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Alternative Communication Technology
To Serve Agricultural Extension and Development
In The West Indies

Volume I

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by

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with the research assistance

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Alternative Communication Technology
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Volume I

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SECTION I

INTRODUCTION

This paper has been prepared for the University of the West Indies (UWI) as one of the background studies for their overall feasibility study on what types of communication technology would be appropriate to increase the outreach capacity of the university to better serve its member territories. This study focuses on the needs of the agricultural sector in general, and on the problems of small farmers in particular, in each territory to determine what communication technologies might be used to link the resources of the Faculty of Agriculture to its agricultural clientele and more fully support the agricultural development objectives of each territory.

The resources and programs of the Faculty of Agriculture are described following the overview of the agricultural situation in the region, which includes an assessment of national agricultural extension systems. Because the Faculty of Agriculture is one of several regional institutions that serves the agricultural sector, it seemed appropriate and necessary to briefly describe these other regional institutions. If the university decides to install a fully developed telecommunications system, some of these other regional institutions might be potential users of the system, thereby reducing the overall cost to the university.

Following the description of the resources of the Faculty of Agriculture and of the other regional institutions that serve agriculture, the various types of communication technology that are currently being used in the agricultural sector of other countries are examined: First, the various types of communication technology are described, including their advantages and disadvantages vis-a-vis the needs of the agricultural sector; then, specific applications and examples of communication technology are considered in the context of teaching, research, and service--the primary functions of the university. The final section concludes with the technological and institutional issues the university should consider as it conducts its feasibility study.

CURRENT AGRICULTURAL SETTING IN THE WEST INDIES

Agriculture is a major economic activity in most of the 14 territories served by the University of the West Indies. These countries include Antigua, the Bahamas, Barbados, Belize, the British Virgin Islands, the Cayman Islands, Dominica, Grenada, Jamaica, Montserrat, St. Kitts-Nevis-Anguilla, St. Lucia, St. Vincent, and Trinidad and Tobago. These countries depend economically upon the exportation of crops such as sugar, bananas, coffee, cocoa, citrus, and selected spices; at the same time, their agricultural balance of trade is unfavorable because of their high import bill for food crops and animal products.

This section briefly describes some of the major features of the agricultural sector in the region and the major problems faced by producers, especially the small farmers. Although a regional perspective dominates this section, country descriptions are provided in Appendix B to delineate individual differences.

A. THE POPULATION AND LAND AREA DEVOTED TO AGRICULTURE

The total population of the territories served by the UWI is estimated at 4.4 million, ranging from about 12,700 persons in Montserrat to about 2.1 million in Jamaica. The distribution of population and land area among the 14 territories is illustrated in Table 1. Population densities range from a low of 16 persons per square mile in Belize to a high of 1,506 persons per square mile in Barbados.

Employment patterns in many territories of the West Indies can be characterized as occupational multiplicity, where there is considerable part-time employment in agriculture combined with various types of off-farm employment. The employment statistics for some territories reported in Table 1 may, therefore, be understated.

Small farmers are the major agricultural group in the region, both in absolute numbers and in food crop production. In many territories, the small farmer plays an increasingly important role in the production of export crops such as bananas and other tree crops. These small farmers use labor intensive cultivation methods and have limited access to technical information and modern inputs (including credit) that could increase agricultural production and farm family incomes.

The participation of women in the production and distribution of food crops in the region is significant and warrants special attention. The percentage of women in the agricultural labor force of each territory is summarized in Table 2. These figures may be understated because of the under-enumeration of de facto female-headed households reported in official statistics (CAEP paper, p. 11). Women tend to concentrate on the production of subsistence and backyard vegetable crops.

Women also play an important role in the marketing of food crops, particularly within the territories' internal markets. Their role in these internal markets is as wholesaler and retailer--taking food crops purchased at the farm gate and then retailing them to the immediate consumer.

B. STRUCTURE OF THE AGRICULTURAL SECTOR

Two distinct types of agriculture exist in the Caribbean today: plantation and peasant farming. Both are remnants of the plantation slavery system that

DISTRIBUTION OF POPULATION AND LAND AREA BY TERRITORY

<u>COUNTRY</u>	<u>TOTAL POPULATION</u>	<u>% AGRICULTURALLY EMPLOYED</u>	<u>TOTAL LAND AREA*</u>	<u>ARABLE ACRES</u>	<u>DENSITY**</u>
Antigua	72,500	10.6	171	28,000	423
Bahamas	230,000		5,380	40,000	43
Barbados	250,000	+10.0	166	90,000	1,506
Belize	140,000	+35.8	8,867	175,000	16
British Virgin Islands	10,500	7.8	59	5,000	178
Cayman Islands	15,000	4.1	100		150
Dominica	76,700	39.5	290	47,000	264
Grenada	105,000	33.3	133	42,000	790
Jamaica	2,137,000	35.4	4,411	1,100,000	484
Montserrat	12,700	20.3	39	5,000	325
St. Kitts-Nevis-Anguilla	49,700	34.2	103	38,000	482
St. Lucia	110,100	39.7	238	75,000	462
St. Vincent	103,000	29.0	150	47,000	687
Trinidad and Tobago	1,130,000	13.0	1,980	420,000	572
<u>Totals</u>	<u>4,442,200</u>		<u>22,087</u>		

- Sources:
1. Quarterly Economic Review West Indies.
 2. Working Document Series, USDA, 1978.
 3. Agricultural Statistics, Caribbean Series, 1978.
 4. Caribbean Statistics Year Book, 1967.

* Land area in square miles.
 ** Persons per square mile.

TABLE 2

PARTICIPATION OF WOMEN IN THE WEST INDIAN AGRICULTURAL LABOR FORCE

<u>COUNTRY</u>	<u>RATE OF PARTICIPATION (%) 1979</u>
Antigua	50%
Barbados	40%
Belize	16%
British Virgin Islands	10%
Cayman Islands	9%
Dominica	36%
Grenada	20%
Jamaica	19%
Montserrat	50%
St. Kitts-Nevis-Anguilla	45%
St. Lucia	47%
St. Vincent	30%
Trinidad and Tobago	22%

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- Sources: 1. I.L.O., Yearbook of Labor Statistics, Geneva, 1979.
2. Agricultural censuses of respective countries, quoted in Working Document Series.

existed throughout the Caribbean from the beginning of the seventeenth century up to the nineteenth century (Pescatello, p. 19). Generally, plantation farms use the flat fertile land for commercial export crops, while the hilly land, with relatively shallow and infertile soil, is left for subsistence peasant farms (Smith, p. 1).

The distribution of land between large and small farmers is uneven in quantity and quality. As illustrated in Table 3, large plantation farms of 100-plus acres comprise only 1 to 2 percent of all farms but may account for 80 percent of the land area, while peasant farms of fewer than 5 acres may constitute 80 to 90 percent of all farms but only 10 to 20 percent of the land area.

Traditionally, plantation agriculture concentrated on export crops such as sugar, bananas, cocoa, coffee, and sea island cotton. Small farmers, on the other hand, generally concentrate on subsistence food crops (i.e., roots, tubers, and pigeon peas) and various vegetables that provide food and income for the small farm family. Although small farmers tend to use traditional forms of technology, their farming systems are complex and intensive: They are systems that have evolved over time to fit available resources. These farming systems are diversified to reduce risk, but tend to be inefficient and not very productive. Table 4 depicts the characteristic differences between plantation (estate) and small farm agriculture in the West Indies.

In recent years, rising labor costs combined with fluctuating world prices have threatened the economic viability of the plantation production system. In some territories, small farmers are increasing their production of export crops while some former plantation lands lay idle. As small farmers increase their output of food and export crops, they will need to shift from traditional to more efficient production technologies. Enabling small farmers to make this shift will require the expansion of support services including agricultural extension.

C. AGRICULTURAL PRODUCTION

Agriculture's share of the Gross Domestic Product (GDP) in the territories served by the university ranges from 3 to 37 percent; its share of employment ranges from about 4 to 40 percent. Agriculture's share of export earnings is substantial in many of the territories: This is particularly true in the Windward Islands and Jamaica. Bananas are the most important cash crop commodity and export-foreign exchange producer in the Windwards. Much of the banana export is generated by small farmers which is likely to increase. Jamaica produces significant amounts of citrus, cocoa, sugar, and coffee. Sugar is the major export commodity of St. Kitts and Barbados; Trinidad and Tobago also export significant amounts of sugar, cocoa, and coffee. Certain other commodities are important export earners in specific islands: nutmeg and mace in Grenada, cocoa in St. Lucia, citrus in Dominica, and arrowroot in St. Vincent.

Table 5, following, lists the major export crops, food crops, and livestock commodities for each territory. This list provides an overview of the diverse agricultural situation found in the West Indies. (For more information on the agricultural situation of individual countries, see the country studies in Appendix B.)

TABLE 3

PERCENTAGE DISTRIBUTION OF FARMS AND LAND AREA
BY FARM SIZE CATEGORY IN SELECTED TERRITORIES

<u>COUNTRY</u>		<u><5 ACRES</u>	<u>5-9.99 ACRES</u>	<u>10-99.99 ACRES</u>	<u>≥100 ACRES</u>
Antigua	Farms	91.9	4.0	2.1	2.0
	Area	(*)	(*)	(*)	(*)
Barbados	Farms	96.7	1.3	0.8	1.2
	Area	11.6	1.4	4.1	82.9
Belize	Farms	30.3	15.7	47.7	6.3
	Area	0.9	1.5	22.3	75.2
Dominica	Farms	7.3	15.6	10.0	1.4
	Area	12.5	10.2	21.7	55.5
Grenada	Farms	90.5	6.0	3.0	0.5
	Area	(*)	(*)	(*)	(*)
Jamaica	Farms	77.96	19.88	1.62	0.54
	Area	14.85	22.13	8.30	54.72
Montserrat	Farms	90.3	5.7	3.2	0.8
	Area	19.8	7.5	14.1	58.6
St. Kitts- Nevis-Anguilla	Farms	95.2	3.3	1.0	0.5
	Area	40.0	8.1	9.7	42.2
St. Lucia	Farms	82.0	10.4	7.0	0.6
	Area	14.2	9.8	23.6	52.4
St. Vincent	Farms	87.5	9.3	2.8	0.4
	Area	23.5	11.8	11.1	53.6

Source: Agricultural censuses of respective countries, quoted in Working Document Series #2, Caribbean Region, 1978.

* No data available.

TABLE 4

THE DIFFERENCE BETWEEN ESTATES AND SMALL FARMS
IN THE WEST INDIES

<u>ESTATES</u>	<u>SMALL FARMS</u>
<u>LAND</u>	
Large acreage.	Small acreage, mostly under five acres and many less than one acre.
Flattest, most fertile land and most accessible land.	Small, scattered plots. Poor land; hilly, dry, infertile soils, and often remote, inaccessible areas. Land often rented; on owner-occupied land, the legal title is often uncertain.
<u>LABOR</u>	
Large number of workers, some only seasonal. Trained and specialist labor and management.	Family labor, often part-time. Some help from neighbors. Untrained farmers. The government or farmers' organizations may supply specialist advice and services.
Foreign specialists and managers.	
<u>CAPITAL</u>	
Modern equipment for cultivation and processing.	Little capital, therefore primitive equipment.
Fertilizers and insecticides.	Little fertilizer and insecticides used. The government or farmers' organizations may supply loans for equipment and fertilizers, etc.
<u>ENTERPRISE</u>	
Often provided by specialists and well-organized bodies, often expatriate.	Provided by small farmers with little control over the market for their products. May be helped by government and farmers' organizations.

TABLE 5

MAJOR EXPORT AND FOOD CROPS AND LIVESTOCK ENTERPRISES BY COUNTRY

<u>COUNTRY</u>	<u>MAJOR FOOD CROPS</u>	<u>MAJOR EXPORT CROPS</u>	<u>LIVESTOCK</u>
Antigua	sweet potatoes cassava yams tomatoes cabbage carrots eggplant pumpkins corn okra peas beans squash breadfruit cucumbers	sugar cane cotton	cattle sheep goats poultry
Bahamas	onions tomatoes cucumbers pigeon peas lima beans cabbage beets carrots spinach egg plant pepper	sugar cane citrus fruit bananas pineapple sisal	goats swine poultry dairy cattle beef cattle
Barbados	carrots cabbage string beans lettuce beets eschallots yams onions mangoes avocado citrus fruit bananas melons gooseberries cherries	sugar cane	cattle (dairy)

TABLE 5

MAJOR EXPORT AND FOOD CROPS AND LIVESTOCK ENTERPRISES BY COUNTRY (cont.)

<u>COUNTRY</u>	<u>MAJOR FOOD CROPS</u>	<u>MAJOR EXPORT CROPS</u>	<u>LIVESTOCK</u>
Belize	red kidney beans rice maize root crops vegetables	sugar cane citrus bananas cocoa coconut cohune nuts	cattle beef dairy pigs poultry
British Virgin Islands	limas bananas coconuts mangoes ground provisions	sugar cane	cattle
Cayman Islands	ground provisions tree crops: mangoes citrus avocado breadfruit		beef cattle (ready for export)
Dominica	ground provisions plantains cucumbers tomatoes cabbages	bananas citrus (esp. limes)	goats pigs cattle
Grenada	pigeon peas ground provisions corn tomatoes okra lettuce mangoes avocado beans	nutmeg mace cocoa bananas breadfruit	pigs goats sheep beef cattle dairy cattle
Jamaica	corn pineapple rice vegetables root crops	annato bananas citrus cocoa coconuts tobacco sugar cane pimento ginger coffee	beef cattle pig dairy cattle poultry

TABLE 5

MAJOR EXPORT AND FOOD CROPS AND LIVESTOCK ENTERPRISES BY COUNTRY (cont.)

<u>COUNTRY</u>	<u>MAJOR FOOD CROPS</u>	<u>MAJOR EXPORT CROPS</u>	<u>LIVESTOCK</u>
Montserrat	ground provisions peppers tomatoes carrots onions peas beans breadfruit	cotton bananas limes coconuts	cattle goats pigs sheep poultry
St. Kitts- Nevis- Anguilla	ground provisions mangoes cabbages carrots tomatoes peanuts onions	coconuts cotton sugar cane	beef cattle (mainly draft animals)
St. Lucia	ground provisions corn pigeon peas beans ginger peanuts breadfruit plantains	bananas cocoa coconuts citrus nutmeg coffee	cattle, beef and dairy pigs goats sheep poultry horses, mules, and donkeys
St. Vincent	ground provisions carrots maize pigeon peas tomatoes pumpkins avocado mangoes	arrowroot bananas coconuts cotton nutmeg mace tobacco	pigs cattle
Trinidad and Tobago	rice root crops vegetables peas beans maize	sugar cane cocoa coconuts citrus coffee tobacco	goats swine dairy cattle beef cattle donkeys

Sources: 1. Working Document Series Caribbean Region #2, 1978.
2. Caribbean Yearbook, 1979.

In addition to the diversity of crops grown in each territory, similar diversity exists in the ecological environments found in the region and even within the individual territories. Rainfall patterns differ substantially within some islands affecting the types of farming systems that are possible. Furthermore, soil types vary from the Pine Ridge soils in Belize to the shale soils of central Jamaica, to the calcareous soils of Antigua and Barbados and the volcanic soils of the Windward and other Leeward Islands, to the heavy, clay soils of Trinidad and Tobago.

Agriculture in the West Indies is relatively small in terms of overall production and in the amount of land area under cultivation, but it has very complex farming systems. If small farmers in the West Indies are to become productive, they must have access to competent extension workers, back-stopped by well trained and technically competent specialists who can quickly respond to a range of technological problems.

While many of the territories earn scarce foreign exchange through the sale of export crops, they also have a negative agricultural balance of trade because of the substantial levels of food they import. Some nations are now adopting a policy of import substitution to reduce their dependence on foreign food supplies. To do this, they need to remove the constraints to increased agricultural production.

Several of these factors which limit agricultural production include: (1) most of the productive land is owned by the large land owners and devoted to export crops; (2) agricultural research has concentrated on plantation crops, and as a result there is little improved technology available to increase food production, particularly for the small farms; (3) land ownership and use rights are not well defined in some islands, limiting most types of capital investment (particularly in permanent tree crops and other medium- and long-term capital improvements) and constraining access to production credit; and (4) the shifting market demand for food crops created by the unreliable transportation system and the uncertain marketing situation in the region substantially increases the level of risk to producers. Most small farmers, therefore, are unwilling to take on added risk without marketing assurances. These are some of the major problems which must be overcome before small farm agriculture in the region can develop to meet the region's food requirements.

SECTION IIINATIONAL AGRICULTURAL EXTENSION SYSTEMS IN THE WEST INDIES

National agricultural extension systems in the West Indies must function as the primary link between the region's small farmers and the world of technology, credits, inputs, services, etc. There are virtually no other organizations which can offer this kind of service. Agricultural societies, cooperatives, and fraternal societies are small, extremely limited in scope, or non-existent. Private-sector involvement in small farm agriculture (such as fertilizer dealerships, seed and equipment merchants, aggressive private banks, etc.) is limited, except for the Windward Islands Banana Growers Association and J. Geest, the extra-regional shipping firm. Agricultural extension is therefore the only institution that is available to transmit information to the small farmer. Its importance is enhanced because of the regional investments occurring in agricultural research, marketing, and planning which will generate new technology and information for transmission to farmers (CAEP, p. 24).

A. OVERVIEW OF AN EFFECTIVE ORGANIZATION

An extension system must be (1) problem oriented, (2) research based, and (3) educational in character. Because farmers only make changes that meet their objectives and can be realized without undue risk, extension workers must educate, guide, and motivate the farmer after securing his or her confidence. Assignments should not conflict with the educational relationship that must exist between the farmer and extension personnel; furthermore, target farmers should be directly involved in setting program priorities and in program evaluation.

Extension personnel must be able to facilitate the adoption of improved farm practices through the use of appropriate extension methods and demonstrated competence in the improved technology. Frequent farm visits must be made to assist the farmers in using the new technology. To do this, extension personnel must be trained in hands-on work; they must live in the areas that they are assigned to serve; they must have transportation and the communication and demonstration funds that are essential for such an assignment; and furthermore, they must be backstopped when they encounter problems beyond their capacities. Through such an approach, with a sound, consistently administered personnel policy, an extension service can build a reputation for leadership and become a leading force in development (CAEP, pp. 24-25).

