.84	NS
Sees monetary gain as main motive for education	.77	.42	.86	.35	7.61	<.01
Number of years of education desired for children	4.44	1.94	5.43	1.48	47.28	<.0001
Corn production	20.2	42.30	22.90	22.45	.85	NS
Bean production	7.99	8.57	8.60	7.54	.84	NS
Total revenue from corn & beans	369.48	372.11	401.06	293.73	1.29	NS
Age	43.2	14.47	40.40	14.10	5.94	<.05

b. Variables included in the discriminant function
(in order of relative contribution)

<u>Background Items</u>	<u>Standardized discriminant function coefficients</u>	<u>Multivariate partial F (df=21, 716)</u>	<u>Univariate F (df=1, 736)</u>
Number of years of education desired for children	0.4	21.6***	47.28***
Number of children	-0.3	9.6***	3.84*
Receives letters	0.3	12.2***	29.99***
Feels that money is more important than friends	0.3	10.7***	7.26**
Has better than thatch roof on house	0.2	6.7***	17.68***
Belongs to an organized group	0.2	7.1***	16.38***
Has toilet facilities	0.2	6.6***	17.36***
Sees monetary gain as a motive for education	0.2	6.6***	7.61**
Uses fuel other than wood or candles for lighting	0.2	6.6***	9.89**
Bean production (first year)	-0.2	3.5***	.84
Includes bread in weekly diet	0.2	3.5***	18.57***
Sells part of corn crop	0.2	3.0***	12.05***
Includes vegetables in weekly diet	0.2	2.5**	14.14***
Sees no risk in use of credit	0.1	2.1*	8.32**
Includes cheese in weekly diet	-0.1	1.6	6.86**
Works away from the farm	-0.1	1.6	1.82
Percent of landholdings owned	0.1	1.6	1.84
Age	-0.1	1.1	5.94*
Sees chances of advancement in farming	-0.1	1.4	.10
Makes agricultural decisions alone	-0.1	1.3	1.75
Feels that family has more health problem than others	-0.1	1.2	.78

Group Centroids:

Illiterates -0.3
Literates 0.7

Multivariate F ratio (for the discriminant function) = 7.9,
 Canonical correlation (for 2 groups equivalent to multiple R) = 0.4
 Canonical correlation squared (proportion of variance accounted for) = 0.2
 Wilks' Lambda for best single predictor variable (Item EDASP) = 0.9
 Wilks' Lambda for discriminant function = 0.8

c. Results of prediction of group membership
based on discriminant function

<u>Actual Group</u>	<u>Predicted Group</u>		<u>Total Sample</u>
	<u>Illiterate</u>	<u>Literate</u>	
Illiterate	356 (70%)	152 (30%)	508 (100%)
Literate	74 (32%)	156 (68%)	230 (100%)

69% of the cases were classified correctly

* $p < .05$
 ** $p < .01$
 *** $p < .001$

Table 26. Difference between illiterate and literate farmers in Occidente in terms of background characteristics: results of discriminant analysis.

a. Univariate relationships between illiterate and literate farmers in Occidente						
Background Items	Illiterate		Literate		Univariate F Ratio	Significance of F Ratio
	X	SD	X	SD		
Makes agricultural decisions alone	.99	.11	.95	.21	4.58	<.05
Sees no risk in use of new seed	.51	.50	.54	.50	.15	NS
Sees no risk in insecticide use	.48	.50	.51	.50	.37	NS
Sees no risk in fertilizer use	.86	.35	.79	.41	3.38	NS
Sees no risk in herbicide use	.15	.36	.17	.38	.40	NS
Sees no risk in fungicide use	.24	.43	.24	.43	.00	NS
Sells part of corn crop	.02	.14	.05	.21	2.69	NS
Sells part of bean crop	.05	.21	.08	.28	2.04	NS
Sees no risk in use of credit	.04	.20	.09	.29	4.21	<.05
Seeks advice on agricultural matters	.02	.15	.05	.21	1.52	NS
Number of parcels into which land is divided	1.40	.64	1.60	.82	6.89	<.01
Percent of landholdings owned	.99	.07	.99	.06	.01	NS
Percent of landholdings rented	.01	.05	.01	.06	.07	NS
Total amount of land available for planting	1.65	1.02	1.57	.82	.51	NS

Background Items	Illiterate		Literate		Univariate F Ratio	Significance of F Ratio
	X	SD	X	SD		
Feels his land is worse than his neighbors	.03	.18	.04	.19	.02	NS
Number of animals owned	1.80	2.00	2.19	2.16	3.08	NS
Works away from the farm	.34	.48	.33	.47	.04	NS
Works as a skilled worker (teacher, merchant, driver)	.11	.31	.28	.45	19.14	<.0001
Perceives of money as important	.99	.09	.98	.14	.92	NS
Feels that money is more important than friends	.67	.47	.70	.46	.33	NS
Sees chances of advance- ment in farming	.83	.37	.89	.32	1.66	NS
Receives letters	.16	.36	.44	.49	44.22	<.0001
Owens a radio	.39	.49	.52	.50	5.60	<.05
Listens to a radio	.43	.49	.58	.49	8.19	<.01
Belongs to an organized group	.06	.23	.07	.26	.36	NS
Feels that meeting with friends & neighbors about agricultural matters is important	.51	.50	.59	.49	2.42	NS
Visits nearest municipality at least a few times a year	.99	.11	1.00	.00	1.44	NS
Visits department capital at least a few times a year	.50	.50	.55	.49	.85	NS
Visits Guatemala City at least a few times a year	.14	.35	.24	.43	5.90	<.05
Feels that family has more health problems than others	.06	.23	.02	.14	2.82	NS
Includes bread in weekly diet	.81	.39	.82	.38	.12	NS
Includes lard in weekly diet	.47	.49	.50	.50	.34	NS
Includes plantains in weekly diet	.23	.42	.29	.46	1.82	NS

Background Items	Illiterate		Literate		Univariate F Ratio	Significance of F Ratio
	<u>X</u>	SD	<u>X</u>	SD		
Includes rice in weekly diet	.44	.49	.43	.49	.01	NS
Includes vegetables in weekly diet	.70	.46	.66	.48	.75	NS
Includes meat in weekly diet	.87	.33	.93	.26	2.31	NS
Includes cheese in weekly diet	.27	.44	.29	.46	.24	NS
Includes milk in weekly diet	.19	.39	.17	.38	.12	NS
Includes incaparina in weekly diet	.34	.47	.38	.49	.54	NS
Owens own house	.99	.01	.99	.09	.89	NS
Has better than thatch roof on house	.84	.36	.73	.44	7.24	<.01
Has better than mud-fill walls	.90	.29	.87	.34	.89	NS
Uses fuel other than wood or candles for lighting	.83	.37	.84	.36	.03	NS
Gets water from other than river or stream (i.e. well or faucet)	.79	.40	.92	.26	9.62	<.01
Has toilet facilities	.04	.20	.12	.33	9.25	<.01
Number of children	3.58	2.26	3.29	2.48	1.26	NS
Sees monetary gain as main motive for education	.46	.49	.73	.44	25.45	<.0001
Number of years of education desired for children	3.70	2.07	4.81	1.82	25.58	<.0001
Corn production	17.81	14.92	17.28	15.75	.11	NS
Bean production	1.71	1.82	1.95	2.54	1.25	NS
Total revenue from corn and beans	154.64	121.79	155.26	132.40	.00	NS
Age	40.33	13.08	34.31	12.12	18.36	<.0001

b. Variables included in the discriminant function
(in order of relative contribution)