While the preceding description of an effective extension organization is a valid goal for national extension systems in the West Indies, considerable work needs to be done before this goal can be realized. The University of the West Indies, through the newly initiated Caribbean Agricultural Extension Project, will assist nine of the national extension systems in the region in moving closer to this goal. Before delineating the main features of this new project, the following section will describe the current status of national extension systems in the region.

B. SIZE AND STRUCTURE OF NATIONAL EXTENSION SYSTEMS

An agricultural extension system is essentially an educational organization that transmits to the farmer technical and other types of information from different services or support institutions. For this reason, the size and quality of staff is an important factor relating to organizational effectiveness; further-

more, examining how extension personnel are organized suggests the type of functions being carried out by the extension organization.

Table 6 presents a breakdown of extension personnel, by role, for each national system on which data are available. This ratio assumes that most extension agents are in the field working with farmers on a regular basis. As the paper for the Caribbean Agricultural Extension Project points out, extension personnel are engaged in many non-educational roles. Many field level extension agents are required to coordinate tractor and machinery services, sell licenses, and even settle minor land disputes (CAEP, p. 27). Additionally, some national systems have more personnel involved in administrative, supervisory, and support roles than as agents in the field, which further reduces the number of personnel actually available to work with farmers. Finally, one chief agriculture officer reported that some lower-level extension positions are frequently filled for political reasons (CAEP, p. 27). This observation suggests something about the quality of extension personnel, explored in more detail in the following section.

C. THE QUALITY OF EXTENSION PERSONNEL

Assessing the quality of extension personnel is an imprecise task. One objective measure that can be used, however, is the educational qualifications of the extension staff. Table 7 provides some information on the educational qualifications of extension personnel in the region.

These data reflect the educational qualifications of extension personnel at the study's conclusion in 1974. About half of those staff members with a diploma or degree in agriculture obtained them while they were staff of their respective national extension systems. The appointment of non-qualified extension personnel, therefore, places a continuing demand on the national system to upgrade its staff.

Another quality index is how many personnel have received additional technical training since joining the organization. Data on the Caribbean territories are presented in Table 8. As can be seen from these data, at the time the survey was taken only 60 percent of the staff received additional technical training to upgrade their technical skills and knowledge. No information is available on the type or amount of additional training received. Another area of interest is the professional preparation extension personnel receive as part of their pre-service training. Data on the training extension workers receive in the area of extension/communication methods and skills are presented in Table 9. As can be seen from the data, about 44 percent of the extension personnel indicated they had received no training in extension methods and techniques as part of their pre-service or in-service training. Again, no information is available on the type or quality of extension training received.

D. EXTENSION METHODS AND COMMUNICATION SKILLS USED BY EXTENSION PERSONNEL

This section will examine the specific communication skills and extension methods used by extension personnel to obtain some indication of the adequacy of training in these areas. These skills and methods will be examined within the major categories of extension methodology, including mass media and group and individual contacts.

TABLE 6

SIZE AND STRUCTURE OF NATIONAL EXTENSION SYSTEMS IN SELECTED TERRITORIES
IN THE WEST INDIES

<u>COUNTRY</u>	<u>ADMINISTRATIVE SUPERVISORY PERSONNEL</u>	<u>TECHNICAL SPECIALISTS</u>	<u>FIELD EXTENSION WORKERS</u>	<u>TOTAL PERSONNEL</u>
Antigua	3	1	10	14
Bahamas	2	12	15	29
Barbados	3	3	5	11
Belize	7	N/A	28	35
Dominica	5	4	17	26
Grenada	5	9	16	30
Montserrat	2.5	3	4.5	10
St. Kitts- Nevis-Anguilla	1	1	3	5
St. Lucia	8	2	19	29
St. Vincent	5	9	10	24
Trinidad & Tobago	39	11	52	102

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- Sources: 1. Adapted from the 1974 Agricultural Extension Staff Survey of the Eastern and Southern Caribbean, Department of Agricultural Extension, University of the West Indies, 1974 (unpublished data; do not quote or reproduce).
2. Adapted from Agricultural Extension Organization and Extension Training Institutions, 1975.
3. Vickie Sigman (trip report), 1980.
4. McCabe, Marie S. and Burton E. Swanson, International Directory of Extension Organizations and Extension Training Institutions, MUCIA, 1975.

TABLE 7

EDUCATIONAL QUALIFICATIONS OF EXTENSION PERSONNEL IN SELECTED TERRITORIES

<u>COUNTRY</u>	<u>NO FORMAL QUALIFICATIONS</u>	<u>AGRICULTURE SCHOOL DIPLOMA</u>	<u>UNIVERSITY DEGREE</u>	<u>TOTAL</u>
Antigua	8	5	1	14
Barbados	-	9	2	11
Dominica	14	10	2	26
Grenada	12	17	1	30
Montserrat	4	5	1	10
St. Kitts- Nevis-Anguilla	2	3	-	5
St. Lucia	6	15	3	24
St. Vincent	6	15	3	24
Trinidad & Tobago	13	72	17	102

Source: Adapted from 1974 Agricultural Extension Staff Survey of the Eastern and Southern Caribbean, Department of Agricultural Extension, University of the West Indies, 1974 (unpublished data; do not quote or reproduce).

TABLE 8

ADDITIONAL TECHNICAL TRAINING RECEIVED BY EXTENSION PERSONNEL
FOR SELECTED TERRITORIES (1974)

<u>COUNTRY</u>	<u>TECHNICAL TRAINING RECEIVED</u>	<u>TECHNICAL TRAINING NOT RECEIVED</u>	<u>TOTAL</u>
Antigua	7	7	14
Barbados	7	4	11
Dominica	19	7	26
Grenada	25	5	30
Montserrat	4	6	10
St. Kitts- Nevis-Anguilla	2	3	5
St. Lucia	17	12	29
St. Vincent	18	6	24
Trinidad & Tobago	<u>51</u>	<u>51</u>	<u>102</u>
<u>Totals</u>	<u>150</u>	<u>100</u>	<u>251</u>

Source: 1974 Agricultural Extension Staff Survey of the Eastern and Southern Caribbean, Department of Agricultural Extension, University of the West Indies, 1974 (unpublished data; do not reproduce or quote).

TABLE 9

PRE-SERVICE AND IN-SERVICE TRAINING RECEIVED BY EXTENSION PERSONNEL
IN EXTENSION METHODS FOR SELECTED TERRITORIES

<u>COUNTRY</u>	<u>PRE-SERVICE TRAINING RECEIVED</u>	<u>IN-SERVICE TRAINING RECEIVED</u>	<u>NONE RECEIVED</u>	<u>TOTAL</u>
Antigua	6	4	4	14
Barbados	3	1	7	11
Dominica	2	7	17	26
Grenada	5	11	14	30
Montserrat	2	2	6	10
St. Kitts- Nevis-Anguilla	1	1	3	5
St. Lucia	6	7	16	29
St. Vincent	7	12	5	24
Trinidad & Tobago	<u>48</u>	<u>15</u>	<u>39</u>	<u>102</u>
<u>Totals</u>	<u>80</u>	<u>60</u>	<u>111</u>	<u>251</u>

Source: 1974 Agricultural Extension Staff Survey of the Eastern and Southern Caribbean, Department of Agricultural Extension, University of the West Indies (unpublished data; do not reproduce or quote).

1. Mass Media Methods

In the 1974 Agricultural Extension Staff Survey of the Eastern and Southern Caribbean, extension use of mass media--newspaper and radio--was explored. The survey asked the respondents several questions: whether extension personnel had prepared a news article in the last six months; whether they had ever prepared a news article; and if they had ever presented a radio talk. These findings are presented in Table 10.

As illustrated in Table 10, newspaper and radio are used for extension purposes in all the territories included in the survey; however, there is broader usage of the radio. These findings are consistent with reports from other sources suggesting that radio is widely used to communicate agricultural information to farmers (see country studies in Appendix B).

2. Group Extension Methods

The 1974 extension staff survey also examined various types of group extension methods that agents utilized. Extension personnel were asked whether they had addressed a meeting of farmers in the last three months; whether they had organized a field day in the last six months; whether they had organized a film show for farmers in the last six months; and whether they had shown slides to farmers in the last six months. These data follow in Table 11.

As can be seen in Table 11, there is widespread use of group extension methods, particularly field days. Although there is a surprisingly high use of film in most of the territories, there are far fewer cases where slides are used to teach farmers. Because slides appear to be a simpler form of communication technology to prepare and utilize, it would be helpful to know how relevant the film shows were to local farm problems. If the films used were produced outside the region, it is questionable how relevant these teaching materials were to local problems. These data do suggest, however, that extension agents are familiar with a variety of group methods and given appropriate teaching materials there is high probability they would be utilized.

3. Individual Methods

The survey did not explore the use of individual extension methods such as the farm visit, conferences in the extension office, or the telephone. Based on information presented at the 1979 agricultural extension conference held on the St. Augustine campus, the lack of adequate transportation and/or travel allowances appears to be a major factor in limiting agent contact with farmers in the field. Field-level extension personnel to be effective must be mobile to make regular visits to the farmers.

Past experience suggests that when extension agents work directly with farmers, there is a propensity to work with the larger, more commercially oriented producers (CAEP, p. 30). This bias may reflect the heavy emphasis on export or cash crops and/or the increased receptivity of larger, better educated farmers to new ideas. Now, with the new emphasis on food crops and multiple cropping systems, the small farmer must become the new target group and the extension message must reflect the new, improved technology. This change in message content, plus the need to direct it to a new client group, will require some modification of the extension methods used to accomplish this new extension task.

PERCENTAGE OF NATIONAL EXTENSION STAFF USING MASS MEDIA METHODS IN SELECTED COUNTRIES

<u>COUNTRY</u>	<u>% WHO PREPARED NEWS ARTICLE (LAST 6 MO.)</u>	<u>% WHO EVER WROTE NEWS ARTICLE</u>	<u>% WHO GAVE A RADIO TALK</u>
Antigua	7% (1/14) N	14% (2/14) N	29% (4/14) N
Barbados	9% (1/11)	9% (1/11)	18% (2/11)
Dominica	38% (10/26)	38% (10/26)	42% (11/26)
Grenada	10% (3/30)	31% (8/26)	27% (8/30)
Montserrat	0% (0/10)	10% (1/10)	70% (7/10)
St. Kitts-Nevis-Anguilla	- (0/5)	40% (2/5)	80% (4/5)
St. Lucia	10% (3/29)	14% (4/29)	28% (8/29)
St. Vincent	4% (1/24)	4% (1/24)	17% (4/24)
Trinidad & Tobago	3% (3/102)	4% (4/102)	16% (16/102)
<u>Average</u>	<u>9% (22/251)</u>	<u>13% (33/251)</u>	<u>25% (64/251)</u>

Source: 1974 Agricultural Extension Staff Survey of the Eastern and Southern Caribbean, Department of Agricultural Extension, University of the West Indies, 1974 (unpublished data; do not quote or reproduce).

PERCENTAGE OF GROUP EXTENSION METHODS USED BY EXTENSION PERSONNEL

<u>COUNTRY</u>	<u>ADDRESSED FARMERS MEETING LAST 3 MO.</u>		<u>ORGANIZED FIELD DAY LAST 6 MO.</u>		<u>ORGANIZED FIIM SHOW LAST 6 MO.</u>		<u>SHOWED SLIDES TO FARMERS LAST 6 MO.</u>	
Antigua	21%	(3/14) N	36%	(5/14) N	36%	(5/14) N	36%	(5/14) N
Barbados	36%	(4/11)	64%	(7/11)	27%	(3/11)	0%	(0/11)
Dominica	65%	(17/26)	81%	(21/26)	19%	(5/26)	19%	(5/26)
Grenada	40%	(12/30)	53%	(16/30)	7%	(2/30)	0%	(0/30)
Montserrat	50%	(5/10)	40%	(4/10)	0%	(0/10)	10%	(1/10)
St. Kitts-Nevis- Anguilla	0%	(0/5)	40%	(2/5)	0%	(0/5)	0%	(0/5)
St. Lucia	55%	(16/29)	69%	(20/29)	69%	(20/29)	52%	(15/29)
St. Vincent	33%	(8/24)	25%	(6/24)	13%	(3/24)	4%	(1/24)
Trinidad & Tobago	36%	(37/102)	51%	(52/102)	43%	(44/102)	10%	(10/102)
<u>Average</u>	<u>41%</u>	<u>(102/251)</u>	<u>53%</u>	<u>(133/251)</u>	<u>33%</u>	<u>(82/251)</u>	<u>15%</u>	<u>(37/251)</u>

Source: 1974 Agricultural Extension Staff Survey of the Eastern and Southern Caribbean, Department of Agricultural Extension, University of the West Indies, 1974 (unpublished data; do not quote or reproduce).

E. PERCEPTIONS OF TRAINING NEEDS AND TECHNICAL SUPPORT BY EXTENSION PERSONNEL

Data on perceived training needs were also collected in the survey of agricultural extension staff in the eastern and southern Caribbean. Agents were asked if they needed additional training in technical subjects and extension principles and methods. These data follow in Table 12.

As illustrated in the table, there is a high demand for both technical and extension methods training. Unfortunately, complete data were not available on the desired types of training (within each category). For our purposes, we can conclude there is a continuing need for additional training for approximately 75 percent of all sampled extension personnel in the region.

The survey also explored how well extension personnel were supported by technical publications and their perceived need for backstopping by technical specialists. These data are presented in Table 13.

As shown in Table 13, most extension personnel throughout the region regularly receive technical publications. These findings indicate that the Agricultural Information Unit at UWI is successfully preparing and disseminating these technical materials. With the expanded capacity to be developed by the Agricultural Extension Project, a wider range of extension teaching materials should be forthcoming to backstop agents.

Although technical publications can solve certain problems, they are not a sufficient answer for all problems. More than 80 percent of the extension agents need more direct help from technical specialists in diagnosing and solving their immediate problems.

In a region as vast as the West Indies with few technical specialists available to the smaller territories, there is an obvious need to regularly draw on this expertise. It appears there is a strong perceived need on the part of extension personnel to tap the faculty resources of the St. Augustine campus, as well as CARDI personnel in the region and national program staff members in other territories who have the needed expertise to solve a particular problem.

F. ROLE AND FUNCTION OF UWI AGRICULTURAL EXTENSION PROJECT TO IMPROVE NATIONAL EXTENSION SYSTEMS IN THE REGION

The project paper outlining the major components of the Agricultural Extension Project detailed some of the major deficiencies currently found in many of the region's national extension systems. The deficiencies include the following:

- Non-educational role of extension agents.
- Personnel or staff development problems.
- Organization and management problems.
- Skewed client groups.

TABLE 12

PERCENTAGE OF EXTENSION PERSONNEL PERCEIVING A NEED FOR ADDITIONAL TRAINING
IN TECHNICAL SUBJECT MATTER AND EXTENSION METHODS

<u>COUNTRY</u>	<u>% DESIRING MORE TECHNICAL SUBJECT MATTER</u>		<u>% DESIRING MORE EXTENSION METHODS</u>	
Antigua	100%	(14/14) N	100%	(14/14) N
Barbados	73%	(3/11)	73%	(8/11)
Dominica	65%	(17/26)	92%	(24/26)
Grenada	77%	(23/30)	80%	(24/30)
Montserrat	60%	(6/10)	80%	8/10)
St. Kitts-Nevis- Anguilla	100%	(5/5)	100%	(5/5)
St. Lucia	62%	(18/29)	83%	(24/29)
St. Vincent	50%	(12/24)	67%	(16/24)
Trinidad & Tobago	71%	(72/102)	75%	(76/102)
<hr/>				
<u>Average</u>	<u>70%</u>	<u>(175/251)</u>	<u>79%</u>	<u>(199/251)</u>

Source: 1974 Agricultural Extension Staff Survey of the Eastern and Southern Caribbean, Department of Agricultural Extension, University of the West Indies, 1974 (unpublished data; do not quote or reproduce).

TABLE 13

TECHNICAL SUPPORT OF EXTENSION PERSONNEL

<u>COUNTRY</u>	<u>% REGULARLY RECEIVE TECHNICAL PUBLICATIONS</u>		<u>% PERCEIVED NEED FOR MORE HELP FROM TECHNICAL SPECIALISTS</u>	
Antigua	64%	(9/14) N	100%	(14/14) N
Barbados	91%	(10/11)	82%	(9/11)
Dominica	88%	(23/26)	92%	(24/26)
Grenada	77%	(23/30)	80%	(24/30)
Montserrat	100%	(10/10)	80%	(8/10)
St. Kitts-Nevis- Anguilla	60%	(3/5)	100%	(5/5)
St. Lucia	79%	(23/29)	83%	(24/29)
St. Vincent	63%	(15/24)	54%	(13/24)
Trinidad & Tobago	69%	(79/102)	81%	(83/102)
<hr/>				
<u>Average</u>	<u>74%</u>	<u>(186/251)</u>	<u>81%</u>	<u>(204/251)</u>

Source: 1974 Agricultural Extension Staff Survey of the Eastern and Southern Caribbean, Department of Agricultural Extension, University of the West Indies, 1974 (unpublished data; do not quote or reproduce).

- Training.
- Delivery systems problems.
- Mobility problems.
- Equipment (educational and field).
- Small farmer receptivity.
- Lack of technical backstopping.*

In response to these deficiencies, the project design team delineated several activities which will upgrade these national programs so they can function more effectively. These activities are summarized briefly below.**

1. Establish a Regional Agricultural Extension Coordinating Committee

The first major task to be undertaken by the project staff will be to establish a Regional Agricultural Extension Coordinating Committee (RAECC) which will provide advice and counsel to UWI about the implementation of the project and serve a communication function for agricultural extension in the region. The chief agricultural officer and the director of agricultural extension in each territory, as well as the representatives of other extension-related institutions such as WINBAN, and a representative from the Women in Development Unit at UWI will be invited to serve on the committee which will meet five times during the life of the project.

The specific objectives of the coordinating committee are as follows:

- Provide advice and counsel to UWI regarding the implementation of the project.
 - Provide an essential linkage between the project and the national territories, as well as an important linkage between territories for sharing ideas.
 - Share insights about regional resources in the development of national extension systems.
 - Participate in the periodic evaluation of the national extension plans and the project.
2. Conduct an Institutional Analysis and Develop a National Extension Improvement Plan for Each Territory

Following the first RAECC meeting, a comprehensive institutional analysis of each national extension system will be undertaken. Based on these

* For more information on these deficiencies, see the Caribbean Agricultural Extension Project Paper, pp. 26-39.

** This section is excerpted from the Caribbean Agricultural Extension Project Paper, pp. 40-68.

findings, a national extension improvement plan will be developed. Each national plan will be tailored to the territory's specific needs--no preconceived model will be "forced" into operation, and the plan will rely on host government input and approval. Project staff, assisted by short-term technical advisors, will conduct the institutional analyses and prepare recommendations for the national extension improvement plans.

Each national government will be strongly urged to appoint government officials as well as lay people (farmers, including women, and representatives from agricultural business firms, agricultural banks, marketing boards, etc.) to the planning committee. This joint planning committee will collect information on the strengths and weaknesses of the national extension systems and formulate recommendations incorporated into a national plan to improve the following:

- The relationship between the national extension system and other institutions that serve the agricultural sector.
- The policies and procedures within the national extension systems that are related to performance (organizational

The planning committee will additionally provide the following services:

- Conduct an analysis of delivery systems currently employed by national extension systems and examine the types of programs currently carried out by each national extension system, including the types of extension methods employed, and the types of extension software available and used.
- Identify extension personnel resources currently available to or lacked by the national extension systems.
- Conduct an examination of extension hardware and other resources currently utilized or needed by national extension systems.
- Collect household survey data on the three territories not included in the original UWI/CARDI survey.

The final outcome of these joint planning and analysis activities will be a set of comprehensive, four-year plans for the improvement of the national extension systems. Because of the specific weaknesses identified during the institutional analysis, each national extension improvement plan will identify (1) the specific deficiencies being addressed, (2) how these deficiencies or problems will be solved, and (3) which institutions (i.e., UWI backstopped by the U.S. counterpart institution or the national extension system) will carry out the specific task.

3. Develop and Implement National Extension Improvement Plans

The ten major deficiencies identified among national extension services can be alleviated through organized activities in these four major areas: organization and management, training, delivery systems, and backstopping.

a. Organization and management

The current extension system is a vestige of the past geared to the delivery of services in an authoritarian framework. Extension services must be more responsive to farmers' needs. The national planning committees, working with project staff, will design extension services which are flexible, responsive, and organizationally sound. The CAO for each territory will be in charge of the reorganized services units; the number of hierarchical levels will be kept to a minimum.* It is essential that the reorganized extension service earns the trust of small farmers so they can organize their educational activities in an atmosphere of shared confidence.

In addition to these organizational problems, many administrative management needs will be addressed. Although the degree of need varies in the different territories, these management needs involve the development of work procedures and plans, reports and accountability requirements, and the deployment of staff. Supervision is inadequate, yet very important because of the limited training of many existing extension personnel.

b. Training

The training section of each national extension plan will allocate resources to diploma- and degree-level educational programs in agricultural extension, as well as to in-service training programs on specific topics or problem areas that seriously limit the effectiveness of extension personnel and programs in one or more of the territories or in the region as a whole.

1) Educational programs

Diploma-level programs in agriculture--Because a substantial proportion of personnel in national extension systems are untrained, scholarships have been established for some extension personnel to pursue the diploma of agriculture at an intermediate-level school of agriculture, e.g., the Jamaica School of Agriculture (JSA), Eastern Caribbean Institute of Agriculture and Forestry (ECIAF), or the Guyana School of Agriculture (GSA).

Degree-level programs in agriculture extension--An effective extension organization requires well-trained field agents working with farmers and competent mid-management and technical specialists personnel. To help the smaller territories build this leadership component for the future, some educational resources were allocated for B.Sc.- and M.Sc.-level training in agricultural extension at UWI.

Diploma program in extension education--The UWI will establish a one-year diploma course extension education for school of agriculture diploma-level graduates. This course will offer special training in agricultural extension for younger, but experienced extension personnel who want to upgrade their professional qualifications. This program is responsive to concerns expressed by territorial governments that degree-level training takes too long and is too costly.

* CAO designates the Chief Agricultural Officer for each territory.

2) In-service training programs

Based on the institutional analysis conducted during the first year and on the field observations of long-term staff in subsequent years, in-service training programs will be identified and carefully designed and handled on a national or regional basis.

c. Delivery systems

A major result of the national extension improvement plans will be the design of a delivery system for transmitting appropriate improved technology to small farm households in each territory. There will be commonalities in these systems, but each will be in some measure unique to the territory it is to serve, taking into account such variables as the characteristics of the indigenous farm population, the prevailing cropping mix, and the characteristics and ability of the extension staff. Local participation by the national planning committees in the development of national extension improvement plans will be of crucial importance in the design of locally effective delivery systems.

Given the conflicts in existing delivery systems on some islands between educational and regulatory functions assigned to the same individual agent, it is expected that it will be necessary to work out appropriate roles and divisions of labor for these subsystems to maximize the effectiveness when the following are introduced:

1) Vehicles needed by national extension systems

Lack of mobility was consistently pointed out by CAOs and others as a critical factor inhibiting effective extension work. Vehicles are absolutely essential to the sort of extension service this project seeks to develop--one which is in close, frequent touch with the farmers, providing information, listening to responses, etc.

2) Communication equipment for national extension services

A major need expressed by local extension personnel was for greatly expanded communication capacity--i.e., the expanded ability to use radio, films, newspapers, bulletins, and audiovisual equipment to more efficiently share technical information with farm families. The project would provide assistance to each national extension service in acquiring communication equipment it needs.

d. Backstopping and outreach programs

The UWI already has the nucleus of an outreach capacity which the Agricultural Extension Project will materially strengthen. The university has an extramural program on each island in the region, but the Department of Agricultural Extension has been constrained by staff shortages from being a fully effective presence within this program. The Agricultural Extension Project will allow the department to station a full-time resident staff member, with an appropriately equipped office, in the Leewards, the Windwards, and Belize. The core of the project's staff will reside in Trinidad. The expanded Agriculture Information Unit will be described in the last section of Section IV.

SECTION IVFACULTY OF AGRICULTURE RESOURCES
TO SUPPORT REGIONAL AGRICULTURAL DEVELOPMENTA. INTRODUCTION

The University of the West Indies is an independent university serving 14 territories in the West Indies. The university has campuses at Cave Hill in Barbados, at St. Augustine in Trinidad, and at Mona in Jamaica. The total student body, which numbers more than 7,000, is distributed among the faculties of agriculture, arts and general studies, education, engineering, law, medicine, natural science, and social sciences.

The Faculty of Agriculture of the University of the West Indies was formerly part of the Imperial College of Tropical Agriculture which merged with the university in 1960. In addition to the Faculty of Agriculture, a university library, a College of Arts and Science, a Faculty of Social Science, a Faculty of Engineering, an Institute of Education, and Institute of International Relations, a School of Legal Education, a Department of Management Studies, the Caribbean Agricultural Research and Development Institute, and the Caribbean Industrial Research Institute are also located on the St. Augustine campus.

The university library at St. Augustine serves the faculties of agriculture, engineering, social sciences, arts, law, and education, and now has more than 126,000 bound volumes and 360,000 unbound items--pamphlets, unbound serial parts, microfilm, and maps. More than 5,000 journal and serial titles are currently received, and a large majority of those are in agriculture and the sciences. The university library collection of books and journals on tropical agriculture is one of the best in the world.*

The Faculty of Agriculture operates a 350-acre field station, which includes a dairy herd of over 150 animals. Closely associated with the field station is the Texaco Food Crops Farm which, though independently managed, draws its labor supply from the field station's labor pool.**

B. THE FACULTY

The Faculty of Agriculture consists of nearly 40 professionally qualified staff members organized into six departments:

- Agricultural Economics and Farm Management.
- Agriculture Extension.
- Biological Sciences.

* Excerpted from UWI Faculty of Agriculture Information Booklet on Postgraduate Studies, pp. 6-7.

** UWI, Compendium of Research, p. 3.

- Crop Science.
- Livestock Science.
- Soil Science.

A current list of the academic staff is included as Appendix C to this report.

C. THE ACADEMIC PROGRAM

The Faculty of Agriculture admits students for the bachelor of science (B.Sc.) degree in agriculture and for the postgraduate degrees of master of science (M.Sc.) and doctor of philosophy (Ph.D.) in agriculture and agricultural economics. The requirements for the B.Sc. degree program and the proposed diploma in extension education are briefly discussed here. The implications for distance teaching of these academic courses will be discussed in a following section. A listing of the current course of study for the B.Sc. degree and a list of postgraduate courses is included as Appendix D.

1. Qualifications for Admission to the B.Sc. Degree Program

Before admission as a student in the B.Sc. degree program, a candidate must possess the following minimum qualifications:

- English language at GCE 'O' level or its equivalent.
- Elementary mathematics at GCE 'O' level or its equivalent.
- Passes in three additional subjects at GCE 'O' level or equivalent qualifications.
- Diploma from the Jamaica School of Agriculture, the Eastern Caribbean Institute of Agriculture and Forestry, the Guyana School of Agriculture or equivalent qualifications.*

2. Bachelor of Science in Agriculture Degree Requirements

The bachelor of science in agriculture is a three-year course of study (see Appendix D); however, before beginning this program, students must satisfy the university matriculation's requirements for entry into a degree course and must possess the following minimum qualifications: 'O' level mathematics (or equivalent), 'A' level chemistry and biology (or equivalent), and 'A' level chemistry, botany, and zoology.

Candidates may be exempted from Part I and admitted directly to Part II if they possess either an associates degree in science from the Jamaica School of Agriculture or equivalent qualifications.** To complete these requirements, many students register for the pre-agriculture year. Candidates admitted to

* UWI Faculty of Agriculture Information Booklet for Academic Year 1979-80, p. 17.

** UWI Faculty of Agriculture Information Booklet for the Academic Year 1979-80, p. 17-18.

the pre-agriculture year are required to take the following courses: N₁ chemistry, N₁ biology, N₁ physics, N₁ pure mathematics, and N₁ applied mathematics. Depending on a student's qualifications, the faculty board may require, on the advice of its entrance committee, that candidates take particular courses from the previously mentioned offerings.

Candidates admitted to the pre-agriculture year with minimal qualifications will be required to take and pass N₁ chemistry and N₁ biology.*

3. Diploma in Agriculture Extension

The UWI Agricultural Extension Project funded by USAID calls for the development of a one-year diploma course in agricultural extension. The objective of this program is to upgrade the skills and knowledge of extension personnel throughout the West Indies. The diploma course will be designed for extension personnel with diplomas in agriculture from either the Jamaica School of Agriculture, the Guyana School of Agriculture, or from the Eastern Caribbean Institute of Agriculture and Forestry. The one-year course of study will be organized into content areas that will enable extension personnel to improve their professional extension and communication skills. It is anticipated that this additional qualification will enable them to advance professionally in their respective national systems.

D. THE RESEARCH PROGRAM

The research program of the Faculty of Agriculture is organized into nine multidisciplinary program areas. Most are crop- or livestock-oriented, but some are in disciplines. The current research programs are as follows:

<u>Research Program</u>	<u>Program Leaders</u>
Root Crop	Dr. C. R. McDavid
Grain Legume	Dr. T. U. Ferguson
Forage Legume	Prof. N. Ahmad
Cereals	Dr. R. Brathwaite
Horticulture	Prof. L. A. Wilson
Soils	Dr. F. Gumbs
Livestock	Prof. H. E. Williams
Agricultural Extension	Dr. T. H. Henderson
Agricultural Economics	Dr. L. B. Ranking

The basic objective of each research program is to increase regional food production. The research programs are aimed at developing systems of crop and livestock production that are economically viable for adoption by farmers in the 14 territories served by the University. Collaboration is established with the local ministries of agriculture, particularly where research in extension methods or in the process of adoption of new technology is involved.

* UWI Faculty of Agriculture Information Booklet for the 1979-80 Academic Year, p. 18.

Research work is financed from university funds, augmented by a number of special grants from philanthropic and private organizations and from individuals.* Some of the main research objectives of each program are described next.

1. Root Crop Research Program

The following major root crops are produced in the Commonwealth Caribbean:

Dioscorea spp.	- yams
Ipomoea batatas	- sweet potato
Manihot esculenta	- cassava
Colocasia esculenta	- dasheen and eddoes
Xanthosoma sagittifolium	- tannia

An estimated 350,000 metric tons are produced per annum, about 73 percent of which is produced in Jamaica. A large proportion of this production is carried out by small farmers on steep hillsides using inefficient, labor-intensive methods and unimproved varieties resulting in low yields. Although most of the root crops produced are consumed locally, they are often of secondary importance as staples to imported root crops, such as the white potato (Solanum tuberosum) and cereals.

Because nutrition surveys have shown that there are protein/calorie deficiencies in most of the Caribbean states, the root crop program was established in 1967 with the following objectives: (1) substantially reduce the gap between carbohydrate production and utilization in the region; (2) increase the profitability of root crop production by small farmers to encourage increased production, thereby reducing unemployment; and (3) stimulate the development of agro-industries producing processed root crop and products.

The root crop program continues to work towards these three basic objectives, with a particular emphasis on improving yam and cassava production through plant breeding, varietal testing, and agro-economic studies (excerpted from The Compendium, p. 17-19).

2. Grain Legume Research Program

The grain legume program has concentrated mainly on pigeon peas (Cajanus cajan), an important protein source throughout the West Indies. The varieties currently available have a long growing season of some six months and are only harvested during the shorter days from December to March. The central thrust of the program has been to develop a short-season pigeon pea plant which can be harvested over a longer period of the year (photoperiod insensitive). This would have the advantage of making the crop available in the fresh state for a longer period of the year and reduce the weed and pest control needed between planting and harvest.

* Excerpted from UWI Faculty of Agriculture, A Compendium of Research, January 1980, p.p. 8-10, and "Postgraduate Studies in the Faculty of Agriculture," 1979-1980, pp. 7-8.

In the three years since the inception of the breeding program, two new varieties have been developed with shorter season cropping time (reduced from six months to three months) and which are capable, at least under Trinidad conditions, of cropping at any time of the year. This has a tremendous potential impact on the production of pigeon peas at both the small and medium farm level, and on the reduction of protein deficiencies in the region (excerpted from The Compendium, p. 10).

3. Forage Legume Research Program

The forage legume program is concerned with improving pasture yield to increase sheep, goat, and cattle production and thereby increase the supply of animal protein in the region. Research has been concentrated in Belize and Antigua which ecologically represent large areas of the Caribbean. The program has several objectives as follows:

- Collect legume and grass plant species which are adaptable to dry climatic conditions and high pH soils and assess their pasture quality.
- Assess the performance of carefully selected grasses and forage legumes throughout the annual weather pattern in Antigua.
- Assess the effect of improved pastures on livestock production.
- Ascertain the best environmental conditions for nitrogen fixation by Rhizobia.
- Provide technical advice and planting materials for pasture improvement throughout the region (adapted from The Compendium, pp. 87-91).

4. Cereals Research Program

The cereals research program was initiated by the Faculty of Agriculture toward the end of the 1975-76 academic year. The crops included for study in order of priority were maize (Zea mays L.), sorghum (Sorghum bicolor L.), and rice (Oryza sativa L.). Although funding has been limited, this program studied maize, sorghum, and rice germplasm introduced to the Caribbean from the major world cereal-breeding centers (i.e., CIMMYT, ICRISAT, and IRRI). It also identified high yielding and high protein quality cultivars that would optimize annual cereal productivity in selected ecosystems in the Commonwealth Caribbean (adapted from The Compendium, pp. 101-4).

5. Horticulture Research Program

The demand for tropical fruit, flowers, nuts, and spices has increased in countries having large metropolitan migrant populations. Also, the export trade in these commodities from the Caribbean is facilitated by regional carrier rapid air transportation. Because of the high value of these products,

there is a justifiable demand for research to improve the cultivation of relevant horticulture crops. To date, funding has not been available. The Faculty of Agriculture, therefore, has not been able to implement its proposed research program except for some preliminary studies funded by the Government of Trinidad and Tobago (The Compendium, p. 95).

6. Soils Research Program

The goal for the Commonwealth Caribbean soils research program was enunciated in May 1947, as follows:

"To provide for the undertaking of systematic soil surveys together with related research into the chemistry and physics of main soil types, including an investigation of the possible role of trace-elements in West Indian soils."

To this is added the broad interpretation of the results in terms of land-usage and land capability.

This program has been in effect for over 20 years. The soils of most of the Commonwealth Caribbean territories have been surveyed and extensive investigations on their chemical properties have been carried out. The original soils research program intended to study the physical properties and the trace elements of soil; however, these studies were never carried out. Subsequent land use and capability policies were formulated without this important data.

The new comprehensive soil research program is, therefore, aimed at obtaining information still needed for the completion of the 1947 program and to accumulate further information on soil development, soil classification, soil microbiology, soil physical behavior, soil chemical reactions, fertilizer requirements of crops, soil conservation, and land use (quoted from The Compendium, p. 45).

7. Livestock Research Program

The livestock research program is divided into four subject areas: ruminants, swine, poultry, and forage production. The major effort has been concentrated on improved ruminant production, but some work continues on swine nutrition and forage grass production.

Efficient meat production from small ruminants has long been neglected in the region. Consequently, the Barbados Blackbelly sheep is now considered a regional resource because of the emphasis on increased ruminant production. As a first step toward increased yield, this breed must be evaluated for various performance traits to enhance its promotional value in the market. Secondly, alternative breeding strategies should be investigated to increase Barbados Blackbelly sheep meat yield, such as systematic cross-breeding or the development of new breeds. Similar breeding and management systems will need to be explored to increase meat yield from goats.

Other research studies include the identification of health factors affecting the survival, growth, production, and milk production of ruminants; the development of balanced rations for ruminants formulated from local rather than imported feeds; forages for meat and milk production; and the economic production of pork by reducing the dependence on imported feed (adapted from The Compendium, pp. 35-39).

8. Agricultural Extension Research Program

The agricultural extension research program has conducted a number of studies in recent years to carry out the following objectives:

- Determine the impact of different communication techniques and different extension education approaches on the spread of agricultural innovations.
- Determine the factors affecting the acceptance of innovations.
- Analyze the rural community setting to determine how its nature affects the diffusion of modern agriculture technology.
- Determine the diffusion path of innovations in rural communities to identify key communication leaders with whom extension officers should work.
- Evaluate the organization of agriculture extension services in the region to determine the factors impeding or enhancing the effectiveness of extension workers.
- Determine what characteristics of Caribbean extension workers are associated with effective job performance (UWI, Postgraduate Studies Bulletin, p. 9).

9. Agricultural Economics Research Program

Caribbean agricultural economics research has been conducted in two basic ways: First, new theoretical models have been devised to describe the structure of the agriculture sector. Second, descriptive, empirical research in small farm economics has been the major work activity. The Department of Agricultural Economics at St. Augustine has been mainly concerned with the latter kind of work. This is reflected in crop and livestock industry studies in which the economics of production are investigated (UWI, Postgraduate Studies Bulletin, p. 8).