<u>Background Items</u>	<u>Standardized discriminant function coefficients</u>	<u>Multivariate partial F (df=24, 461)</u>	<u>Univariate F (df=1, 484)</u>
Sees monetary gain as main motive for education	.4	22.2***	24.45***
Receives Letters	.4	23.9***	44.22***
Age	-.3	12.0***	18.36***
Has better than thatch roof on house	.3	9.0***	7.24**
Sells part of corn crop	.3	7.2***	2.69
Gets water from other than river or stream (i.e. well or faucet)	.2	6.6***	9.62**
Sees no risk in fertilizer use	-.2	5.5***	3.38
Includes meat in weekly diet	.2	5.0***	2.31
Works as a skilled worker (teacher, merchant, driver)	.2	3.5***	19.14***
Number of parcels into which land is divided	.2	3.8***	6.89**
Sees no risk in use of credit	.2	4.5***	4.21*
Visits Guatemala City at least a few times a year	-.2	2.9***	5.90*
Number of years of education desired for children	.2	4.2***	25.58***
Total amount of land available for planting	-.2	3.3***	.51
Number of animals owned	.2	3.8***	3.08
Includes rice in weekly diet	-.2	2.5***	.01
Includes plantains in weekly diet	.2	2.2***	1.82
Listens to a radio	.2	2.9***	8.19**
Makes agricultural decisions alone	-.2	3.3***	4.58*
Corn production	-.2	1.9**	.11
Includes lard in weekly diet	-.1	1.2	.34
Feels that meeting with friends & neighbors about agricultural matters is important	.1	1.6*	2.42
Sees chances of advancement in farming	.1	1.5	1.66
Has toilet facilities	.1	1.5	9.25**

Group Centroids:

Illiterates -0.3
Literates 1.2

Multivariate F ratio (for discriminant function) = 7.6
 Canonical correlation (for two groups equivalent to multiple R) = 0.5
 Canonical correlation squared (proportion of variance accounted for) = 0.3
 Wilks' Lambda for best single predictor (Item = Letters) = 0.9
 Wilks' Lambda for discriminant function = 0.7

c. Results of prediction of group membership
based on discriminant function

<u>Actual Group</u>	<u>Predicted Group</u>		<u>Total Sample</u>
	<u>Illiterate</u>	<u>Literate</u>	
Illiterate	295 (78%)	83 (22%)	378 (100%)
Literate	19 (18%)	89 (82%)	108 (100%)

79% of the cases were classified correctly

* $p < .05$
 ** $p < .01$
 *** $p < .001$

PART II

Profile of a Literate Family

Membership in a literate family, like individual literacy, is likely to be associated with a number of other background characteristics. The analysis reported in Part I was, therefore, replicated for farmers having families with less than 25% of their members literate vs. those with 25% or greater of their members literate. (The analysis was also performed using two alternative family literacy categories: families with no literate members vs. those with some literate members. Results were essentially the same as those described in the current section.) The following section summarizes and compares the results for both the Oriente and the Occidente regions (see Tables 27 and 28).

As is readily apparent from an examination of Tables 27 and 28, illiterate and partially literate families in Oriente differ significantly from highly literate families across a much wider range of background variables than do those same groups in the Occidente region.

A. General life-style characteristics

1. Economic indicator variables: Highly literate families in Oriente farm significantly more land than their partially literate counterparts. Further, they own a greater percentage of their available land, and farm a greater number of parcels. This last difference is shared by the highly literate Indian families, who also farm a greater number of parcels.

In further contrast to those in Occidente, Oriente families vary greatly on the number of animals owned with the highly literate group owning an average of 2.18 animals as compared to 1.37 for the non and partially literate families. There is no relationship between family literacy and animal ownership as the groups own 1.89 and 1.90 animals (non-literate vs. highly literate) respectively. The two cultures are, however, similar in that in both regions, highly literate families have significantly greater potential incomes from the sale of corn and beans than do illiterate and marginally literate families in their respective areas.

While the two regions are similar in their potential revenue from corn and beans, they differ in the production of these two commodities. In the area of corn production, highly literate families in Occidente produce significantly more, while in the Oriente there is significant difference between the groups. In contrast, highly literate families in Oriente produce significantly more beans than their marginally literate counterparts. There is only a slight difference in bean production between the Indian groups.

There is only one area of significant difference on the topic of corn sales in the two cultures. Highly literate Ladino families sell significantly more corn than non and partially literate families. The Occidente groups do not differ on the percentage of their corn crop sold, and the groups in neither culture differ on bean sales.

2. Economic indicator variables: level of living: Occidente families do not differ significantly across the literacy variable, with respect to house ownership and quality. This is in contrast to the Oriente groups where the illiterate and partially literate group is significant and much more likely to have a thatched roof and mudfilled walls.

In the areas of fuel usage, water sources, and toilet facilities, again the Oriente groups evidence more significant differences than do their Occidente counterparts. Highly literate Ladino families are more likely to use fuel other than wood or candles for lighting, and to have toilet facilities. On these topics, Occidente families differ significantly only in that highly literate families are three times as likely to have toilet facilities as are other groups.

In both cultures, highly literate families are more likely to own radios. However, only in Occidente are the highly literate families more likely to be radio listeners.

Literacy has no relationship to diet for Indian families. On no diet item is there a significant difference in consumption by literacy groups. This is quite different from Oriente, however, where there are significant differences on all items except incaparina.

B. Modern attitude variables

The Oriente groups differ significantly on the perception of risk in insecticide and herbicide use. In contrast the Occidente group differs on no risk item.

Significantly more highly than partially literate families in the Oriente perceive of money as important. The two groups do not differ on the relative value of money and friends, however. Further, they agree that monetary gain is the chief motive for education. In Occidente, there is no significant difference between the two groups on either of these three topics. The Occidente groups are, however, much more likely to see money as more important than friends.

In contrast to the Occidente groups, Oriente families differ significantly on the number of years of education desired for their children.

C. Other background variables

Highly literate Occidente families are significantly younger than their illiterate neighbors. There is no significant differences in family age in Oriente

Highly literate families in both cultures are significantly more likely to visit the department capital and Guatemala City during the course of the year than are non or partially literate families. In neither culture do the groups differ on visits to the nearest municipalities and nearly all families in both Oriente and Occidente visit them at least a few times a year.

There is no significant difference between groups in either culture on the number of skilled workers or non-farm workers. Although Occidente families are

much more likely to have a skilled worker, there is little difference in the degree to which they work away from the farm.

Both groups in both regions have high expectations for the chances for advancement as a farmer (85% and 86% of Occidente, and 92% and 95% for Oriente).

Oriente families differ significantly in group membership. Significantly more highly literates belong to organized groups than do non or partially literate families. There is no difference for the Occidente groups.

Significantly more highly literate Oriente families feel that meeting with friends and neighbors about agricultural matters is important. However, a similarly large majority of both groups make agricultural decisions alone. There is no significant difference in the number of Oriente families who seek advice on agricultural matters.

In Occidente, also, the vast majority of both groups make agricultural decisions alone, few seek agricultural advice and a bare majority of both groups feel that meeting with friends about agricultural matters is important.

Very few of either group in either culture feel that their land is worse than their neighbors. Similarly, there is no significant difference in the groups in either culture on perceived family health, as few feel that their family has more health problems than others.

Highly literate Indian families, have significantly fewer children than their illiterate neighbors. This is in contrast to Oriente where there is no significant difference in family size across the literacy variable.

Understandably, highly literate families in both cultures receive significantly more correspondence than their neighbors.

Table 27. Difference between illiterate or partially literate families ($\leq 25\%$) and highly literate families ($> 25\%$) in the Oriente in terms of background characteristics: results of discriminant analysis.

Background Items	Illiterate or Partially Literate		Highly Literate		Univariate F Ratio	Sig. of F Ratio
	\bar{X}	SD	\bar{X}	SD		
	Makes agricultural decisions alone	.97	.18	.95		
Sees no risk in use of new seed	.83	.38	.87	.34	2.98	NS
Sees no risk in insecticide use	.70	.45	.79	.41	6.35	$<.05$
Sees no risk in fertilizer use	.83	.37	.87	.34	1.99	NS
Sees no risk in herbicide use	.56	.49	.63	.48	4.57	$<.05$
Sees no risk in fungicide use	.48	.50	.54	.49	2.46	NS
Sells part of corn crop	.14	.35	.23	.42	9.07	$<.01$
Sells part of bean crop	.67	.47	.72	.45	2.48	NS
Sees no risk in use of credit	.19	.39	.30	.46	10.70	$<.01$
Seeks advice on agricultural matters	.38	.48	.43	.49	1.73	NS
Number of parcels into which land is divided	2.16	1.11	2.45	1.15	12.12	$<.001$
Percent of landholdings owned	.49	.44	.61	.42	11.71	$<.001$
Percent of landholdings rented	.37	.44	.26	.38	13.83	$<.001$
Total amount of land available for planting	2.97	1.66	3.71	2.17	26.54	$<.0001$

Background Items	Illiterate or Partially Literate		Highly Literate		Univariate F Ratio	Sig of F Ratio
	\bar{X}	SD	\bar{X}	SD		
Feels land is worse than his neighbors	.09	.29	.08	.28	.45	NS
Number of animals owned	1.37	1.96	2.18	2.60	22.13	<.0001
Works away from the farm	.37	.48	.33	.47	1.78	NS
Works as a skilled worker (teacher, merchant, driver)	.01	.09	.01	.07	.39	NS
Perceives of money as important	.91	.28	.95	.22	4.20	<.05
Feels money is more im- portant than friends	.19	.39	.21	.41	.73	NS
Sees chances of advancement in farming	.92	.27	.95	.22	2.14	NS
Receives Letters	.42	.49	.62	.49	28.09	<.0001
Owns a radio	.46	.49	.62	.48	20.57	<.0001
Listens to a radio	.84	.36	.89	.32	2.92	NS
Belongs to an organized group	.11	.32	.18	.39	7.89	<.01
Feels that meeting with friends & neighbors about agricultural matters is important	.78	.42	.84	.37	4.32	<.05
Visits nearest municipality at least a few times a year.	.94	.24	.95	.22	.13	NS
Visits department capital at least a few times a year	.72	.45	.82	.38	10.28	<.05
Visits Guatemala City at least a few times a year	.29	.46	.37	.48	4.99	<.05
Feels that family has more health problems than others.	.13	.34	.12	.33	.13	NS
Includes bread in weekly diet	.42	.49	.55	.49	12.60	<.001
Includes lard in weekly diet	.35	.48	.43	.49	4.83	<.05
Includes plantains in weekly diet	.04	.20	.09	.29	6.72	<.01

<u>Background Items</u>	<u>Illiterate or Partially literate</u>		<u>Highly Literate</u>		<u>Univariate F Ratio</u>	<u>Significance of F Ratio</u>
	\bar{X}	SD	\bar{X}	SD		
Includes rice in weekly diet	.35	.48	.43	.49	4.83	<.05
Includes vegetables in weekly diet	.34	.47	.43	.49	7.30	<.01
Includes meat in weekly diet	.29	.46	.39	.49	6.59	<.05
Includes cheese in weekly diet	.63	.48	.71	.46	4.53	<.05
Includes milk in weekly diet	.47	.49	.59	.49	10.79	<.01
Includes incaparina in weekly diet	.16	.36	.19	.39	1.56	NS
Owns own house	.94	.23	.96	.19	1.37	NS
Has better than thatch roof on house	.55	.49	.75	.43	35.47	<.0001
Has better than mudfill walls	.51	.50	.73	.44	39.79	<.0001
Uses fuel other than wood or candles for lighting	.87	.34	.93	.26	7.97	<.01
Gets water from other than river or stream(i.e. well or faucet)	.55	.49	.53	.49	.38	NS
Has toilet facilities	.02	.14	.09	.29	17.49	<.0001
Number of children	4.28	2.45	4.25	2.71	.02	NS
Sees monetary gain as main motive for education	.77	.42	.82	.38	2.95	NS
Number of years of education desired for children	4.25	2.01	5.17	1.60	48.28	<.0001
Corn production	18.87	50.39	22.92	20.08	2.17	NS
Bean production	7.06	6.71	9.14	9.29	11.84	<.001
Total revenue from corn and beans	335.52	385.92	416.74	311.08	10.01	<.01
Age	42.6	14.8	42.2	14.0	.00	NS

b. Variables included in the discriminant function
(in order of relative contribution)