The work in production economics will continue, but it will be reinforced by the concern for developing new farming systems, introducing new crops, and stimulating technological progress. This role for the faculty--as a catalyst, source of assistance, and advice to the territorial governments--should continue on a more organized basis in the future (UWI, The Compendium, pp. 107-108).

E. THE OUTREACH PROGRAM

The outreach activities of the Faculty of Agriculture are carried out under the leadership and coordination of the Department of Agricultural Extension. The department serves as the conduit for a two-way flow of information between the national territories and the faculty. The Department of Agricultural Extension was formally established by the university in 1969 and currently has three full-time faculty members. In addition, the department has a supporting staff that runs the Agricultural Information Unit.

Although the department maintains an active undergraduate and post-graduate teaching and research program, the outreach activities of the department are becoming increasingly important and commanding attention. To demonstrate that commitment to outreach extension services, the vice chancellor of the university appointed an advisory committee to assist the department in providing many services to the territorial governments' agricultural programs. Each department has committed some faculty time to outreach.

The Department of Agricultural Extension is also mandated to work closely with the Caribbean Agricultural Research and Development Institute (CARDI) and other technology-developing institutions in the region to facilitate the flow of improved agricultural technology to small farmers. CARDI scientists, located in Trinidad, and the agricultural extension staff will be housed in the new CARDI/Agricultural Extension Building in 1981.

Starting in July 1980, the faculty's outreach activities will be greatly expanded by an USAID-funded, five-year project which will improve extension systems throughout the region. One of the primary objectives of this project is to increase the outreach capacity of the faculty. As part of this project, the university will have full-time outreach staff members stationed in Belize, Antigua (to serve the Leeward Islands), and St. Lucia (to serve the Windwards), in addition to St. Augustine-based staff serving the Windward Islands. University personnel will be assisted by counterpart faculty members and short-term consultants from the United States Midwest Universities Consortium for International Activities, Inc., (MUCIA). Current and proposed outreach activities are discussed below.

1. Agricultural Information Unit

The Agricultural Information Unit is a regional clearinghouse on technical and extension information for extension systems throughout the region. The unit produces teaching materials, technical bulletins, a quarterly newsletter, and maintains an audiovisual library of teaching aids.

Under the USAID-funded Agricultural Extension Project, activities will be expanded to include:

- Taping information and education programs for distribution to local radio stations for broadcast. The project will provide the necessary tape dubber.

- Developing colorslide series and filmstrips with accompanying audiotapes and written scripts for use by extension workers in the region.
- Preparing, publishing, and distributing a wide range of illustrated bulletins and pamphlets, including those for youth and women programs.

To carry out these expanded information services, the project will provide a full-time agriculture communication specialist throughout the life of the project.

2. In-Service Staff Development Activities

For the past ten years, the department has conducted annual in-service training workshops for agricultural extension workers mainly from the Leeward and Windward Islands. Additionally, the department organizes short agriculture courses for field and rural workers. A recent manpower survey advocated that these annual in-service short courses be continued and that territory-specific short courses be introduced (UWI, Department of Agricultural Extension, "Development Projections for the Period 1976-1981," p. 3).

The Agricultural Extension Project will significantly expand these in-service training activities throughout the life of the project. Its objective is to provide extension workers with the technical and professional skills they will need to perform their full-time educational role in the reorganized national extension system. After this intensive training period, there will be a need for regular training workshops to reinforce the new organizational structure and extension work behavior. Regular workshops will also be needed to update extension personnel of new, improved agricultural technology.

Another important staff development program of the Agricultural Extension Project, which will continue after the project terminates, is the diploma course in agricultural extension. This academic program will be designed especially for the graduates of the three intermediate schools of agriculture in the region (JSA, GSA, and ECIAF). This one-year course will offer special training in agricultural extension for the younger, but experienced extension personnel to upgrade their professional qualifications. This program answers concerns expressed by territorial governments that (for regular extension personnel) degree-level training takes too long and is too costly.

SECTION VOTHER INSTITUTIONAL RESOURCES IN THE CARIBBEAN
SERVING THE AGRICULTURAL SECTOR

This section will briefly describe some of the other regional institutions that serve the agricultural sector. It is based on secondary data and discussions with officials from several of these institutions. The communication problems and plans of these institutions will also be discussed because of the similar problems they face in reaching agricultural development goals. There is considerable potential for a regional communication project. As the university conducts its feasibility study, it should consider the merits of such a project.

A. CARIBBEAN AGRICULTURAL RESEARCH AND DEVELOPMENT INSTITUTE (CARDI)

The Caribbean Agricultural Research and Development Institute (CARDI) was established in 1975. It was headquartered on the St. Augustine campus of the University of the West Indies. Although a new organization, CARDI began with the Regional Research Center, formerly a part of the Imperial College of Tropical Agriculture (until 1960) and the Faculty of Agriculture of UWI (1960-1975).

1. Objectives

As a regional agriculture research and development institution, CARDI's primary role is to develop and test appropriate agriculture technologies. The wide range of ecological conditions, livestock, and marketing problems, however, impede the adoption of new production technologies, making CARDI's task difficult.

2. Functions

CARDI's functions can be broken down into two major types. First are the commodity programs which identify the most productive crop varieties and recommend optimal production conditions for each commodity grown in the region. Because ecological conditions differ greatly throughout the territories, the recommended varieties and cultural practices tend to be "location specific" and may differ among the ecological zones.

The second major task undertaken by CARDI is to bring the commodity research programs to the farmers. Because land is scarce, the farmers must follow intensive, multiple-cropping systems to survive. If CARDI is to be responsive to these needs, it must understand these farming systems, incorporate technological changes, and meet the farmers' production goals. A brief outline of CARDI's research program for 1979-81 is included as Appendix E to this report.

3. Structure

In 1978, CARDI underwent a significant reorganization by decentralizing its scientific staff throughout the region. This move increased CARDI's visibility within its member territories and substantially narrowed the communication gap existing between the researcher, the extension agent, and

the farmer. Furthermore, CARDI research activities have shifted towards adaptive research which should result in improved agriculture technology appropriate for small farm conditions.

The reorganized CARDI program should be more responsive to national programs but there are drawbacks to decentralization. One important disadvantage is poor internal communication within the CARDI organization itself. Because of the difficulty and cost of inter-regional communication and travel, considerable internal inefficiencies can be expected, particularly in the area of central staff research functions. Additionally, certain central research activities may suffer.

4. Communication Problems and Plans

Although CARDI has improved communications between the scientists and the national programs, it has also created many internal communication problems. CARDI is currently exploring several problem-solving approaches. Some of the approaches include an internal staff newsletter, a telex connection between each national program, etc.

Obviously what is needed is an interactive system that will bridge the spatial distance between CARDI's many national offices. Research scientists who have specialized research responsibilities within the commodity research programs and/or broader research responsibilities within the farming systems program should regularly interact and consult with their colleagues who have responsibility for other commodity/farming systems programs. This communication function is critical to both the central and outreach research programs. Presently, the communications function is being handled by staff meetings at a common site or through central staff members making site visits on a regular basis and carrying messages between national programs. This is inefficient and costly in terms of staff time and travel expense.

The other communication area that merits exploration is the Agricultural Information Unit that has been established in Barbados. CARDI's Agricultural Information Unit has three separate roles to perform as follows:*

a. Information about CARDI and its work

In providing information about CARDI and its work, three distinct audiences are targeted, each with quite different needs:

General Public - to be reached through the media (radio, press, television) and pamphlets and brochures.

International Visitors - to be reached through brochures and, eventually, audiovisual presentations on the Institute's work.

* Extracted from CARDI's work program for 1979-81.

Technical Public - to be reached through a newsletter on the unit's projects and staff activities; technical bulletins and reports published at the end of a project; special bulletins reporting on, for example, a workshop or seminar; an annual report reviewing the year's activities; and the board of directors' annual report.

b. General agricultural information

Information on agricultural technology is important to people, and CARDI has a leading role in bridging the "information gap" which presently exists. Four mechanisms are planned to meet this objective:

Agricultural Magazine - reporting on new and successful products, machines, and techniques to extension agents and farmers.

Commodity Reviews - assessing present commercial practices and research findings to plan research, development, and commercial activities.

Information Service - responding to specific informational requests.

Proceedings of Seminars, Workshops, and Conferences - assisting event organizers in publishing and distributing these findings.

The resources for these first three activities will include the staff of CARDI, the staff of other institutions, the experience of successful farmers, and documented materials in libraries.

c. Communication packages

CARDI will assist these institutions in establishing and operating their communication divisions (particularly ministries of agriculture). This may include the preparation of pamphlets, films, tapes, videos, etc., at the request of an institution, or advising the institution on how to prepare such packages themselves. At present, the Agricultural Information Unit has only two professional staff, making it possible to fulfill some, but not all, of the functions listed above. Priority will be given to providing information about CARDI and assisting institutions with communication packages. General agricultural information is the most urgent need in the region. Efforts will be made to secure funding to enable CARDI to provide this additional service (CARDI, 1979, pp. 103-105).

B. CARDATS

CARDATS is a regional agricultural development and training project that is administered by the United Nations Development Program and the Food and Agricultural Organization of the United Nations, with the CARICOM secretariat as the regional cooperating agency. CARDATS currently serves the Windward and Leeward Islands of the eastern Caribbean.

1. Objectives

Through the implementation of intensive field extension programs, CARDATS will bring about small farm development in the region to increase production and rural farmers' incomes.

2. Functions

CARDATS works with small farmers on a variety of programs including: (1) improved production techniques and management skills, (2) soil and water conservation, (3) soil fertility and crop production, (4) small farm machinery, (5) production credit, (6) orchard development, and (7) livestock production.

3. Structure

CARDATS works through United Nations' Volunteers (UNVs) assigned to pilot project sites in each territory. These volunteers, in turn, are backstopped by FAO and CARICOM experts from CARDATS' headquarters in Grenada.

4. Communication Problems and Plans

Because the UNVs are generally well educated (B.Sc. in agriculture), but inexperienced, they need support in ensuring that the technical information being transmitted to the farmers is accurate and appropriate. To provide this support, CARDATS is installing a shortwave radio system to link each project site with its headquarters and technical experts. In addition to providing technical backstopping, this communication system will also facilitate program administration and coordination.

C. CARIBBEAN DEVELOPMENT BANK (CDB)

The Caribbean Development Bank (CDB) is expected to provide substantial financing for food projects in the CARICOM countries. Among its many funding programs, the CDB provides short-term production credit to farmers in the region.

1. Objectives

The objective of the CDB is to bring about long-term agriculture development in each territory by making available new sources of capital to the producers, input suppliers, processors, and distributors of agricultural products. The CDB works through the local Development Finance Corporation (DFC) in each territory.

2. Functions

In addition to making capital available, the CDB is exploring ways for each DFC to be more responsive to local business and entrepreneurs by making technical information available. Such a service requires accessing appropriate data bases in the United States. CARIRI is currently preparing to do this. If an entrepreneur in one of the territories wants capital to

start some type of agro-industry, the local DFC can quickly obtain information on the current type/level of technology available, the type of equipment needed, etc. This information greatly enhances the likelihood of the business venture succeeding and reduces the investment risk to the bank.

3. Communication Problems and Plans

The CDB is also exploring ways to improve its own internal communications and enhance program coordination and administration. Teleconferencing capability would certainly enhance organization and communication. Teleconferences would enhance organization communication by making available to CDB's personnel several training workshops and seminars on technical and management skills.

D. OTHER REGIONAL ORGANIZATIONS THAT SERVE AGRICULTURE

Caribbean Food Corporation (CFC) is expected to be the central agency responsible for the implementation of the "food plan." The food plan will integrate the various regional organizations into a well-organized and coordinated effort to increase food production.

Caribbean Community and the Common Market (CARICOM) is the major mechanism for regional economic integration in the Commonwealth Caribbean.

Caribbean Investment Corporation (CIC) is responsible for promoting industrial development, including the development of agro-based industries and integrated agricultural and industrial complexes in the LDCs.

Caribbean Food and Nutrition Institute (CFNI) assists member states by collecting, analyzing, and interpreting data on food and nutrition and advising governments on food and nutrition policies.

Caribbean Industrial Research Institute (CARIRI) is solely financed by the Trinidad and Tobago government, but it is available to carry out research and development to relevant agro-industry in the CARICOM region. Because CARIRI is located on the St. Augustine campus and has recently installed a telex link with data bases in the United States, this new capacity should be expanded.

During June 1980, CARIRI installed a new telex terminal in their information resource center on the St. Augustine campus with a capacity to establish an interactive telex link with data bases in the United States. They have a contractual arrangement with DIALOG and ORBIT information retrieval services. While both services have a similar set of data bases, DIALOG will be the primary service system. Some of the agricultural data bases in this system are listed below:

- BIOSIS Previews 1974-present (Biological Abstracts)
- SOCIAL SCISEARCH (Scientific Information)
- COMPENDEX (Engineering Index)
- AGRICOLA (National Agriculture Library)
- SCISEARCH 1974-78
- SCISEARCH 1978-present

COMPREHENSIVE DISSERTATION ABS.
SOCIOLOGICAL ABS.
COMMONWEALTH AGRICULTURAL BUREAUX
FOOD SCIENCE AND TECHNOLOGY ABS.
CRIS (USDA)
ECONOMICS ABS. INTERNATIONAL

In addition, it is expected that the CARIS system (food and agriculture organization data base) will be available.

Two problems with the telex linkage have been identified by CARIRI's staff. First, the telex system is much slower than a telephone (microwave) system, so the online connect time and print charges will be considerably higher. Second, the telex system uses a telephone connection from St. Augustine to Port-of-Spain, which is somewhat irregular and may result in online disruptions and further expense. Despite these problems, linkages to U.S. data bases is bringing agricultural research information to the faculty.

Windward Islands Banana Association (WINBAN) is a confederation of banana-grower associations in Grenada, St. Vincent, St. Lucia, and Dominica to market bananas in the United Kingdom and provide research services and technical assistance to growers on each island.

Eastern Caribbean Common Market (FCCM) serves as a coordinator and integration mechanism for trade and industrial development in the Leeward and Windward Islands.

SECTION VICOMMUNICATION TECHNOLOGY IN AGRICULTURAL AND RURAL DEVELOPMENT

The University of the West Indies is committed to increasing agriculture productivity throughout the Caribbean by improving the livelihood and well-being of small farm families. Many of the mechanisms for achieving that goal are already in place, and major new efforts, most notably the Caribbean Agricultural Extension Project, are now being implemented. Ultimately, the successful achievement of that goal will depend upon effective communication that can overcome training, organization, and delivery system deficiencies that limit the effectiveness of agricultural extension services.

A. COMMUNICATION TECHNOLOGY IN USE TODAY

A wide range of modern communication technology is currently being used by governments, agricultural research organizations, and education agencies to help solve communication-related problems. Television, radio, telephone, computers, audio- and videotapes, slides, and other print media are all being used today. Each has advantages and disadvantages; some are better suited to specific locations and purposes than others. In most cases, the most effective communication is a combination of several technologies skillfully used by dedicated, well-trained individuals.

This section of the report will briefly describe the range and types of communication technology currently available, provide examples of how these technologies are being used today by agricultural and related organizations, and conclude with examples of pilot projects and experiments in communications that have been conducted in developing countries.

1. Satellite Communication

To most people, the concept of communication by satellite is awesome. It is important, however, to keep in mind that a satellite is simply a means of transmitting messages. Dr. Marlene Cuthbert, in the June 1980 edition of Caribbean Contact, stressed this point:

A satellite is not a new means of processing messages, but simply a means of delivering them that is more cost-effective in some situations than terrestrial (microwave) and submarine (underwater cable) systems.

Communication satellites today provide many services including international telephone, telegraph, and telex services; radio and television broadcasts (both live and prerecorded); facsimile transmission; and computer networking.

The principal advantage of satellite communication, unlike microwave or cable transmission, is that the cost of linking one or many sites is not related to distance; furthermore, physical factors, such as mountains and large bodies of water that are obstacles to cable and microwave transmission, do not interfere with satellite transmission. As Cuthbert points out in the previously cited article: "a satellite has a far greater capacity to transmit radio and

video signals than any other delivery system and thus greatly increases the number of available communications channels."

Satellite systems also have an advantage over terrestrial systems in their capacity-related flexibility. Edwin B. Parker explains this characteristic in a short article, "Communication Satellites and Satellite Demonstrations in Rural Development," in the April 1979 issue of Development Communication Report, a publication of the Clearinghouse on Development Communication:

Ground stations can be installed to provide as little as a single voice channel of service...Additional capacity can be added easily in those locations where demand develops. Other services, including data transmission and radio and television reception, can be added incrementally to the same basic ground station as needed. In contrast, a terrestrial microwave system must have enough capacity at the outset at all locations to provide for maximum end-to-end capacity required, and a terrestrial open-wire system cannot undergo major capacity expansions at any remote location unless the entire system is altered, invariably at considerable cost. Satellite systems also permit a simplex circuit to be shared at a number of locations as a common conference circuit. This costs less than obtaining the same capacity by using duplex circuits to interconnect each pair of points. In addition, this capability is easier to provide by satellite than standard telephone service.

If satellite communication is taken for what it is--a means of delivering messages to isolated, rural areas that overcomes many of the cost and physical constraints--the discussions which follow on other media can be considered separately from the specific technology used in the delivery: For example, the Indian Satellite Instructional TV Experiment (discussed later) which relies on a communication satellite to transmit videotaped programs directly to television sets in remote villages is really no different in concept than similar efforts that involve non-satellite television broadcasting.

Similarly, the experiences of the University of Illinois' TeleNet Teleconferencing System in using telephone lines for transmission can be applied to other situations where the telephone signals are transmitted by satellite.

2. Radio and Television

Of all the electronic communication technologies, radio has probably been the most applied and studied in relation to agriculture and rural development. Fewster (1965) quotes a UNESCO report which concluded: "radio broadcasting, when carefully used, is proving to be one of the most effective media of communication with...far flung populations." That assessment was probably based to a large degree on the successes of the Radio Farm Forum in Canada, where the concept originated, and in India, where the first experimental work occurred.