<u>Background Item</u>	<u>Standardized discriminant function coefficient</u>	<u>Multivariate partial F (df=20,717)</u>	<u>Univariate F (df=1,736)</u>
Number of years of education desired for children	0.4	20.2***	48.28***
Number of children	-0.3	13.0***	.02
Has better than thatch roof on house	0.3	8.2***	35.47***
Total amount of land available for planting	0.2	6.2***	26.54***
Uses fuel other than wood or candles for lighting	0.2	6.5***	7.97**
Receives letters	0.2	4.9***	20.57***
Has better than mudfill walls	0.2	3.1***	38.79***
Has toilet facilities	0.2	3.2***	17.49***
Works as skilled worker (teacher, merchant, driver)	-0.2	3.3***	.39
Feels that money is more important than friends	0.2	2.6**	.73
Owens a radio	0.2	2.3**	20.57***
Sees monetary gais as main motive for education	0.1	2.3**	2.95
Number of parcels into which land is divided	0.1	2.0*	12.12***
Percent of landholdings rented	0.1	1.9*	13.83***
Sees no risk in use of credit	0.1	1.9*	10.70**
Includes cheese in weekly diet	-0.1	1.8*	6.72**
Includes plantains in weekly diet	0.1	1.8*	6.72**
Includes bread in weekly diet	0.1	1.5	12.60***
Sells part of bean crop	-0.1	1.4	2.48
Sees no risk in use of herbicides	0.1	1.2	4.57*

Group Centroids

Illiterate or partially literate families = -0.5

Highly literate families = 0.4

Multivariate F ration (for discriminant function) = 7.7

Canonical correlation(for two groups equivalent to multiple R) = .42

Canonical correlation squared(proportion of variance accounted for) = .18

Wilks' Lambda for best single predictor (Item = EDASP) = .94

Wilks' Lambda for discriminant function = .82

c. Results of prediction of group membership
based on discriminant function

<u>Actual Group</u>	<u>Predicted Group</u>		<u>Total Sample</u>
	<u>Illiterate or Partially lit families</u>	<u>Highly literate families</u>	
Illiterate or partially literate families	222 (65%)	118 (35%)	340 (100%)
Highly literate families	123 (31%)	275 (69%)	398 (100%)

67% of the cases were classified correctly

-
- * $p < .05$
 - ** $p < .01$
 - *** $p < .001$

Table 28. Difference between illiterate or partially literate families ($\leq 25\%$) and highly literate families ($> 25\%$) in Occidente in terms of background characteristics: results of discriminant analysis.

Background Items	Illiterate or Partially literate families		Highly Literate families		Univariate F Ratio	Significance of F Ratio
	\bar{X}	SD	\bar{X}	SD		
	Makes agricultural decisions alone	.98	.14	.98		
Sees no risk in use of new seed	.54	.49	.46	.50	1.85	NS
Sees no risk in insecticide use	.48	.50	.50	.50	.14	NS
Sees no risk in fertilizer use	.84	.36	.84	.37	.01	NS
Sees no risk in herbicide use	.16	.37	.13	.34	.66	NS
Sees no risk in fungicide use	.24	.43	.24	.43	.00	NS
Sells part of corn crop	.02	.14	.04	.19	1.22	NS
Sells part of bean crop	.05	.21	.08	.27	1.43	NS
Sees no risk in use of credit	.05	.24	.03	.17	1.37	NS
Seeks advice on agricultural matters	.02	.16	.04	.19	.56	NS
Number of parcels into which land is divided	1.42	.67	1.57	.77	3.90	$< .05$
Percent of landholdings owned	.99	.06	.99	.08	.74	NS
Percent of landholdings rented	.00	.05	.01	.08	1.95	NS
Total amount of land available for planting	1.61	.98	1.72	1.00	.97	NS
Feels his land is worse than his neighbors	.04	.19	.03	.17	.09	NS
Number of animals owned	1.89	2.04	1.90	2.07	.00	NS
Works away from the farm	.35	.48	.30	.46	.97	NS

<u>Background Items</u>	<u>Illiterate or Partially lit- erate families</u>		<u>Highly literate families</u>		<u>Univariate F Ratio</u>	<u>Significance of F Ratio</u>
	\bar{X}	SD	\bar{X}	SD		
Works as a skilled worker (teacher, merchant, driver)	.13	.34	.21	.41	3.83	NS
Perceives of money as important	.99	.10	.99	.10	.00	NS
Feels that money is more important than friends	.68	.47	.69	.46	.04	NS
Sees chances of advancement in farming	.85	.36	.86	.35	.10	NS
Receives letters	.19	.39	.35	.48	12.63	<.001
Owens a radio	.39	.49	.52	.50	5.23	<.05
Listens to a radio	.43	.49	.59	.49	8.28	<.01
Belongs to an organized group	.06	.25	.05	.22	.29	NS
Feels that meeting with friends & neighbors about agricultural matters is important	.54	.49	.49	.50	.68	NS
Visits nearest municipality at least a few times a year	.99	.11	1.00	.00	1.31	NS
Visits department capital at least a few times a year	.48	.50	.65	.48	9.12	<.01
Visits Guatemala City at least a few times a year	.15	.35	.23	.42	3.93	<.05
Feels that family has more health problems than others	.05	.23	.03	.17	1.00	NS
Includes bread in weekly diet	.83	.38	.76	.43	2.30	NS
Includes lard in weekly diet	.47	.49	.49	.50	.11	NS
Includes plantains in weekly diet	.24	.43	.27	.45	.36	NS
Includes rice in weekly diet	.45	.49	.41	.49	.47	NS
Includes vegetables in weekly diet	.70	.46	.65	.48	1.00	NS
Includes meat in weekly diet	.89	.30	.84	.37	.48	NS
Includes cheese in weekly diet	.29	.45	.24	.42	.89	NS

<u>Background Items</u>	<u>Illiterate or partially lit- erate families</u>		<u>Highly literate families</u>		<u>Univariate F Ratio</u>	<u>Significance of F Ratio</u>
	\bar{X}	SD	\bar{X}	SD		
Includes milk in weekly diet	.19	.39	.17	.38	.24	NS
Includes incaparina in weekly diet	.35	.48	.35	.48	.00	NS
Owens own house	.99	.05	.99	.10	1.06	NS
Has better than thatch roof on house	.83	.37	.77	.42	2.03	NS
Has better than mudfill walls	.89	.31	.92	.27	.83	NS
Uses fuel other than wood or candles for lighting	.83	.37	.86	.35	.47	NS
Gets water from other than river or stream (i.e. well or faucet)	.82	.39	.87	.34	1.62	NS
Has toilet facilities	.04	.19	.13	.34	11.31	<.001
Number of children	3.70	2.23	2.81	2.48	12.03	<.001
Sees monetary gain as main motive for education	.50	.50	.60	.49	3.03	NS
Number of years of education desired for children	3.89	2.07	4.20	2.07	1.72	NS
Corn production	16.90	14.63	20.76	16.42	5.24	<.05
Bean production	1.74	2.01	1.85	1.98	.24	NS
Total revenue from corn and beans	148.84	120.62	177.68	134.87	4.32	<.05
Age	39.68	12.95	36.36	13.41	5.14	<.05

b. Variables included in the discriminant function
(in order of relative contribution).

<u>Background Items</u>	<u>Standardized discriminant function coefficients</u>	<u>Multivariate parital F (df=16, 469)</u>	<u>Univariate F (df=1,484)</u>
Corn production	1.2	6.37***	5.24*
Total revenue from corn and beans	-0.7	2.40**	4.32*
Number of children	-0.6	23.08***	12.03***
Has toilet facilities	0.4	10.92***	11.31***
Receives letters	0.3	7.66***	12.63***
Has better than thatch roof on house	-0.3	5.67***	2.03
Includes bread in weekly diet	-0.3	4.54***	2.30
Visits department capital at least a few times a year	0.2	4.24***	9.12**
Sees monetary gain as main motive for education	0.2	3.51***	3.03
Listens to the radio	0.2	2.64**	8.28**
Percent of landholdings rented	0.2	2.92***	1.95
Includes lard in weekly diet	0.2	2.03*	.11
Sees no risk in use of new seed	-0.2	1.86*	1.85
Includes rice in weekly diet	-0.2	1.48	.47
Owens own house	-0.2	1.84*	1.06
Belongs to an organized group	-0.2	1.47	.29

Group Centroids:

Illiterate or partially lit. families = -0.22

Highly literate families = 0.83

Multivariate F ratio (for discriminant function) = 5.32

Canonical correlation (for two groups equivalent to multiple R) = .39

Canonical correlation squared (proportion of variance accounted for) = .15

Wilks' Lambda for best single predictor (Item = Letters) = .97

Wilks' Lambda for discriminant function = .85

c. Results of prediction of group membership based on discriminant function

<u>Actual Group</u>	<u>Predicted Group</u>		<u>Total Sample</u>
	<u>Illiterate or Partially lit. families</u>	<u>Highly Literate families</u>	
Illiterate or Partially Lit. Families	278 (72%)	108 (28%)	386 (100%)
Highly literate families	30 (30%)	70 (70%)	100 (100%)

72% of the cases were classified correctly

* $p < .05$

** $p < .01$

*** $p < .001$

PART III

Profile of a Literate Village

The current section describes the results of the village literacy analysis in the Oriente and Occidente (see Tables 29 and 30). Respondents were classified into groups according to whether or not they lived in a village having more or less than 30% literacy.

A. General life-style characteristics1. Economic indicator variables

a. Land size: There is little difference in the amount of land available for planting in illiterate or partially literate villages and highly literate villages in Occidente. The same is also true for both groups in Oriente. However, land availability does differ considerably between regions as the Occidente farmer in general has about half the available land of his village counterpart in Oriente.

Differences in the number of parcels into which land is divided are highly significant between illiterate or partially literate villages and highly literate villages, both in Oriente and Occidente. In Occidente, land in literate or partially literate villages is divided into 1.39 parcels per farmer, while in highly literate villages this figure increases to 1.63 parcels per farmer. In Oriente, land in illiterate or partially literate villages is divided into 2.10 parcels per farmer and in highly literate villages, into 2.46 parcels. This indicates that although the amount of land available to farmers in the two types of villages is virtually the same, its relative concentration varies significantly.

b. Land tenure arrangements: Although the Occidente villages have less land available for planting per farmer, virtually all of it is owned. For both illiterate or partially literate villages and highly literate villages, 99% of the available land is owned. In Oriente, 52% of the available land in illiterate or partially literate villages is owned. In the highly literate villages of Oriente, this figure increases significantly to 58%. The highly literate villages of Oriente thus possess a significantly greater amount of owned land than do the illiterate or partially literate villages of the same region.

c. Animal ownership: Farmers in illiterate or partially literate villages in Occidente possess a significantly smaller number of animals than do farmers in highly literate villages. Farmers in highly literate villages possess 2.47 animals, while farmers in less literate villages possess only an average of 1.69. For the Oriente area, there is no significant difference between the two types of villages in regard to animal ownership.

d. Total potential revenue from corn and bean crops: There is no significant difference in the total potential cash value of corn and beans for farmers in illiterate or partially literate villages and highly literate villages in Occidente. In the Oriente region, a non-significant relationship also exists

for the two groups. Farmers in Oriente receive more than twice the total potential revenue from corn and bean crops than do their village counterparts in Occidente. Mean production of corn and beans also does not vary significantly between village types in either of the two regions.

e. Crop sales: For the Occidente area, 37% of the farmers in illiterate or partially literate villages sell part of their corn crop, while none of the farmers in highly literate villages sell their corn. This represents a significant difference ($p < .05$) between the two village types. The percentages of farmers selling part of the bean crop (5% in illiterate or partially literate villages, 4% in the highly literate villages) is not significant. For the Oriente area, 18% of those in illiterate or partially literate villages sell part of their corn crop, while 71% and 69% of the farmers of the same respective village types sell part of their bean crop. None of the above differences are significant.

2. Economic indicator variables: level of living

a. House type: In both the Occidente and Oriente the vast majority of farmers own their homes. Ninety-nine percent of the farmers from both village types in Occidente own their home, while 95% of the farmers (also from both village types) own their own home in Oriente

Whether farmers from villages with a greater or lower amount of literacy have better homes seems to depend upon the region in which they are located. In Occidente, 89% of the farmers in illiterate or partially literate villages have non-thatch roofs, compared to only 60% of those from literate villages. Ninety-two percent of the farmers in the villages with lower literacy had houses with walls of adobe, wood or brick (as opposed to mud-filled walls) while only 81% of the farmers in highly literate villages possessed these.

When one examines the Oriente region, the pattern is reversed. Fifty-six percent of the farmers in villages with low literacy have non-thatch roofs, compared to 72% of those in the highly literate villages. Only 49% of the farmers in villages with low literacy have better than mud-filled walls, while 73% of those in the highly literate villages possess these.

b. Lighting, water and toilet facilities: There is no difference in the variety of fuel used by farmers in the two types of villages, both in Oriente and Occidente. For Occidente, however, source of water and possession of toilet facilities greatly depend on village type. Seventy-eight percent of farmers in villages with high literacy get their water from either a well or faucet. In this same region, only 2% of farmers in illiterate or partially literate villages have toilet facilities, compared to 16% of farmers in literate villages. For Oriente, there is no difference in regard to water sources or possession of toilet facilities between the two village types.

c. Radio ownership and listenership: There is no difference in radio ownership or listenership between farmers living in villages with low or high literacy in Occidente. Farmers in both village types are almost equally likely to own a radio and listen to it.

In Oriente, a similar relationship is also found, although a greater percentage of farmers in both village types own and listen to the radio here.

d. Diet: There is no statistically significant variation in diet between farmers in illiterate or partially literate villages in Occidente. In Oriente, however, the two groups differ significantly on weekly use of the following foodstuffs: bread, lard, rice, meat, cheese and milk with farmers from villages with high literacy levels making a greater use of these products. No differences were found in use of plantains, vegetables, or incaparina.