Radio and radio-listening groups continue to play a major role in many agricultural development efforts. Fewster further noted that "radio is not a self-sufficient medium..." Great successes have been reported when the medium has been used with listening and discussion groups, two-way communication (via the written word), cassette tapes, and other supplemental education materials. Other possibilities for getting "audience participation" are amplified telephone and sideband radio. Two projects that relied heavily on the use of radio--Guatemala's Basic Village Education Project and Thailand's Radio Farm Forum Pilot Project--will be described later in this report. Summaries of other agricultural radio projects, prepared by the Clearinghouse on Development Communication, are included in Appendix F.

In the September 1978 Development Communication Report, Dean T. Jamison and Emile G. McAnany note that "experience shows that radio can be used to help formal education systems meet their goals by improving the quality and relevance of education, keeping educational costs down and broadening access to education, particularly in rural areas." But they conclude that "radio's potential in development communication is for the most part untapped." They cite examples of health and nutrition radio campaigns that achieved short-term behavioral changes, contradicting the current belief that radio is effective only at the awareness and interest stages of the change process.

One likely reason why radio has been used in agriculture extension work more extensively than other electronic communication media is because it clearly has the capacity to extend education. Radio has been around longer; it reaches large areas; local and regional stations serve local and regional interests; radio receivers are generally available at prices the potential audience can afford; and illiteracy is not a barrier to reception of radio-broadcasted messages.

Conventional radio broadcasting, however, is a one-way process that precludes interaction between the presenter and listener, which is considered necessary for the listener to adopt a specific practice. Two-way radios have been used in some health care delivery systems to help overcome this. It has been reported that CARDATS is in the process of implementing shortwave radio communication among several Caribbean areas.

The impact of television in agriculture improvement schemes in developing countries has not been well explored. Rogers (1972) notes that "satellite (and non-satellite) television broadcasting for agricultural development purposes offers a great potential, but one that has not yet been demonstrated in less developed nations." He reports that the "Krishi Darshan" television program produced by All-India Radio has been evaluated, but the results are disappointing: few adult farmers watched regularly, and they rated the programs as low in interest.

Since that time, an Indian experiment with satellite-transmitted television programming for farmers--the Satellite Instructional Television Experiment (SITE)--has been studied. Some of the findings of that study will be reported later in this report.

An obvious advantage of television is that it combines video with the audio message. Like radio, conventional television is limited to one-way communication, although this limitation can be offset by combining educational television with other communication efforts. More than radio, television must appeal to a vast audience, and unfortunately for agriculture planners, many, if not most, television producers seem to be oriented to "big city" viewers and unsympathetic to the needs of the rural community. Television receivers are more expensive than radio receivers, and unless they are supplied by the government or some other agency, they may be beyond the reach of most small farmers. As mentioned earlier, distance and physical barriers present obstacles to conventional television transmission which may limit its reach to rural areas.

3. Videocassettes, Audiocassettes, and Slide Shows

Other communication technology beginning to play increasingly visible roles in agricultural development efforts include video- and audiocassettes and slidetape presentations.

Audiocassettes have been used to supplement radio and other communication forms in Mali and Afghanistan, for example, and have been used with radio-listening groups to provide feedback to program developers.* In general, audiocassettes offer advantages in flexibility. Education tapes can be produced specifically to meet the interests of a relatively specialized audience. They can be produced in local dialect for maximum understanding. The pace and order of the presentation can be controlled by the field agent, based on the perceived needs of the group.

For program developers, prerecorded cassettes ensure some degree of message uniformity. All the groups receive the same basic message, subject, of course, to the interpretation of the local change agent or monitor presenting the program. Audiocassettes can be combined with slide shows, picture-story books, posters, charts, etc., to enhance the educational message.

Videocassettes offer the same advantage over audiocassettes as television offers over radio. They combine action video with the audio message. There is growing interest among agriculture developers in many countries, Philippines and Sri Lanka, for example, to use videotapes in program delivery and reporting, in addition to or instead of 16mm film.

Chapman Mott, writing in the January 1979 Development Communication Report, compares three-quarter inch video tape and 16mm film for cost, quality, ease of operation, flexibility, editing, and display and distribution. He compares these two from among the many media that combine sound with pictures--slide shows; super-8, 16mm and 35mm film; 1/2, 3/4, 1 and 2 inch videotape--because they "are roughly comparable in range of use." He cautions, however, that comparisons should be based on how and for what purposes the programs will be used.

* See project summaries in Appendix F.

Mott says that in many cases videotape offers a significant cost advantage over film. It does not require professional developing and processing, and the same tape can be erased and re-recorded several times without significant quality loss. Animated graphics, special effects, and superimposed titles or messages are often less expensive to produce on videotape than on film.

Film generally provides better image and color quality than videotape. Film equipment has a slight edge over videotape equipment for field use where maneuverability, rapid set-up, or access to tight places is critical. The film camera is a self-contained system which records sound on film, while the video camera must be connected to a videotape recorder to capture sound. It should be noted, however, that videotaping equipment is becoming more compact and portable.

A unique advantage of videotape, Mott points out, is its ability to be played back immediately to correct problems on the spot. With film, mistakes, omissions, or other problems might not be caught until the film is returned from the processing lab. Another advantage of videotape is the way it is edited. Original footage is left intact. Editing is done by copying the original footage onto a master tape. All changes are made on the master. By recopying the original footage onto different master tapes, unlimited versions are possible. Film editing is done on original footage making later use more difficult.

In addition to production considerations, Mott also compares videotape and film in terms of display and distribution ease. Film, he points out, is projected on relatively inexpensive and easy-to-obtain equipment, and the image is magnified so that it can be viewed by large audiences. In contrast, videotape is normally played back on television-size equipment, limiting the number of individuals who can comfortably view one screen. This limitation can be overcome by hooking several playback monitors to the same tape player. Equipment is now available to project larger images. However, even a single playback unit may be difficult to find in remote areas of many developing countries making it necessary to transport equipment for each viewing.

The University of Illinois' College of Agriculture has recently used videotapes in formal classroom education to train field staff, and eliminate the time, cost, and distances necessary for first-hand observation. For example, it is important that students enrolled in livestock production courses become familiar with the facilities and management techniques used in modern swine housing systems. It is expensive to transport students to farms where such systems are in operation. It takes time and takes the students away from campus and other classes. Furthermore, few operators are willing to risk the possible diseases that could be brought in by visiting students. But now students are able to take a videotaped tour of one of the state's most outstanding swine confinement facilities and learn from the owner himself (again via videotape) about his operation.

Videotape is also being used by extension entomologists at the University of Illinois to train field scouts who work or will work in integrated pest management programs. The system allows educational program designers to record problem situations and demonstrate proper scouting techniques in the field during the growing season when the problems exist and then use the programs to teach others at any time of the year.

Videotape is also being used to help students develop good public speaking and demonstration techniques. Students present a speech or demonstration before their fellow students and a video camera. As soon as the videotape is rewound, they have an opportunity to see and hear their performances, to critique themselves, and to discuss with their classmates and instructors ways of improving their performances. Then they have an opportunity to re-record their presentations and evaluate their success.

Video teaching has been used successfully to train primary-school teachers in Nigeria (Miltz, 1979). Although no instances were found of this technique being used to train agriculture teachers or extension workers in developing countries, the technique has obvious applications in many situations.

Slide shows, with or without accompanying audiotapes, have been a mainstay of agricultural extension programs in many countries for many years. The advantages are obvious: Colored images can be projected for viewing by large numbers of people on relatively inexpensive and easily available equipment adding visual dimension to live or pre-recorded presentations. Slide shows offer flexibility. New slides can be added or existing slides rearranged to suit the needs and interests of particular audiences. With some basic instruction in camera and audiovisual presentation techniques, subject matter specialists can put together their own presentations.

The pre-recording of messages on audio tape limits the flexibility of slide shows, but ensures their uniformity. This is important in situations where slide-specific teaching aids are duplicated and distributed to a number of field agents and educators. Playback equipment that advances automatically on pre-programmed cues is available. A written script, however, with cues to indicate when the slides should manually advance also works well.

4. Computers

Recent advances in computer technology have brought decreases in their cost and widened their potential use among educators. James McGrann, associate professor, Department of Agricultural Economics, Texas A&M University, groups the agricultural use of computers into three general areas: decision-making, education, and communication.

Farmers and ranchers in the United States are turning increasingly to computers to help them make critical management decisions. Three regional computer networks and one state network offering standardized programs are described later in this report. In most cases, the farmer works with an extension worker to use the computer. Some farmers, however, have their own "personal computers" that can hook into a larger computer at the state or county level to gain access to the same programs.

McGrann notes that extension educators are starting to look upon the computer as a tool to teach analytical concepts and procedures necessary for effective decision-making. Computers are also being used to reduce the cost and time delays associated with delivering farm market news, weather information, and other timely advice directly to farmers or field agents.

The value of computers in agricultural work depends, to a large degree, upon the availability of relevant, specialized programs (software) for farmers. U.S. agricultural educators are attempting to overcome this limitation by sharing already developed programs and rapidly developing new ones. Priority will have to be given to systematic development of models and programs based upon local and/or regional conditions in developing countries to make computers useful to agricultural researchers and educators.

Computers give agricultural researchers and educators almost instant access to the latest research or information in the field. Computer networking allows the researcher or educator to tap into national and international data bases, to conduct on-line literature searches, and to instantly obtain computer printed bibliographies, abstracts, or short summaries. Through Lockheed's "Dialog" information system, for example, the researcher or educator can gain access to AGRICOLA, the U.S. National Agricultural Library data base, the Commonwealth Agricultural Bureaux files, and CRIS, the Current Research Information System that serves as the U.S. Department of Agriculture's documentation and reporting system for agriculture and forestry research, as well as other data bases on the system.

5. Print Media

This report does not discuss in any depth the use of print media (e.g., books, newsletters, pamphlets, magazines, etc.) in agriculture extension education. But, the impact of modern technology on the printed word is startling.

Information stored in print will always be valuable because it is easily retrieved. The time needed to produce and distribute materials and the need for users to be literate are, however, disadvantages of this medium.

New technology is changing the ways in which print is composed, reproduced, and distributed. In many cases, technology is speeding up the process and reducing costs. Technology makes it possible to pinpoint automatically appropriate language level, best page format, relationships between text and photographs, charts, diagrams, etc. Agriculture educators will need to keep abreast of these developments to produce new materials to support agricultural development programs.

6. Interpersonal Communication

Think of agricultural extension work and the vision almost automatically comes to mind of an agricultural worker advising and teaching a farmer in his field. Indeed, few would argue that the key anywhere in the world to successful extension work is the interpersonal communication between the farmer and the extension worker. Interpersonal communication in the decision process is the crucial step for adoption.

Lack of adequately trained and mobile extension agents is almost always cited as a constraint to effective extension work, especially in developing countries. There simply are not enough people to make the face-to-face contacts.

Daniel Benor argues, however, that while low agent-client ratios clearly make it impossible for extension workers to maintain regular, direct contact with most of the farmers, "In good extension work, ...this is neither necessary nor even desirable."

The training and visit system Benor developed has been adopted in project areas in many countries, including India, Turkey, Burma, Nepal, Sri Lanka, and Thailand. His approach involves fundamental reorganization of extension services with a single line of command to provide for a unified system exclusively devoted to agricultural extension work. Once that is accomplished, extension work is organized into a "systematic, time-bound program of training and visits." Schedules of work, duties, and responsibilities are clearly defined and supervised at all levels. The number of farm families per extension worker is set at a manageable level. A specific schedule of visits to farmers' fields is closely followed.

The training part of Benor's system consists of frequent (weekly or bi-weekly) one-day training sessions for field-level extension staff. One of the sessions is taught by subject-matter specialists, the other by the field-level workers' immediate supervisor.

During the training sessions, the extension worker receives intensive instruction in three of four of the most important recommendations for the next one or two weeks of the growing season. The amount of information the extension worker receives is limited, so he/she understands and absorbs it more readily and often has more confidence in his/her ability to transmit it to farmers. The intense training also makes it possible to employ as extension workers individuals with relatively little formal education. This helps overcome the constraints of limited personnel.

In Benor's system, the field-level extension worker concentrates his/her attention on "contact farmers" who are willing to try out new practices and have other farmers visit their fields, but not so progressive that they are regarded as "exceptional" by others in the community. The recommendations adopted by the contact farmers are spread in two ways. First, non-contact farmers observe what the contact farmers are doing. Second, each contact farmer is asked to explain the new practices to not more than 10 others and help them adopt them.

The underlying approach to Benor's system is to enable farmers to make the best use of available resources. The initial focus is on improved management or cultural practices. Improving management practices generally requires more work on the part of the farmer, but allows him/her to make most effective use of later innovations. Contact farmers are also asked to try the recommendation only on part of their land thereby reducing the risk involved.

Benor recognizes that extension cannot do the entire job. New types of seed, fertilizer, and pesticides; effective credit institutions; investments in irrigation; and a policy that provides adequate incentive for farmers to produce more are also needed. The systematic approach to extension requires good lines of communication at all levels of the extension system.

B. APPLICATIONS OF COMMUNICATION TECHNOLOGY IN TEACHING

Following are several examples of projects using communications which are relevant to UWI's outreach objectives.

1. Formal Courses

a. The University of the South Pacific Satellite Communication Project

The University of the South Pacific, Suva, Fiji, is mandated to serve the higher educational needs of approximately 1.5 million people who inhabit 11 small, widely scattered countries in the South Pacific. USP also serves as a resource center for other development programs that operate in the region. In these respects, USP is very similar to UWI. Both institutions have similar needs for an effective communication system among the countries they serve.

USP's experience with satellite communication began in 1972 as part of the PEACESAT (Pan-Pacific Educational and Communication Experiment by Satellite) project directed by the University of Hawaii. In 1974, the USP network became independent and was allocated separate time on the ATS-1 satellite. The first and second phases of the project extend through 1980. Plans are being developed to continue the satellite telecommunication network. Early experimentation with the network included the external classroom offering credit courses and tutorial assistance, curriculum development, continuing education, and administration.

A total of 21 courses was offered during 1977. Registered students at all USP centers take courses by satellite. Program offerings include courses in land tenure, sociology, government, accounting, mathematics, and English. Special tutorial sessions are arranged through the regional centers. Regional administration includes staff meetings and discussions of financial matters.

The network also serves as a means for exchanging information on such matters as course enrollment, equipment availability, textbook ordering, etc. Continuing education has primarily centered on teacher training, but has also included courses on contemporary problems, consumer education, nutrition, and home economics. The USP network facilitates two-way audio interaction using audio tapes, print materials, and tutorials to accomplish its objectives.

The system has generally proven successful in extending the educational reach of the USP. However, limiting class size, avoiding long speeches and lectures, and stimulating maximum involvement of participants are important to its success.

b. Appalachian Education Satellite Program

The Appalachian Educational Satellite Program (AESP) was developed in response to a 1960 survey conducted by the Appalachian Regional Commission (ARC). The survey indicated that teachers in the region wanted more in-service education, especially in the areas of reading and career education. About the

same time, the ARC learned that the U.S. National Aeronautics and Space Administration (NASA) would provide transmission time on the ATS-6 Satellite to deliver training programs to people in relatively isolated communities.

Planning on the project began in 1971. Beginning in July 1974, the first graduate-level courses were broadcast to teachers in 15 communities. Students meet weekly at the receiving locations. Typically, each session utilizes videotaped instructional programs and supplementary instructional materials. Four times during the course students personally participate in seminars to discuss issues with course designers and experts.

Some conclusions from the early AESP experiments include these:

- Use of satellites and relatively inexpensive ground receiving equipment is feasible to deliver graduate courses to students scattered over a large geographical area.
- Courses can be administered on-site provided staff has easy access to headquarters and sufficient instruction in subject matter.
- Students perceive that satellite-delivered courses afford adequate opportunity during on-site seminars for personal interaction with instructors.
- Course participants generally prefer satellite-delivered course instruction to on-campus graduate courses.
- Course participants show gains in knowledge and application in their own classrooms.

By 1979, AESP expanded to 60 receiving sites, offering graduate and undergraduate university courses and workshops in education, human resources, medicine, health, business, industry, and government. AESP gained the necessary experience to continue, in 1979, to extend the reach of its public-service programming via satellite to a projected 18 million cable-television subscribers throughout the United States.

c. Educational Telephone Network (ETN)--University of Wisconsin-Extension

Wisconsin's Educational Telephone Network (ETN) is a four-wire dedicated telephone network that provides simultaneous interactive communication between University of Wisconsin extension faculty and students in more than 200 ETN centers throughout the state. Students at any of the locations are able to listen to lectures or panel discussions, ask questions of the course instructors, and interact with students at other locations. Visual materials, colored slides, film strips, 16mm films, and other program materials are sent in advance to the learning centers to supplement the two-way audio communication provided by ETN.

Most of the programs offered via ETN are non-credit, continuing education courses for adults throughout Wisconsin. Only about 5 percent of the offerings are designed for graduate or undergraduate credit. Dr. Lorne Parker (1975) explains that the proportion of credit courses is low because these are generally available elsewhere. Most of the credit courses are not duplicated on campus and are developed in response to specific requests from a sufficient number of students throughout the state. Courses include medicine, pharmacy, English, law, social work, home economics, library science, education, nursing, physics, agriculture, and engineering. 4-H programs, extension-faculty conferences, and departmental staff meetings are also carried by ETN.

In its first 10 years, ETN shows that the two-way channel can be an effective means of reaching potential learners throughout the state. The strengths of the system include: It is a continuing education medium open to all; it saves time and money for teachers as well as students; it can reach entirely new audiences; it can reach isolated professionals; and it provides a mechanism for sharing resources among universities and other institutions.

Experience has also shown that it is important that subject-matter specialists offering programs via ETN understand its limitations as well as its strengths and develop effective distance-teaching techniques to foster positive interaction among students located in widely scattered locations.

The Statewide Extension Education Network (SEEN) of University of Wisconsin-Extension combines a four-wire telephone system, similar to the ETN system, with an electrowriter to instantly transmit line drawings the instructor is accustomed to writing on the classroom chalkboard--diagrams, formulae, outlines, etc. SEEN was initiated by Extension Engineering in 1970 to help overcome the limitations of a voice-only communication system. SEEN offers more credit courses than ETN, and also carries non-credit continuing education courses in accounting, business management, art, and education.

d. TeleNet--University of Illinois at Champaign-Urbana

The TeleNet system of the University of Illinois at Champaign-Urbana is a four-wire dedicated telephone network that connects 66 locations throughout the state. The system provides two-way audio interaction between sites. Audiovisual support materials in the form of colored slides, overhead transparencies, etc., are prepared and distributed to the receiving locations in advance. These materials are used in conjunction with the lectures or discussion transmitted via TeleNet.