B. Modern attitude variables

1. Risk perception: In respect to the perception of risk in new agricultural practices, the Occidente villages differ only on one variable, perceiving no risk in the use of fertilizer. In contrast to what might be expected, 87% of the farmers in villages with low literacy perceived no risk, compared to 75% of the farmers in highly literate villages.

For Oriente, the two village types differ significantly on a number of perceived risk activities: 80% of the farmers in illiterate or partially literate villages see no risk in the use of new seed as compared to 88% of the farmers in villages where literacy is high; 31% in villages with low literacy see no risk in the use of fertilizer, compared to 88% when literacy is high; and 47% in villages with low literacy see no risk in the use of fungicides, compared to 54% where literacy is high.

2. Attitude toward money: For Occidente there are no significant differences between farmers in illiterate or partially literate villages and highly literate villages in regard to the perception of money as important and that money is more important than friends. Forty-nine percent of the farmers living in villages with low levels of literacy and 61% of the farmers living in villages with high levels of literacy, however, see monetary gain as the main motivation for achieving an education, thus reflecting a substantial difference between the two groups.

3. Educational aspirations: Whether one is a member of a village with high or low levels of literacy makes a significant difference in the number of years of education that are desired by the respondent for children. This is true for both the Occidente and Oriente regions. Farmers in illiterate or partially literate villages in Oriente desire a mean of 4.45 years of education for their children in contrast to 4.95 years for farmers in highly literate villages. In the Occidente area, farmers living in areas of low literacy desire only a mean of 3.77 years of education, as compared to 4.47 years for those in highly literate areas.

C. Other background characteristics

1. Age: In the Oriente, the age for highly literate villages is significantly higher than the age found in the illiterate or partially literate villages

with a mean age of 43.56 in the highly literate villages compared to a mean age of 40.65 in the other villages. Mean age in the Oriente is slightly higher than reported in the villages in the Occidente, but no significant difference is found between the illiterate or partially literate villages and the highly literate villages in the Occidente.

2. Mobility: In the areas of mobility, visits to the nearest municipality, department capital, or Guatemala City are at about the same frequency for both illiterate or partially literate villages and highly literate villages. The mobility pattern is quite different in the Occidente with the highly literate villages reporting a much greater frequency of visits to Guatemala City as compared to illiterate or partially literate villages. The illiterate or partially literate villages were significantly higher than the highly literate villages in visits to the nearest municipality. But it should be noted that in both cases, almost all members of both villages report visiting the nearest municipality a few times a year.

3. Other work: The pattern of work reported in Oriente including working away from the farm or working as a skilled worker shows no significant difference between illiterate or partially literate villages and the highly literate villages. About 35 percent report working away from the farm but almost no one reports working as a skilled worker in such occupations as merchant, teacher or driver. In the Occidente a quite different pattern emerges, with a significantly higher number of the illiterate or partially literate villages reporting work away from the farm when compared to the highly literate villages. Also, a significant difference is found in the number of persons reporting work as a skilled worker with the highest percentage being found in the highly literate villages compared to the illiterate or partially literate villages.

4. Chances for advancement as a farmer: Both illiterate or partially literate villages and highly literate villages in the Oriente report seeing a chance for advancement in farming at a high level but with no significant difference between the two groups. In the Occidente a similar pattern is found with a slightly lower number in both groups reporting chances of advancement in farming but again no significant differences.

5. Group membership: Between 13 and 17 percent of the respondents in the illiterate or partially literate villages and highly literate villages report belonging to an organized group, with no significant difference between the two groups in the Oriente. Similarly, in the Occidente there is no significant difference between the two groups but it should be noted that both groups report membership in an organized group at a level of about 6 percent, considerably lower than that reported in the Oriente.

6. Attitude toward seeking agricultural advice: In the Oriente, about 80 percent report that meeting with friends and neighbors about agricultural matters is important but there is no significant difference between the two groups.

In the Occidente only about 50 percent report this is important but again there is no significant difference between the two groups. In relation to making agricultural decisions alone, a higher percentage of illiterate or partially literate villages compared to highly literate villages in the Oriente state they do make their decisions alone but in both cases over 90 percent are reporting making their major agricultural decisions alone. In the Occidente both illiterate or partially literate villages and highly literate villages report making their agricultural decisions alone at a level of 90 percent and 97 percent respectively with no significant difference.

In the Oriente, however, the highly literate villages are generally more likely to seek outside advice on agricultural matters when compared to the illiterate or partially literate villages, and this is at a significant level. Such a difference can readily be seen in relation to the potential for change in highly literate villages. In the Occidente virtually no farmers in either the literate or partially literate villages report seeking outside advice on agricultural matters.

7. Perceptions of relative well being: In the Oriente only a small percentage of the farmers feel that their land is worse than their neighbors and there is no significant difference between the two groups. A similar pattern is found in the Occidente which would imply general satisfaction with their land in relation to their neighbors' land and no difference between the two major groups. Further, a similar pattern is found where in both Oriente and Occidente regardless of village membership health problems in their own families are perceived as being about the same level as found with neighbors in their own villages.

8. Family size: Family size is quite similar in the villages under comparison in the Oriente with the mean number of children in the illiterate or partially literate villages at 4.06 and the highly literate village mean number being 4.40 and this difference is not significant. In the Occidente smaller family size is reported with 3.45 children in the illiterate or partially literate villages and 3.72 in the highly literate villages and again this is not a significant difference.

9. Correspondence: In the Oriente about half of the illiterate or partially literate villages report receiving letters and about half in the highly literate villages receiving letters with no significant difference. Receiving a letter in the Occidente is a much less frequent occurrence but much more likely to happen in highly literate villages. Eighteen percent of the illiterate or partially literate villages in the Occidente report receiving letters compared to 34 percent in the highly literate villages and this difference is quite significant.

Table 29. Difference between illiterate or partially literate villages ($\leq 30\%$) and highly literate villages ($> 30\%$) in Oriente in terms of background characteristics: results of discriminant analysis.

Background Items	Illiterate or partially literate villages		Highly literate villages		Univariate F Ratio	Significance of F Ratio
	\bar{X}	SD	\bar{X}	SD		
Makes agricultural decisions alone	.98	.14	.94	.23	6.26	$< .05$
Sees no risk in use of new seed	.80	.40	.88	.32	10.03	$< .01$
Sees no risk in use of insecticide	.72	.45	.77	.42	1.98	NS
Sees no risk in use of fertilizer	.81	.39	.88	.32	8.06	$< .01$
Sees no risk in herbicide use	.59	.49	.60	.49	.05	NS
Sees no risk in fungicide use	.47	.50	.54	.50	3.86	$< .05$
Sells part of corn crop	.18	.39	.20	.40	.10	NS
Sells part of bean crop	.71	.46	.69	.46	.19	NS
Sees no risk in use of credit	.24	.42	.27	.44	.90	NS
Seeks advice on agricultural matters	.32	.47	.46	.50	14.02	$< .001$
Number of parcels into which land is divided	2.10	1.08	2.46	1.16	18.32	$< .0001$
Percent of landholdings owned	.52	.43	.58	.43	4.00	$< .05$
Percent of landholdings rented	.36	.42	.28	.40	7.52	$< .01$
Total amount of land available for planting	3.25	2.02	3.45	1.96	1.87	NS
Feels land is worse than his neighbors	.10	.30	.08	.28	.27	NS

Background Items	Illiterate or partially literate villages		Highly literate villages		Univariate F Ratio	Significance of F Ratio
	\bar{X}	SD	\bar{X}	SD		
Number of animals owned	1.81	2.40	1.80	2.34	.00	NS
Works away from the farm	.37	.48	.34	.47	.84	NS
Works as a skilled worker (merchant, teacher, driver)	.01	.10	.00	.07	.76	NS
Perceives of money as important	.91	.29	.95	.22	5.06	<.05
Feels that money is more important than friends	.19	.40	.20	.41	.31	NS
Sees chances of advancement in farming	.93	.26	.94	.24	.17	NS
Receives letters	.51	.50	.54	.50	.86	NS
Owens a radio	.52	.50	.56	.50	1.27	NS
Listens to a radio	.87	.34	.86	.34	.06	NS
Belongs to an organized group	.13	.33	.17	.38	2.67	NS
Feels that meeting with friends & neighbors about agricultural matters is important	.80	.40	.81	.39	.19	NS
Visits nearest municipality at least a few times a year	.94	.23	.94	.23	.01	NS
Visits department capital at least a few times a year	.80	.40	.75	.43	2.23	NS
Visits Guatemala City at least a few times a year	.33	.47	.34	.47	.06	NS
Feels that family has more health problems than others	.13	.34	.12	.32	.28	NS
Includes bread in weekly diet	.43	.50	.53	.50	6.77	<.01
Includes lard in weekly diet	.43	.50	.52	.50	5.68	<.05
Includes plantains in weekly diet	.07	.25	.07	.26	.01	NS
Includes rice in weekly diet	.33	.47	.44	.50	9.95	<.01

Background Items	Illiterate or Partially literate villages		Highly Literate Villages		Univariate F Ratio	Significance of F Ratio
	\bar{X}	SD	\bar{X}	SD		
Includes vegetables in weekly diet	.35	.48	.41	.49	2.38	NS
Includes meat in weekly diet	.28	.45	.39	.49	8.42	<.01
Includes cheese in weekly diet	.62	.49	.71	.46	5.73	<.02
Includes milk in weekly diet.	.47	.40	.57	.50	7.20	<.01
Includes incaparina in weekly diet	.18	.39	.17	.38	.19	NS
Owens own house	.95	.22	.95	.21	.01	NS
Has better than thatch roof on house	.56	.50	.72	.45	22.20	<.0001
Has better than mud- fill walls	.49	.50	.73	.45	46.82	<.0001
Uses fuel other than wood or candles for lighting	.90	.30	.90	.30	.00	NS
Gets water from other than river or stream (i.e. well or faucet)	.57	.50	.52	.50	2.13	NS
Has toilet facilities	.04	.20	.07	.26	2.51	NS
Number of children	4.06	2.56	4.40	2.61	2.96	NS
Sees monetary gain as main motive for education	.78	.42	.82	.39	1.65	NS
Number of years of education desired for children	4.45	1.94	4.95	1.77	12.86	<.001
Corn production	18.49	17.10	22.83	46.30	2.43	NS
Bean production	8.46	9.72	7.98	7.09	.60	NS
Total revenue from corn and beans	369.65	299.24	386.02	380.91	.39	NS
Age	40.65	14.46	43.56	14.26	7.34	<.01

b. Variables included in the discriminant function
(in order of relative contribution)

<u>Background Items</u>	<u>Standardized Discriminant Function Coefficient</u>	<u>Multivariate partial F (df=</u>	<u>Univariate F (df=</u>
Has better than mudfill walls	0.4	17.12	46.82***
Number of parcels into which land is divided	0.4	15.34	18.32***
Visits department capital at least a few times a year	-0.3	12.02	2.23
Number of animals owned	-0.3	8.24	.00
Age	0.3	8.35	7.34**
Seeks advice on agricultural matters	0.3	9.79	14.02***
Makes agricultural decisions alone	-0.2	5.55	6.26*
Sees no risk in use of new seed	0.2	5.16	10.03**
Includes meat in weekly diet	0.2	4.22	8.42**
Bean production	-0.2	4.24	.60
Has better than thatch roof on house	0.2	2.58	22.20***
Number of years of education desired for children	0.2	2.98	12.86***
Includes bread in weekly diet	0.2	2.57	6.77**
Feels that meeting with friends & neighbors about agricultural matters is important	-0.2	2.85	.19
Feels that money is important	0.2	2.88	.31
Includes rice in weekly diet	0.2	2.25	9.95**
Percent of landholdings rented	-0.2	2.47	7.25**
Sees monetary gain as main motive for education	0.1	2.35	1.65
Includes incaparina in weekly diet	-0.1	2.21	.19
Works as a skilled worker (merchant, teacher, driver)	-0.1	2.04	.76
Sees no risk in fertilizer use	0.1	1.78	8.06**
Includes vegetables in weekly diet	-0.1	1.53	2.38
Corn production	0.1	1.80	2.43
Number of children	-0.1	1.17	2.96

Group Centroids:

Illiterate/Partially lit. villages = -.55

Highly literate villages = .38

Multivariate F Ratio (for discriminant function) = 6.31 p.0001

Canonical correlation (for two groups equivalent to multiple R) = .42

Canonical correlation squared (proportion of variance accounted for) = .19

Wilks' Lambda for best single predictor (Item = 246) = .94

Wilks' Lambda for discriminant function = .82

c. Results of prediction of group membership
based on discriminant function

<u>Actual Group</u>	<u>Predicted Group</u>		<u>Total Sample</u>
	<u>Illiterate/Partially Literate Villages</u>	<u>Highly Literate Villages</u>	
Illiterate/Partially Literate Villages	190 (63%)	112 (37%)	302 (100%)
Highly Literate Villages	127 (29%)	309 (71%)	436 (100%)

68% of the cases were classified correctly

* $p < .05$

** $p < .01$

*** $p < .001$

Table 30. Difference between illiterate or partially literate villages ($\leq 30\%$) and highly literate villages ($> 30\%$) in Occidente in terms of background characteristics: results of discriminant analysis.