Illinois' TeleNet currently consists of four interconnected systems. One network connects the director of the University of Illinois Cooperative Extension Service and other administrative offices on campus with directors of the 10 extension regions of the state. A second network connects the 9 county offices with the regional director's office in the northwest corner of the state. A third network connects the eight counties in northeastern Illinois with its regional director's office. A subnetwork that connects extension offices in suburban Cook County is the only network that is not controlled from TeleNet headquarters. Because needs of extension workers in Chicago and surrounding areas are special, the subnetwork can be switched from city offices. The fourth network connects the remaining TeleNet locations in county extension offices around the state.

A switching arrangement allows the three networks to be separated or operated together. For example, the administrative network can provide private, closed communication among administrators and also link up with networks for general program delivery.

TeleNet is operated by the University of Illinois Cooperative Extension Service and coordinated by the Office of Agricultural Communications. The majority of TeleNet programs are extension service programs--in-service education for county personnel, seminars, workshops and short courses in agriculture, home economics, 4-H and youth, and community-resource development for extension audiences throughout the state and extension administrative liaison. These uses of TeleNet will be discussed later.

Although TeleNet was primarily developed to serve the extension service, University of Illinois faculty also teach credit courses via TeleNet. For example, during the fall semester 1980, four credit courses are offered at TeleNet sites throughout the state in cooperation with the University's Division of Extramural Courses, Office of Continuing Education and Public Service. The courses are as follows: "Seminar on Community Organization," "Construction and Use of Tests in Teaching," "Policy and Program Development in Vocational, Technical and Practical Arts Education," and "Rural Real Estate Appraisal." In addition, the Office of Agricultural Communications offers via TeleNet each fall semester a graduate credit course, "Extension Communication Management."

Experience with these and other courses generally indicates that instructors and students are satisfied with the quality of the educational experience and the savings in time and cost.

2. In-Service Education and Staff Development

a. TeleNet--University of Illinois at Champaign-Urbana

The University of Illinois Cooperative Extension Service gives high priority to in-service education for all staff at all levels. A year-round program is designed to ensure that county and area staff are continually kept abreast of new information and developments in subject matter and delivery techniques to best serve the needs of Illinois residents.

Face-to-face in-service education plays an important part in that process. Field personnel currently come to campus for about four days twice each year--in the fall for extension's annual faculty development institute and in the spring for extension's annual conference. During these on-campus sessions, extension staff take courses, taught by specialists and other experts, to update their knowledge in specific subject-matter areas and to improve their skills in working with the many different groups they serve.

During the year, "A and E" (Administration and Education) conferences are scheduled in each of the 10 regions. State administrative staff and subject-matter specialists travel to these meetings to update field staff on current administrative matters and to provide in-service education, generally on topics of broad interest to all county staff, regardless of their specific responsibilities. Thus, one year the education portion of the A and E meetings focus on working with county mass media; another year the "E" portion is devoted to interpreting the results of a recently completed survey on public issues of concern to Illinois residents.

But the need for in-service education and updating cannot be locked to a pre-planned calendar. As the direct costs of travel, meals and lodging, and time away from the job continue to increase, it is becoming increasingly impractical for county staff to come to campus or for state staff to visit the counties when a need for in-service education arises. To help ensure that county and area staff are always ready to best serve their audiences, the Cooperative Extension Service relies heavily on TeleNet for its continuing in-service education activities.

Formal in-service education activities are scheduled for delivery to county staff via TeleNet, but more importantly TeleNet provides almost instantaneous two-way communication between state specialists and county and area staff and allows for continual updating on rapidly changing situations.

During the cropping season, for example, a weekly update session is scheduled for agricultural advisers.* Subject-matter specialists in soil fertility, weed science, entomology, plant pathology and other relevant disciplines gather at the main TeleNet location on campus. County and area extension staff gather at TeleNet locations throughout the state, and a meteorologist from the National Weather Service's agricultural weather center at Purdue University is hooked into the system by a dial-up arrangement. The subject-matter specialists begin the weekly sessions with brief reports and recommendations about current conditions. Field staff then make similar reports, recommendations, and queries about their specific areas. Not all problems can be solved on the spot. For instance, a plant pathologist may not be able to diagnose a corn disease from verbal descriptions given so he or she would be advised to send a plant sample to the plant diagnostic clinic on campus for follow-up.

Two-way flow of information allows state staff to keep tabs on the spread of potentially serious crop problems throughout the state. State specialists regularly visit field research sites, county advisers, and farmers, but they can't be everywhere at once. If a situation reported during a TeleNet session seems particularly serious, they can travel to that location for first-hand observation.

Similar update sessions are scheduled in horticulture, agricultural, and consumer economics (e.g., analyzing the impact on the Illinois economy of USDA crop estimates, or predicting changes in retail food prices) and home economics. Home economics specialists also conduct regular in-service training sessions via TeleNet for paraprofessionals who teach to low-income people of the state nutrition, consumer, and homemaking skills.

TeleNet can also handle panic situations. President Carter's embargo on grain trade to the USSR has enormous impact on a major grain-exporting state such as Illinois. As soon as the embargo was announced county advisers sought from campus-based agriculture economists answers to questions they were receiving from farmers and grain dealers in their areas. Within two

* Note: In Illinois, county and area staff are called "county extension advisors" or "area advisors." The titles are analogous to the more common "county agent" or "area agent."

days, a TeleNet session was transmitted to state specialists analyzing the potential impact of the grain embargo, and responding to questions directly from farmers, grain dealers, and advisors.

b. Educational Telephone Network (ETN)--University of Wisconsin-Extension

Wisconsin makes similar use of the Educational Telephone Network to keep county agricultural agents up-to-date. A weekly program of agricultural specialists discussing current problems and solutions has proven to be a popular in-service training and informational program for county faculty.

More structured in-service education opportunities for county extension staff are also carried via the system. A study (Pellett, 1970) comparing the effectiveness of the ETN and face-to-face lectures at conventional district training meetings for in-service education of county extension agents showed no significant difference in the amount of knowledge gained, and that agents had a favorable attitude toward the use of ETN. The author concluded that ETN is an effective medium for extension in-service training, improvements can be made in the operation and quality of ETN transmissions, and the degree of open-mindedness does not appear to be a significant factor in the selection of ETN for in-service training.*

c. Personnel Development by Satellite: Hermes/CTS--Canada

The Canadian Hermes Communication Technology Satellite (CTS) experimented with telecommunication in rural Canada to overcome constraints to social and economic development. Although none of the experiments with Hermes/CTS dealt specifically with agriculture, it is cited here because it demonstrates application of communication technology to a variety of education and administration situations involving individuals and groups in remote areas--situations that are similar to those that agricultural and rural institutions face in many newly developing countries. A partial list of some problems with which CTS dealt follows:

- * recruitment of highly-qualified personnel to rural areas
- * high cost and inefficiency of routine visits to rural areas by specialized staff
- * timely consultation with experts before and after emergencies develop
- * inadequate in-service education for field staff
- * no opportunity for Canadian rural communities to share information

The Hermes/CTS experiment demonstrated that such an educational program by satellite was technically feasible and participants were generally satisfied.

* Note: A recent study by University of Wisconsin Professor James Duncan evaluating the effectiveness of the "Meet-Me-Bridge" communication system in the extension-planning hearing process appears as Appendix F to this report.

Other findings from experiments with Hermes/CTS in education, health care delivery, administration, and community interaction include:

- Terminals can be operated by non-technical people with a minimum of training.
- Satellite communication systems can be made acceptable to most individuals.
- Audioconferencing can be an economical and useful system for administration and training.
- Satellite systems can be shared effectively by users with varying program interests.

d. Appalachian Education Satellite Program

The Appalachian Education Satellite Program was originally planned to test the effectiveness of satellite broadcasts in remote rural areas as an alternative education delivery system for in-service training for education professionals and paraprofessionals.

C. APPLICATIONS OF COMMUNICATION TECHNOLOGY IN RESEARCH

As agriculture science and technology literature continues to grow so does the importance of the computer in providing agriculture researchers and other users access to that information.

Two of the largest and most comprehensive data bases for agriculture--AGRICOLA and CAB--are described here.*

1. AGRICOLA--AGRICultural On-Line Access--U.S. National Agricultural Library

AGRICOLA (AGRICulture On-Line Access), the National Agricultural Library's data base, was previously called CAIN (CAtaloging and INdexing system). AGRICOLA contains the titles of all monographs and serials contained in the National Agricultural Library (NAL) in Beltsville, Maryland. NAL is one of the three "national" libraries in the United States and is a depository of books and information on agricultural science gathered from all over the world for more than 100 years.

The AGRICOLA data base exceeds one million records, 90 percent of which are journal articles selected from some 6,500 journal titles and serials. Sixty percent of the records are for English-language publications. Approximately 135,000 records are added to AGRICOLA each year.

AGRICOLA is designed primarily as a means of bibliographic control for NAL and as a document locator for its users. The scope of the NAL data base is

* The descriptions are, for the most part, taken directly from a paper, "Selected Agricultural Data Bases," prepared by Debra Mattingly, graduate student in library science at the University of Illinois, Champaign-Urbana, in 1979.

the worldwide coverage of literature on all aspects of agricultural science: agricultural economics and rural sociology, agricultural products, animal industry, agricultural engineering, economic botany, food and human nutrition, forestry, pesticides, plant and animal sciences, veterinary medicine, soils and fertilizers, and other related subjects such as chemistry, physical sciences, environmental pollution, technology, social sciences and information science.

In 1973, the bibliographic records from the Food and Nutrition Information Center were added to AGRICOLA, and more than 5,000 records of the American Agricultural Economics Data Base were added to AGRICOLA in 1976. About 100 American Agricultural Economics Documentation Center records are added to the regular AGRICOLA monthly update tape. The Bibliography of Agriculture, derived from the monthly AGRICOLA tapes is considered one of the most important indexing services in the field of agriculture.

AGRICOLA is processed for online interactive bibliographic search and retrieval by Bibliographic Retrieval Services (BRS), Lockheed Information Systems, and System Development Corporation (SDC).

2. CAB--Commonwealth Agricultural Bureaux--United Kingdom

The Commonwealth Agricultural Bureaux (CAB) is the most comprehensive information service in the world for research scientists concerned with agriculture in its broadest sense. The production of abstract journals forms a major part of the services CAB provides to its users. Since 1973, abstracting journals have been produced via computer techniques. Therefore all the data covered is available on magnetic tape.

All abstract journals are processed to form a single data base covering the works of all institutes and bureaus called the CAB system. At present, the CAB system is processed by Lockheed Information Systems for online searching.

The CAB data base was first available in machine-readable form in 1974 and covers the time from January 1973 to present. They are intended for use by researchers, teachers and practitioners working in the agricultural sciences. The CAB system was formed by the merging of 20 data bases produced by various bureaus: animal breeding abstracts, agricultural abstracts, bibliography of systematic mycology, bulletin of entomological research, science abstracts, field crop abstracts, forestry abstracts, helminthological abstracts, herbage abstracts, horticultural abstracts, index of fungi, index veterinarius, nutrition abstracts and reviews, plant breeding abstracts, review of applied entomology, review of medical and veterinary mycology, review of plant pathology, soils and fertilizers, world agricultural economics and rural sociology abstracts, and weed abstracts.

3. CRIS--Current Information Service--Science and Education Administration, USDA

The Current Research Information Service (CRIS) is the computer-based information and retrieval system that serves the research project and documentation reporting needs of the U.S. Department of Agriculture. It is cited

here as an example of how communication technology can serve both research scientists and research administrators and managers.

CRIS documents all research sponsored or conducted by USDA research agencies, 56 state agricultural experiment stations, 15 forestry schools, 16 land-grant colleges of 1890, the Tuskegee Institute and 21 schools of veterinary medicine. In 1978, there were approximately 25,000 research project descriptions in the system.

Scientists can use CRIS data to prevent duplication of effort by identifying similar areas of research, to become more aware of new research technology, to identify research gaps, to search unfamiliar areas, and to observe patterns and trends. Administrators and research managers can use CRIS to determine funds and scientist-years allocated by location, research category, organization, and a variety of special categories.

More than 2,400 information requests were processed by CRIS during fiscal year 1978, requests for technical searches outnumbered requests for management searches by 3 to 1. CRIS services are provided free-of-charge to all USDA scientists, research administrators, and managers and state institutions, federal, state, and local government organizations. The CRIS Technical Data Base is also available commercially through the Lockheed Corporation's "Dialog" information service, an online interactive computer system that makes some 100 data bases accessible from any location in the United States, Canada, Australia, Mexico, Western Europe, and other countries.

D. APPLICATIONS OF COMMUNICATION TECHNOLOGY IN EXTENSION AND OUTREACH

1. Project Satellite--University of West Indies

Early in 1978, the University of the West Indies began a two-month experiment in cooperation with the U.S. Agency for International Development (USAID) and U.S. National Aeronautics and Space Administration (NASA) to determine the feasibility and value of satellite teleconferences and workshops to extend education outreach to its widely scattered regions. During the experiment, the UWI Mona (Jamaica) campus, the Cave Hill campus (Barbados), and the University Center in St. Lucia were linked by satellite.

Fifty-one percent of the television time during the Project Satellite experiment was devoted to outreach programs. Sessions included rural medical care in the Caribbean, agricultural research in rural areas, the value of the nurse-practitioner program to rural clinics, family-life education programs in rural schools, early childhood education, and library coordination.

The experiment included two outreach teleconferences that were part of a two-and-a-half day agricultural extension seminar held in St. Lucia. During the first of the two teleconferences, the opening address was delivered by the premier of St. Lucia by satellite link. The keynote address was delivered from Mona by the director of agricultural extension services, Ministry of Agriculture, Jamaica.

The University of West Indies experiment with satellite communication was generally well received and the potential of such a system amply demonstrated.

In summary on "Project Satellite," Dr. G. C. Lalor, pro-vice chancellor of the UWI Mona campus, states:

The level of acceptance achieved argues strongly for further studies and it is recommended that further experiments be carried out to determine the extent to which satellite communication techniques can be used to help meet the educational and community needs of the Caribbean Region.

2. Satellite Instructional Television Experiment (SITE)--India

The Satellite Instructional Television Experiment (SITE) was designed to test the effectiveness of educational television in teaching populations in remote villages in India. The experiment was conducted between August 1975, and August 1976. The project is continuing, however, in areas where television service by ground transmission is possible. During the life of the experiment, the ATS-6 satellite transmitted programs to more than 2,300 remote villages.

Four hours of programming were transmitted daily. School programs, information, and entertainment items were transmitted for one and one-half hours during the day. Non-formal education in agriculture and health was transmitted for two and one-half hours in the evening. Programs were videotaped in three special studios using formats such as song, quiz-in-verse, play opera, group dance, live action, simple animation, documentary films and photo features.

After the initial curiosity wore off, the average evening audience was 100 persons per set--30 percent children, 50 percent adult males, and 20 percent adult females. Television viewing neither decreased nor increased use of other media. However, it did result in increased contact with the village-level extension agent (Mody, 1978).

The SITE experiment yielded statistically significant gains in knowledge of preventative health measures, and gains in the proportion of men and women favoring the small family as ideal. There was a large gain in knowledge about improved animal breeds, but none in general agriculture knowledge. Mody suggests that no gain in general agriculture knowledge may have resulted because farming techniques vary greatly from region to region.

The SITE experience also points out the importance of considering software, the information content and formats of the programs to be transmitted, as well as hardware. Mody states, "In project after project, the media hardware has worked well while the software has been neglected. History repeated itself in SITE..." SITE hardware development began in 1970. Eighty-two percent of the costs were for earth stations, studios, TV sets, etc. Software planning began in 1974 and accounted for only 9 percent of the total cost of the project. Mody continues, "Full-time formative researchers should have been working with content experts from 1970, too, to develop software specifications and prototypes as the engineers were doing."

3. The Basic Village Education Project (BVE)--Guatemala

The Basic Village Educational Project in Guatemala was an experimental non-formal education program to test the effects of modern communication technology on rural development. Two educational radio stations were established. Each station was on-the-air eight hours a day, Monday through Saturday. About 20 percent of the programming featured agriculture-related information. Daily programs included a 30-minute core program (consisting of a radio-novel episode, advice from an agronomist and other short features interspersed with music), 30 to 40 spot announcements, and notices of Ministry of Agriculture activities. A weekly radio forum was broadcast each Saturday. The rest of the broadcast day included music, items of local color and other non-agricultural programming.

The project compared four media combinations as follows:

- System R (radio)--educational messages through mass media, principally radio.
- System R-M (radio-monitor)--a "monitor," a local person employed and trained by the project, supplemented the radio messages by working with the farmers in his own and three or four neighboring villages.
- System R-M-A (radio-monitor-agronomist)--a field agronomist trained and supervised monitors, attended radio forum meetings periodically, conducted agricultural demonstrations, helped identify local problems, advised farmers, and effected communication between the field and project headquarters.
- System M (monitor only)--in areas where the BVE radio signal could not be received monitors worked alone. In practice, however, the radio signal could not be eliminated completely.

BVE project evaluators concluded that all of the media combinations had "a measurable impact on knowledge about, attitudes toward, and/or use of modern agricultural practices," and no single media combination works best in all situations. Level of development, economic well-being, prior exposure to mass media, and technical assistance all influence the impact.

Although the experiment was completed by the end of 1977, similar educational programming by the Ministry of Education is being continued in both regions, and the former project unit has been granted responsibilities in planning and producing audiovisual materials for the Ministry of Agriculture.

4. Radio Farm Forum Pilot Program--Thailand

The Radio Farm Forum Pilot Project in Thailand was established in 1975 to strengthen existing agricultural extension services by providing agricultural information through integrated mass-media and interpersonal channels--specifically radio, publications, and fieldworker visits to organized listening groups.

The pilot project was carried out in eight villages. Since a preliminary survey showed the most convenient time for farmers to meet in radio farm forum groups would be during the evening, radio programs were broadcast with cooperation of Radio Thailand between 8:30 and 9:00 p.m. each Sunday throughout the 20-week duration of the project. Once a listening group was organized in a village, its members were requested to select a leader. These eight leaders were trained in the concept of the radio farm forum, group discussion and leadership techniques, and reporting procedures. The leaders provided post-broadcast reports to the extension officer on the outcome of forum discussions and any problems that could not be resolved locally. After receiving the leaders' reports, the extension officer contacted appropriate individuals or agencies to answer the farmers' questions and problems. Follow-up was provided through mass media (radio, publications), group contact (field trips, seminars, film showings, etc.), and/or personal contact with Department of Agriculture Extension field staff or other specialists.