Background Items	Illiterate or or partially literate villages		Highly literate villages		Univariate F Ratio	Significance of F Ratio
	\bar{X}	SD	\bar{X}	SD		
	Makes agricultural decisions alone	.98	.13	.97		
Sees no risk in use of new seed	.52	.50	.51	.50	.09	NS
Sees no risk in use of insecticide	.48	.50	.49	.50	.04	NS
Sees no risk in use of fertilizer	.87	.33	.75	.43	10.06	$< .01$
Sees no risk in herbicide use	.14	.35	.19	.39	2.01	NS
Sees no risk in fungicide use	.24	.42	.24	.43	.00	NS
Sells part of corn crop	.03	.18	.00	.00	4.14	$< .05$
Sells part of bean crop	.06	.24	.04	.19	.66	NS
Sees no risk in use of credit	.05	.21	.07	.26	1.32	NS
Seeks advice on agricultural matters	.03	.16	.03	.18	.09	NS
Number of parcels into which land is divided	1.39	.65	1.63	.78	11.59	$< .001$
Percent of landholdings owned	.99	.07	.99	.05	.07	NS
Percent of landholdings rented	.00	.05	.00	.05	.00	NS
Total amount of land available for planting	1.61	.96	1.71	1.04	1.06	NS

<u>Background Items</u>	<u>Illiterate or partially literate villages</u>		<u>Highly literate villages</u>		<u>Univariate F Ratio</u>	<u>Significance of F Ratio</u>
	\bar{X}	SD	\bar{X}	SD		
Feels his land is worse than his neighbors	.04	.19	.02	.16	.52	NS
Number of animals owned	1.69	2.00	2.47	2.06	13.31	<.001
Works away from the farm	.38	.49	.22	.42	10.66	<.01
Works as a skilled worker (teacher, merchant, driver)	.09	.29	.32	.47	41.02	<.0001
Perceives of money as important	.99	.09	.98	.13	.59	NS
Feels that money is more important than friends	.67	.47	.71	.45	.77	NS
Sees chances of advancement in farming	.85	.36	.86	.35	.15	NS
Receives letters	.18	.39	.34	.47	13.03	<.001
Owens a radio	.44	.49	.37	.48	1.73	NS
Listens to a radio	.47	.49	.43	.49	.53	NS
Belongs to an organized group	.06	.24	.06	.23	.05	NS
Feels that meeting with friends & neighbors about agricultural matters is important	.52	.50	.55	.49	.33	NS
Visits nearest municipality at least a few times a year	.99	.05	.97	.18	8.20	<.01
Visits department capital at least a few times a year	.52	.50	.50	.50	.18	NS
Visits Guatemala City at least a few times a year	.12	.33	.29	.46	20.96	<.0001
Feels that family has more health problems than others	.05	.22	.05	.22	.00	NS
Includes bread in weekly diet	.81	.39	.82	.38	.24	NS

<u>Background Items</u>	<u>Illiterate or partially literate villages</u>		<u>Highly literate villages</u>		<u>Univariate F Ratio</u>	<u>Significance of F.Ratio</u>
	\bar{X}	SD	\bar{X}	SD		
Includes lard in weekly diet	.47	.49	.48	.50	.04	NS
Includes plantains in weekly diet	.24	.43	.28	.45	.88	NS
Includes rice in weekly diet	.44	.49	.44	.49	.00	NS
Includes vegetables in weekly diet	.68	.47	.72	.45	.68	NS
Includes meat in weekly diet	.88	.32	.88	.32	.00	NS
Includes cheese in weekly diet	.28	.45	.26	.44	.19	NS
Includes milk in weekly diet	.18	.39	.19	.39	.09	NS
Includes incaparina in weekly diet	.33	.47	.39	.49	1.36	NS
Owens own house	.99	.05	.99	.09	.66	NS
Has better than thatch roof on house	.89	.31	.60	.49	54.94	<.0001
Has better than mud-fill walls	.92	.27	.81	.39	12.38	<.001
Uses fuel other than wood or candles for lighting	.84	.36	.81	.39	.81	NS
Gets water from other than river or stream (i.e. well or faucet)	.78	.41	.96	.19	20.57	<.0001
Has toilet facilities	.02	.15	.16	.37	33.61	<.0001
Number of children	3.45	2.26	3.72	2.45	1.28	NS
Sees monetary gain as main motive for education	.49	.50	.61	.49	4.62	<.05

<u>Background Items</u>	<u>Illiterate or partially literate villages</u>		<u>Highly literate villages</u>		<u>Univariate F Ratio</u>	<u>Significance of F Ratio</u>
	<u>X</u>	<u>SD</u>	<u>X</u>	<u>SD</u>		
Number of years of education desired for children	3.77	2.11	4.47	1.85	10.44	<.01
Corn production	18.00	15.24	16.77	14.65	.61	NS
Bean production	1.84	1.83	1.54	2.44	2.01	NS
Total revenue from corn and beans	158.27	124.27	144.36	123.49	1.15	NS
Age	38.98	12.73	39.03	14.01	.00	NS

b. Variables included in the discriminant function (in order of relative contribution).

<u>Background Items</u>	<u>Standardized discriminant function coefficients</u>	<u>Multivariate partial F (df=19,466)</u>	<u>Univariate F (df=1,484)</u>
Has better than thatch roof on house	-0.6	56.66***	54.95***
Works as a skilled worker (teacher, merchant, driver)	0.5	32.99***	41.02***
Number of animals owned	0.3	18.26***	13.31***
Gets water from other than river or stream (i.e. well or faucet)	0.3	17.78***	20.57***
Has toilet facilities	0.3	14.28***	33.61***
Sells part of corn crop	-0.3	8.42***	4.14*
Visits nearest municipality at least a few times a year	-0.3	10.41***	8.20**
Bean production	-0.2	6.33***	2.01
Number of parcels into which land is divided	0.2	7.07***	11.59***
Includes cheese in weekly diet	-0.2	3.67***	.19
Receives letters	0.2	5.13***	13.03***
Sees monetary gain as main motive for education	0.2	3.99***	4.62*
Includes milk in weekly diet	0.1	1.49	.09
Sees no risk in fertilizer use	-0.1	2.67**	10.06**
Sells part of bean crop	0.1	1.44	.66
Feels land is worse than neighbors	-0.1	2.13	.52
Uses fuel other than wood or candles for lighting	-0.1	1.99*	.81
Owens own house	-0.1	1.61	.66
Number of years of education desired for children	0.1	1.44	10.44**

Group Centroids:

Illiterate or partially literate villages = -0.4

Highly literate villages = 1.27

Multivariate F ratio (for discriminant function) = 13.37

Canonical correlation (for two groups equivalent to multiple R) = .59

Canonical correlation squared (proportion of variance accounted for) = .35

Wilks' Lambda for best single predictor (Item = Roof type) = .89

Wilks' Lambda for discriminant function = .65

c. Results of prediction of group membership based on discriminant function

<u>Actual Group</u>	<u>Predicted Group</u>		Total Sample
	<u>Partially Lit./ illiterate villages</u>	<u>Highly Literate villages</u>	
Partia'ly literate/ illiterate villages	301(83%)	63(17%)	364(100%)
Highly literate villages	30(25%)	92(75%)	122(100%)

81% of the cases were classified correctly

- * p < .05
 ** p < .01
 *** p < .001