Radio Farm Forum Pilot results include:

- Flow of information between farmers and extension agents increased. Extension staff recognized that the regular and frequent contact with farmers required by the pilot program was important. Farmers also increased their contact with extension agents because they felt agents were providing information relevant to their needs.
- High interest in program content and reinforcement by various communication channels fostered improved agricultural knowledge.
- Because services were based on actually articulated farmer needs, extension staff reported increased positive feedback from farmers, and increased personal job satisfaction.

5. Computer Management Network--Virginia Polytechnic Institute and State University

The Computer Management Network (CMN) began as a pilot project of the Extension Division, Virginia Polytechnic Institute and State University in 1969 with special funds from the Extension Service (now Science and Education Administration), USDA, to develop a national information system in decision-making for state extension services.

Currently, CMN is accessed by more than 250 users in more than 40 states and Canada. Approximately one-third of the county extension offices in Virginia have terminals. CMN assists extension personnel in solving problems, preparing presentations and evaluating programs. More than 60 interactive computer programs are available to assist extension personnel work with farmers, businessmen, consumers, and families.

The system is designed for easy use. The user does not have to be a computer expert, but should be sufficiently familiar with the subject matter to be able to concentrate on the problem to be solved and the data requirements

associated with it. Only a brief instruction period is needed to acquaint the individual with the mechanics of using CMN.

Programs are available in areas of human nutrition and health, home management, general financing and accounting, taxes and estate management, livestock management, farm management, and machinery and equipment. Other programs help users make best use of the system and provide for retrieval of stored information.

Computer and communications support for the CMN system are obtained from a commercial time-sharing vendor, Honeywell's DATANETWORK. Because of the speed of the computer, thousands of users can share time on the system simultaneously. CMN subscribers can access the system with computer terminals via local or toll-free lines from anywhere in the United States and Canada.

6. TELPLAN--Michigan State University

Michigan State University's TELPLAN system is an example of computer use for educational purposes in the classroom and/or extension work with farmers, consumers, families, business and others. With a minimum investment in time and funds, a professional can access the system and use programs that have been developed and perfected by researchers and extension specialists in several states.

TELPLAN has been in operation for nine years. Initially, it was restricted to state and field extension staff in Michigan. Now it is being used by both extension personnel and classroom teachers in more than 25 states. Some agribusinesses and farmers also use the system. Table 14 from "TELPLAN Progress Report" (1979) shows how usage has increased and diversified over time.

Standard long distance telephone lines are used to connect the computers. All university users are charged a fee for operation of the programs. More than 80 programs are currently available in TELPLAN, ranging from "Corn-Bean Enterprise Planning Guide" which helps determine the best corn and soybean production systems and enterprise mix to "Budgeting for Unemployed Families" which provides budget guidelines for reduced incomes.

Michigan State University's Information Services, in cooperation with TELPLAN, has developed a computer storage and retrieval program for making news and features stories available to mass media around the state. In essence, it provides "paperless" transmission of releases, eliminating the need to duplicate and distribute them by mail. A newspaper or other media outlet must call the MSU computer, sign on with a code provided, enter the proper password, call for the program and then search for items of interest. The user may either search by date, requesting all information released from a certain time, or may search by category/subcategory for all titles on a selected topic. Categories available include: general news, standing general features, entertainment and culture, financial, lifestyle, state and regional, sports, agriculture and marketing, family living, 4-H natural resources, timely topics, and energy legislation. Some categories have as many as 26 subcategories.

TABLE 14

TELPLAN USAGE
NUMBER OF ANALYSES, SELECTED YEARS

<u>TYPE OF USE</u>	<u>1972</u>	<u>1974</u>	<u>1976</u>	<u>1978</u>
M.S.U. Extension Education	4,983*	6,852	17,109	8,896
M.S.U. Classroom Instruction and Research		545	635	3,065
University Extension Education-Other States	3,642*	5,895	3,627	10,298
University Classroom Instruction-Other States		323	400	866
U.S.D.A., Agribusiness, and Others	<u>253</u>	<u>138</u>	<u>276</u>	<u>2,290</u>
<u>Totals</u>	<u>8,878</u>	<u>13,753</u>	<u>22,047</u>	<u>25,415</u>

* Figures separating the campus usage between extension and classroom teaching were not kept for the years 1970-72. Also, some of the figures for 1973-78 were mixed and, therefore, allocated to extension teaching.

Once the news article(s) is selected, the user activates a computer memory device in which it is stored. It can be edited, rewritten, or sent directly to electronic typesetting.

MSU is also developing a "shared-logic" central word-processing system, with video-display terminals and letter-quality printing terminals. When in place, it will be possible to electronically move a piece from the author to an editor to the county extension office. No words will be printed on paper until they reach the county extension office. Less paper printed and stored will reduce costs. If a publication needs major changes or updating it can instantly be done electronically.

7. AGNET--University of Nebraska

Like CMN and TELPLAN, the University of Nebraska's AGNET Agricultural Computer Network is a remote-access computer data base developed for extension program delivery and assistance. Currently about 100 computer programs are available to users in about 25 states. County extension staff serve as contact points for farmers, ranchers, agricultural banking and lending institutions, farm managers, consulting firms and others who want information about or to use the system. Access to AGNET is through typewriter-like terminals connected to the central computer on the University of Nebraska campus through any regular telephone line. The terminals are lightweight and portable and can be used anywhere there is an electrical outlet and a telephone. Users either rent or lease the terminals. AGNET staff provide initial orientation and when needed, assistance in using the system.

8. "Green Thumb" Project--University of Kentucky

The Green Thumb Project was developed to provide directly to farmers in their homes whenever they want or need it current information on weather, crops, pests, market prices, and other topics.

The heart of the system is a state-level computer to which data is automatically transmitted from the U.S. National Weather Service, the Chicago Board of Trade and the Chicago Mercantile Exchange. Local market prices, recommendations from state and county Extension staff, USDA information releases and other information are manually entered into the system. The state computer automatically calls smaller computers located in county extension offices and feeds information for use by farmers participating in the project. In addition, the county extension agent can add any other local information that may be needed.

A micro-processor--known as a "Green Thumb Box"--links the farmer's home phone and television set to provide access to the information system. To get the information he wants, the farmer turns on his receiver and dials a special phone number in the county extension office. He selects the information he wants from a list and records his selection by pushing the appropriate numbers on the Green Thumb Box. The requested information is loaded into the memory of the Green Thumb Box and the telephone line is automatically disconnected. The information is stored in the Green Thumb Box where it is available for the farmer on his television screen to use at his convenience. If he wants updated or additional information, he must place another telephone call to the county computer.

Pretesting of the Green Thumb system began in the fall of 1979. If successful, it will be expanded to a 150-county test in about 10 states. Eventually, it could be made available to farmers throughout the country. Eight states have already made commitments to expand the Green Thumb Project after the pretest is completed.

9. Fast Agricultural Communications Terminal System (FACTS)--Purdue University

FACTS--the Fast Agricultural Communications Terminal System--developed by Purdue University is a state computer system, not a regional system like CMN, TELPLAN, and AGNET or a nationwide system like Green Thumb potentially is.

As an extension education tool, the FACTS computer network provides rapid, detailed information dissemination, a memory capability for recalling data, and a computing capability for rigid analysis of problems and alternatives. "Intelligent" terminals (capable of operating off-line when not connected to the main computer) are located in all 92 Indiana counties. County agents, state specialists and others helped develop the 34 programs currently available from FACTS. Planning and development of the FACTS system began in 1977. FACTS is used when:

- Speed and timeliness are critical. It is not meant to replace print, mail, or telephone.
- Large quantities of repetitive materials, such as mailing lists, program enrollments, etc., are required.
- Periodic minor updating of technical bulleti and other material is needed.
- Limited personnel on campus or in the field make personal teaching impossible.
- Individualized data can help extension clients make decisions.
- Complex problems require interaction of several disciplines.
- Problems require interaction of several computers.

10. Narrative Accomplishment Reporting System--Science and Education Administration, USDA

Cooperative Extension Services from 44 states are participating in the 1980 pilot test of the Narrative Accomplishment Reporting System being carried out by USDA's Science and Education Administration (SEA). The system was designed to meet national information needs for accountability and to provide a way for individual states to exchange program ideas and techniques. State directors

of extension were asked to submit brief narrative descriptions of significant extension program accomplishments in their states during fiscal-year 1979. The narratives were reviewed at the national level, revised if needed, and entered into the national data base. Extension staff in all of the 44 participating states have access to that base through computer terminals and telephone lines.

In a June 3, 1980, letter to Narrative Accomplishment Reporting System participants, USDA/SEA Program Analyst Thomas G. Tate reported that responses from 37 states and institutions indicate that "clearly the states support continuation of the Accomplishment Reporting System." Tate further reported that a majority of the respondents indicated the following:

- The data base provides state staff with new information to which they had no previous access. (97 percent agreed or strongly agreed.)
- Reporting to pre-identified critical concern topics needs to be continued. (97 percent agreed or strongly agreed.)
- Storing and retrieving accomplishment reports through a computer system needs to be continued. (91 percent agreed or strongly agreed.)
- States should be allowed to add reports to the data base throughout the year not just at the end of the year. (74 percent agreed or strongly agreed.)
- The keywords should focus on specific subjects, audiences/beneficiaries and impacts. (88 percent or more agreed.)

SECTION VIICONSIDERATIONS, NEEDS, AND OPPORTUNITIES RELATED TO USES
OF COMMUNICATION TECHNOLOGY TO SERVE NATIONAL AGRICULTURAL EXTENSION SYSTEMS
IN THE TERRITORIES SERVED BY THE UNIVERSITY OF THE WEST INDIESA. GENERAL CONSIDERATIONS REGARDING THE USE OF COMMUNICATION TECHNOLOGY

To decide which communication technology or combination of technologies is best for any given situation, it is essential to carefully analyze the problems, roles, and functions, and the strengths and resources (technical, personnel, and financial) that can be devoted to the effort. Once these assessments have been made, the communication technology can be evaluated on the basis of meeting these requisites.

It is not wise to select a particular technology because it worked well to solve a similar problem in another location. This fails to consider other problems that need to be overcome--problems that may be beyond the functional limits of the technology selected. Neither should the most sophisticated communication technology be selected because it has the capability to perform all of the functions that the organization could ever want performed. Rather, the ultimate decision on technology should be based on an overall communication support plan.

There is often a tendency among communication planners to concentrate primarily on reaching the ultimate audience--in the case of agriculture extension, the farmers. Consideration must also be given to the need for effective communication within the organization itself and among other organizations and agencies. The communication technology selected should be able to help solve some of these inter- and intra-agency communications problems as well.

The plan should also ensure that all of the needed communication functions identified can be performed. Often a combination of communication channels can perform the same functions that a more sophisticated technology can perform alone. For example, if the communication system lacks the facility for two-way, interactive communication--conventional radio broadcasting, for example--other communication strategies such as organized listening groups with leaders or monitors or telephone "call-ins" can be used. A system that provides for two-way interactive communication but lacks visual transmission can be "made to work" by producing and distributing slides, videotapes, or other audiovisuals to the receiving sites in advance.

Hardware considerations aren't the only ones to be made in communication planning. Software and the producers of software also need to be considered. The problem of overemphasizing communication hardware was addressed earlier in this report in relation to the SITE project in India. Philip H. Coombs, vice chairman, International Council for Educational Development, echoes that

sentiment in the introduction to An Educator's Guide to Communication Satellite Technology:

The third and most troublesome qualification concerns the so-called software...the substance of the message as distinct from the hardware that distributes it... Typically, the lion's share of attention and available resources has gone to the hardware and logistics of the system, to the fatal neglect of creating good programs, the whole point of the undertaking.

Software and manpower considerations invariably go together. Questions such as: Are there sufficient numbers of skilled agricultural communicators available to produce the radio tapes, the television programs, the slide sets, or whatever that will ultimately be transmitted via the technology selected? Are there trained individuals to collect, analyze, store, and make locally relevant research findings available to others? What provisions have been made in the overall scheme for educational programs that will prepare the skilled professionals needed to perform these tasks? Are there provisions to train the users and receivers--extension workers, for example--so that they can make most efficient and effective use of the system?

In the long run, quoting again from Dr. Marlene Cuthbert's article in the June 1980 Caribbean Contact:

No communication medium can be any more useful to a society than the people who decide on its messages. The hardware is simply the means of transmission; more time and effort need to be spent on the software if it is to have local relevance.

B. SPECIFIC NEEDS AND OPPORTUNITIES FOR COMMUNICATION TECHNOLOGY TO INCREASE THE OUTREACH CAPACITY OF THE FACULTY OF AGRICULTURE

Appropriate communication technology could markedly increase and improve the outreach capacity of the Faculty of Agriculture. All three primary functions of the university--teaching, research, and service--could be significantly enhanced to make the Faculty of Agriculture a potent force in the agricultural development of the region. This final section examines each function and explores how the faculty could become more accessible and responsive to the agricultural development needs of each member territory.

1. Teaching

Student enrollment in the Faculty of Agriculture is limited because of high cost of education which must be borne directly or indirectly by the individual. This is especially true for students from member territories who must pay the total tuition cost, plus transportation and living expenses.

In the United States, as education costs have escalated, there has been a reversal of the pattern of students coming to the educational institution. Increasingly, universities are taking educational courses, and even degree programs, to students. Initially this reversal manifested itself by professors traveling to extramural centers to reduce the educational cost (travel and living expenses) to students. Now with transportation costs increasing (a

university cost) and the rapid progress being made in communication technology, distance teaching through interactive audio-communication systems is expanding rapidly.

Obviously, there are some limitations and disadvantages to distance teaching; however, the advantages of expanded educational opportunity and substantially reduced educational cost per student served (as measured by cost per instructional unit or contact hour) clearly indicates that distance teaching is not a fad, but an important new delivery system for higher education. Furthermore, distance teaching seems particularly well suited to the conditions and constraints of the regions served by UWI--limited time to travel, high transportation costs, and a diffused population spread over a large region. Distance teaching offers an opportunity for the Faculty of Agriculture to expand in the member territories the availability of both its regular academic courses and its in-service training courses and workshops for extension and technical personnel.

While lecture-discussion courses in the social sciences, including agriculture economics, extension education, and some agricultural science courses, easily lend themselves to distance teaching, many agricultural and natural science courses in a degree program require laboratory exercises and experiments as an integral part of the instructional program. These courses are not easily handled by distance teaching unless adequate laboratory facilities and instructors are available at the remote location.

It appears possible that, in addition to the pre-agriculture year, many of the course requirements for the B.Sc. degree in agriculture could be taught through distance teaching on the other two UWI campuses (Mona and Cave Hill) where laboratory facilities and support personnel are available. Additionally, some pre-agriculture year (N_1 courses) and Part I courses could be taught through distance teaching at extramural centers in many of the other territories. The proposed "Diploma in Agricultural Extension Program," to be developed as part of the UWI Agricultural Extension Project, seems to be another excellent area for the faculty to consider in exploring distance-teaching possibilities. Again, much of the formal course work could likely be handled via distance teaching.

Distance teaching is also a feasible alternative to expand the regional in-service education workshops organized by the Department of Agricultural Extension. Delivering formal workshop sessions about a new technology or extension skills via an interactive, distance-teaching system would reduce costs by reducing travel, lodging, and per diem costs for both teachers and participants, and increase participation. New areas of instruction, such as in-service workshops for commodity, research, and technical personnel, should also be explored.

2. Service

An immediate need of extension personnel in the region is technical backstopping. Extension personnel lack the technical training to handle many of the problems and questions raised by the farmers they serve. Many problems in agriculture, such as a new disease outbreak or an insect attack, require

immediate attention. There is sufficient expertise within the Faculty of Agriculture and the other regional institutions to solve most day-to-day technical problems faced by extension personnel. An appropriate communication system offers an opportunity to link the extension (and technical) personnel on the firing line with the technical expert in the region to help solve many problems.

One of the primary reasons why the faculty is not performing more of these technical assistance activities presently is the lack of travel funds and time. During the academic year, it is difficult for faculty members to leave their classes and other university responsibilities for a week or more. There is a poor and inefficient link between the agriculture experts and those who need their help. In the United States and other agriculturally developed nations farmers obtain quick answers to problems because their extension agent is just a telephone call away from some of the best agricultural scientists in the world.

Clearly, the Faculty of Agriculture has the same level of scientific talent, but unfortunately neither the farmer nor his/her extension agent can tap this resource because of the communication gap that currently exists in the region. A functional communication system could enable the faculty and other agricultural scientists in the region to more effectively backstop extension personnel.

Another area of urgent need in the region is access to accurate and current marketing information. If the region is to reduce its growing dependence on food imports, producers and shippers must have accurate price and market-demand information for the region. With an appropriate communication system for the region, the Agricultural Economics Department could collect, process, and transmit current marketing information. In addition, the department could arrange weekly or bimonthly teleconference meetings with national marketing boards and other regional organizations to discuss marketing problems and forecasts. Such a system would be of considerable value to the smaller territories in expanding their regional markets and reducing inefficiency and waste.

The Faculty of Agriculture should also explore the benefits of satellite-based communication to individual territories, especially Jamaica, Trinidad, Tobago, and Belize. With the availability of low-cost ground stations, district extension offices could tie directly into the central office, which might substantially improve their ability to respond to local needs. For example, Belize is considering the use of CB (Citizen Band) radios to keep extension agents in the field in touch with the district office. However, communication between the district offices, Belmopan (extension headquarters), and the central farm technical support staff will still be weak. A satellite can link the gap between administrative headquarters, technical specialists, district extension staff, and/or UWI faculty. A regional communication system can also make UWI faculty and teaching materials more accessible to the intermediate schools of agriculture in the region by means of videotaped lectures, teaching aids and materials, and selected introductory courses. Finally, a regional communication system would be under the broad rubric of faculty administrative support and service. Teleconferencing, facsimile transmission,

electronic mail, etc., can improve faculty program coordination, operation and administration, and improve efficiency and effectiveness.

Inter- and intra-organizational communication and coordination appear to be serious problems in the region. An appropriate communication system can certainly improve internal communication and certain administrative problems. Also, it could enhance and improve intra-organizational communication and program coordination.

3. Research

Because of present financial limitations, the faculty has in progress little off-campus research. The high cost of making regular visits off-campus to plan and implement with national program personnel field research experiments and trials has confined most of the faculty's research to Trinidad. The faculty's research program is less relevant to the region's needs than it could be as a result. If the faculty is to play an active outreach role, and if academic courses and in-service workshops are to reflect current agricultural problems in the region, the faculty must have strong off-campus research programs in the various territories. This outreach should be coordinated with--and perhaps backstop--CARDI's applied adaptive research efforts to help small farmers increase food production and income. An interactive communication system can facilitate faculty research by reducing transportation costs, improving planning, coordination and implementation. Another useful capability of satellite-based communication is its capacity to easily and cheaply access international computerized data bases appropriate to agriculture and related fields. This capacity can provide nearly instant access to most of the scientific and technological knowledge available in the world today. However, by collaborating with U.S. universities and institutions to link access to their larger computers, the system is able to accomplish major data analyses. While the St. Augustine campus has a small computer facility, the capacity of this computer and the lack of many "user-oriented, canned" analytical programs severely limits the type and amount of analytical work that can be accomplished. Linkage to a large computer facility in the United States would greatly expand the research potential at minimal cost to the university.

4. Conclusion

By international standards, the 40 members of the Faculty of Agriculture are highly competent and an invaluable though scarce regional resource. The capacity of the Faculty of Agriculture to respond to the needs of the outlying territories is limited because of the high cost of travel and communication among the 14 territories served by the university. The Caribbean Agricultural Extension Project Paper pointed out, "If Belize were superimposed over southern Oregon and northern California, Jamaica would lie in eastern Wyoming, Anguilla would be an island in Lake Michigan, with the other Leeward and Windward islands extending down to the Kentucky-Tennessee border; Trinidad would occupy northeastern Alabama, with Tobago to the northeast in Tennessee." Until it is possible to link these territories and their problems to the Faculty of Agriculture, agricultural development in the region will suffer. Furthermore, as pointed out earlier, several other regional agricultural institutions are similarly inefficient because of communication problems.

The University of the West Indies' Faculty of Agriculture would derive enormous benefit from the installation of a satellite-based communication system. Extension education, research, computer data analyses, formal and non-formal classroom instruction, personnel training, crop yield, and animal husbandry would all be enhanced. Moreover, such communication can significantly foster regional collaboration and integration to promote major agriculture economic development and thereby improve the quality of life in the West Indies.



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Alternative Communication Technology
To Serve Agricultural Extension and Development
In The West Indies

Volume II--Appendices

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by

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and

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APPENDIX A

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APPENDIX B

COUNTRY REPORTS

Antigua

The Bahamas

Barbados

Belize

The British
Virgin Islands

The Cayman Islands

Dominica

Grenada

Jamaica

Montserrat

St. Kitts-Nevis
(Anguilla)

St. Lucia

St. Vincent

Trinidad and Tobago

ANTIGUA

A. GENERAL AGRICULTURAL SITUATION

In 1974, agriculture accounted for 4.2 percent of the Gross Domestic Product of Antigua at factor cost (Agricultural Statistics, UN ECLA 1978:18). In 1970, agriculture employed 1,709 men and 740 women who comprised 12 percent and 8.4 percent, respectively, of the labor force 14 years of age and above. According to a Government of Antigua survey, women headed 25 percent of the farm households. In the same survey, nearly 50 percent of the farmers who responded spent at least half their labor time on off-farm activities (Working Document Series, Caribbean Region #2, 1978:9,13).

B. LAND TENURE AND LAND USE

Agricultural land in Antigua (almost 28,000 acres) comprises about 25 percent of the total land area, with 18 percent being arable crop land, 6.8 percent meadows, 15.9 percent in forest land, and the unusable land making up 59.1 percent (Agricultural Statistics, 1978:22).

In a 1973-74 census, it was found that 75 percent of the farms were less than 5 acres; about 2 percent were more than 100 acres. There was an average of 1.2 plots per holding.

The government owns 70 percent of the agricultural land and 75 percent of the farmers (crop producers) are renters. The government also rents land to small livestock producers (Working Document Series 1978:55,57,59).

C. AGRICULTURAL PRODUCTION

1. Main Food Crops

Vegetable production is sufficient to meet local demands and export markets are being sought and found. There is little organized market gardening and vegetables are subject to retail price controls (Caribbean Yearbook 1978-1979:276).

Small farmers produce a considerable variety of food crops mainly for local consumption. The percentage of farms with less than 10 acres which produce various food crops follow:*

corn	82.8%
sweet potatoes	44.2%
cassava	93.5%
yams	94.7%
tomatoes	70.2%
cabbage	95.0%
carrots	27.9%
onions	5.8%
eggplant	59.0%
pumpkin	88.1%

* Working Document Series 1978:64)

ANTIGUA (continued)

2. Main Export Crops

a. Cotton

Sea Island cotton is the main agricultural export crop. Of 100 farmers interviewed by the Antiguan government in 1973-74, 33% reported that cotton was their principal crop (Working Document Series, 1978:63).

Cotton is now mechanically harvested. Cotton production has fluctuated over the years, but heavy government investment in the mid-1970s led to a large increase in acreage planted and subsequent increases in production. The Antigua Cotton Growers Association is responsible for safeguarding the interests of and promoting the development of the cotton industry (Caribbean Yearbook, 1978-1979:276).

b. Sugar cane

Severe drought after the 1964-65 season led to the closing of the island's only sugar factory. It was recently reopened under government ownership (Caribbean Yearbook 1978-1979:276).

c. Livestock

In 1975, livestock activity accounted for 5.9 percent of the Gross Domestic Product, considerably more than crop production whose share of the GDP was only 1.1 percent. However, in 1977, no farmer of the 100 surveyed reported livestock as his most important industry (Working Document Series 1973:65).

Livestock production is encouraged by government assistance through provision of more grazing areas, development of small livestock units, and production incentives, as well as breeding programs for Nelthropp cattle, Black Head Persian Sheep, and Barbados Black Belly sheep. Poultry raising is also developing as an industry. (Caribbean Yearbook, 1978-1979:276).

D. AGRICULTURAL INPUTS INCLUDING LABOR

Small farmers obtain tractor services from the government at nominal cost. In 1976, there was roughly one tractor for every ten households. Small farmers own few tractors; most new tractors are purchased by the government.

Chemical and fertilizer use on small farms is very limited. The Central Marketing Corporation has a near monopoly on the sale of inputs (Working Document Series 1978:73).

E. AGRICULTURAL EXTENSION SERVICE

The Extension System in Antigua was first organized in 1954 and financial support comes from the Ministry of Agriculture. A USAID Survey Team in 1977

ANTIGUA (continued)

found that there were 9 field instructors for the 2,449 farmers on the island, resulting in a ratio of 1:272 (Working Document Series 1978:54). An Antigua Government survey of 100 farmers in 1976 found that 77 percent had some contact with extension instructors and most dealt with at least two other government agencies. Of those receiving assistance from government agencies, 30 percent were completely satisfied, 26 percent fairly satisfied, 19 percent were not satisfied, and 27 percent did not respond. Fifty-nine percent said they would go to the extension instructor to receive information on improved practices. Fifty-eight percent of the respondents listened to agricultural information programs on radio, especially the Ministry of Agriculture's "Agriculture on the Move" program. Only seven farmers said they listen to programs all the time; 49 percent listened occasionally. Almost all who listened found programs either useful or somewhat useful (Working Document Series 1978:85).

F. OTHER SUPPORT SERVICES

1. Credit

The 1976 Government Survey reported that 14 percent of 100 farmers interviewed had "dealings with the Antiguan-Barbuda Development Bank and four dealt with commercial banks. Sixteen farmers dealt with Antigua Sugar Estate Development Board which, in effect, provides credit to promote diversification" (Work Document Series 1978).

2. Marketing

The Central Marketing Corporation purchases farmers' produce but often discards more produce than it sells, partly because it has been reluctant to set quality standards, and thus sometimes buys products that are unmarketable (Working Document Series 1978:94).

Small farmers claim that marketing problems are a particularly important determinant to crop choice. Twenty-three percent of the respondents identified absence of an assured market as the most important factor affecting production decisions (Working Document Series 1978:96).

THE BAHAMAS

A. GENERAL AGRICULTURAL SITUATION

About 40,000 acres of land is being farmed in the Bahamas with about 4,000 acres being used as improved pastures.

B. LAND TENURE AND LAND USE

Much of the better agricultural land is in private hands. The government rents land until the tenant has effected permanent improvements by building or by cultivation, after which an application for a grant of the land will be considered (Caribbean Yearbook 1978-1979:59-60).

Agricultural land occupies 1.77 percent of the total land area--0.2 percent is arable land, 1.4 percent planted to crops, 0.1 percent meadows and pastures, 32 percent forest land, and 66 percent of the land is unusable (Agricultural Statistics:23). A lack of suitable soil frequently limits agriculture. Very little fertile land and surface water is available (Mitchell, 1967:90).

C. AGRICULTURAL PRODUCTS

Pigeon peas and beans: These are popular items of the local diet and are grown and marketed by the Bahamas Produce Exchange.

Tomatoes: More than 1,000 acres of tomatoes are grown. The bulk is sold to local canneries. Vine-ripened fruit reaches local markets. A small excess is exported to the United States.

Cucumbers: Grown primarily for export to the United States. The acreage under cultivation to cucumbers is on the increase.

Other food crops: Cabbage, beets, carrots, spinach, eggplants, pepper, squash, and okra are grown throughout the territory. Large quantities are usually available on the local market.

Bananas: Small amounts of bananas are grown in the Bahamas. To meet local demand, imports are necessary during certain times of the year.

Citrus fruit: This fruit is grown on all islands and shipped to Nassau for sale in the local market. Efforts are being made to increase the acreage planted to citrus.

Sugar cane: Was planted on some 20,000 acres in 1969, but because of failure to find suitable markets in the United States and United Kingdom, operations were abandoned.

Sisal: Mainly used in the manufacture of local handicrafts.

D. LIVESTOCK

Lack of surface water, pasturage and limited use of the islands has restricted livestock production to a small number of home-raised swine, goats,

THE BAHAMAS (continued)

and poultry. A sizeable number of sheep are also able to find grazing land.

Efforts are being made to improve the quantity and quality of pastures and to introduce suitable breeds of cattle to increase the local milk supply.

Poultry: The industry has developed rapidly because of the introduction of modern production methods. While most livestock is raised by small farmers, poultry is raised by large growers who are highly organized.

BARBADOS

A. GENERAL AGRICULTURAL SITUATION

Barbadian agriculture accounts for 14 percent of the GDP at factor cost (Agricultural Statistics 1978:13). In 1970, agriculture employed 8,327 males and 4,907 females who comprised 16.5 percent and 15 percent, respectively, of the total paid labor force over 14 years of age. The estimated mean ages of agricultural workers in 1970 were 45.6 for men and 46.6 for women.

B. LAND TENURE AND LAND USE

Agricultural land (1975) occupied about 90,000 acres, or about 86.4 percent of the total land area, with 76 percent being available as arable land for food and tree-crop production, 9.3 percent for meadows and pastures, and 14 percent unusable (Working Document Series, 1978:7;30).

In 1971, 96 percent of the farms were less than five acres in size and these occupied 11.6 percent of the land area. Only 1.2 percent of the farms consisted of more than 100 acres and these occupied 82.9 percent of the land area. Average number of plots per farm holding was 1.6.

Individual ownership of farms is the predominant land-tenure pattern. Sixty-nine percent of the farms are owner-operator; 24 percent, cash rented; about 1 percent, in share tenancy; 20 percent, in mixed tenancy. Other forms of tenure (freehold) account for another 2 percent.

C. AGRICULTURAL PRODUCTION

1. Main Food Crops

Food crops are grown mainly by small holders with less than 10 acres, although a government order issued in 1956 required that a minimum of 12 acres of estate land be used for this purpose (Caribbean Yearbook 1978-79).

According to a 1969 survey, small farmers grew most of the carrots, cabbages, string beans, lettuce, beets, and shallots produced on the island. Recent evidence indicates that estates are now important producers of onions, carrots, and yams (Working Document Series 1978:64).

Many fruits are grown primarily for local consumption. These include mangoes, avocados, citrus, breadfruit, golden apple, gooseberries, and cherries (Caribbean Yearbook 1978-1979:94).

2. Main Export Crops

a. Sugar cane

This commodity provides the basis for the economy and is the main source of agricultural employment. About 25 percent of the sugar land is owned and run by small-farmers who also work on estates sugar factories part of the year. Several groups and organizations have regulatory and other functions in the sugar industry. These include the Barbados Sugar Producers Association, and the Sugar Industry Price Stabilization Reserve Board among others.

BARBADOS (continued)

b. Bananas

The Robusta strain of bananas was introduced and established on a limited scale in sheltered areas.

c. Livestock

Livestock are mainly raised by small-farmers. In addition, about 24 dairies ranging in size from 10 to 250 cows supply the bulk of fresh milk used on the island.

D. AGRICULTURAL LABOR

Thirty-three percent of farm labor is provided by families, 4 percent by unpaid non-family workers and 63 percent by hired labor. Hired labor was used by 83 percent of farmers surveyed (Working Document Series 1978:81).

E. AGRICULTURAL EXTENSION SERVICE

Program objectives are as follows:

1. To organize and educate farm families in order to ensure successful agriculture diversification in all its phases.
2. To maximize efficiency in land use.
3. To contribute in every possible way to upgrade the status and efficiency of farming in Barbados.

Main production programs are focusing on fresh vegetables, fruit crops, Sea Island cotton, livestock (cattle, hogs, blackbelly sheep, rabbits). The present staff consists of two national and nine county agents.

Several experimental programs and pilot projects are currently underway. These include:

1. Pilot communal grazing pastures for cattle and sheep in Scotland District.
2. A pilot terracing project for eroded corraline soils.
3. Backyard gardening and small livestock project through 4-H Clubs and the applied nutrition program.

Staff shortages and salary levels are identifiable problems (McCabe and Swanson, 1975:11-12).

BELIZE

A. GENERAL AGRICULTURAL SITUATION

In 1975 agriculture in Belize accounted for 28.6 percent of the Gross Domestic Product at factor cost (Agricultural Statistics 1978). In 1970 the industry employed about 10,600 male and about 450 female workers who comprise 42 percent and 8 percent respectively of the workers in the country 14 years of age and over. The mean age for male workers is 41 and for females is 40 (Working Document Series: 1978). These data differ substantially from the 1973/74 census of agriculture issued by the Belize central planning unit, which shows 18,930 males (70.7 percent) and 7,856 females (29.3 percent) employed in agriculture (both paid and unpaid employment).

B. LAND TENURE AND LAND USE

Agricultural land comprises about 175,000 acres which is about 3.1 percent of the total land area--1.8 percent is arable land and only 0.8 percent is planted to crops. Less than 1 percent is used as meadows and pastures. Forest land occupies 44.4 percent, and other land takes up the remaining 50.5 percent (Agricultural Statistics Caribbean Series 1978:23).

Belize, unlike the island territories, does not have an overwhelming number of farmers with holdings of less than five acres. Only 12.9 percent of the farms are in this size range. However, 83 percent have holdings of less than 50 acres. About 1.5 percent have holdings of more than 200 acres and these farms occupy about 68 percent of the land area being used for agricultural purposes (1974) (Working Document Series 1978:56).

The Lands Department is responsible for the management of national land including leasing and subsequent collection of rent, processing of applications to purchase and also for assessing and collecting land tax. Lands suitable for agriculture purposes are usually sold in small parcels to farmers.

C. AGRICULTURAL PRODUCTION

1. Main Food Crops

a. Red kidney beans

These are produced in sufficient quantity to meet local demand with a small surplus available for export. The crop is normally planted in rotation after maize and rice. Small farmers produce about 80 percent of the total production of red kidney beans (Working Document Series 1978:64).

b. Maize

Maize is planted in most areas of the country. Two systems are employed--shifting cultivation and mechanized cultivation. Small farmers produce about 30 percent of the maize under the shifting cultivation system.

BELIZE (continued)

c. Rice

Rice is the most important food crop and was produced almost exclusively by small farmers up to the late 1960s. Now, one large scale, mechanically-cultivated ranch produces about half of the paddy rice produced each year.

The marketing board purchases and mills a large portion of the rice produced. The board operates a number of threshers in the main rice growing areas of the country.

d. Root Crops

Considerable quantities of yam, sweet potatoes, and cassava are produced for local consumption. "Irish" potatoes are grown on a small scale.

e. Vegetables

Vegetables of various kinds are produced mainly for local consumption by small scale growers.

2. Major Export Crops

a. Livestock

The beef cattle population is increasing. The 1970 figure of 38,000 showed an increase of 22 percent over 1968. Emphasis is on production to meet local demands. A few hundred are exported on the hoof annually to Mexico.

Dairy: The industry is still in its infancy. Most of the fresh milk is produced by the Mennonite community in the Orange Walk District. A large volume of milk products is imported annually. There is great room for expansion of the industry.

Pigs: Pigs are reared on a "backyard" basis. The government maintains a piggery for breeding and upgrading. Weaners are sold to farmers.

Poultry: Poultry and poultry products produced locally are insufficient to meet demand, so there is a large volume imported annually. Attempts are being made to form cooperatives to increase production.

b. Sugar cane

Sugar cane is usually grown in monoculture but can be alternated with corn and soybeans. Considerable difficulties have been experienced because of labor shortages. The affairs of the sugar industry are handled by the Sugar Board, a statutory body, and by the Cane Farmers Association.

BELIZE (continued)

c. Citrus fruits

Citrus fruits of all kinds are produced in Belize but most production occurs on larger scale plantations. The Citrus Control Board, a statutory body, and the Citrus Growers Association cater to the affairs of the industry.

d. Other Export Crops

Bananas: Are grown mainly by commercial growers.

Cocoa: Lost its popularity after hurricane damage in the 1960s. Recovery is now very slow.

Coconuts: Plantations are producing small quantities through a coconut rehabilitation scheme organized after the hurricane of 1960. Production is expanding, but is still not sufficient to warrant a processing plant.

Coltune nuts: Are grown particularly for cooking oil. (Caribbean Yearbook 1978-1979.)

D. AGRICULTURAL EXTENSION SERVICE

The present agricultural extension agency was first organized in 1967. It is financed and supported by the Ministry of Agriculture. Its program objectives are to obtain self sufficiency in all crops and livestock products; improve quality, quantity, and range of export crops; develop the livestock industry and promote export trade; promote farming as a way of life based on sedentary agriculture; and encourage farmers' active participation in national agricultural developments.

The main production programs concern maize, red kidney beans, tobacco, bananas, rice, beef cattle, mangoes, and soybeans.

The following services are provided:

Marketing board: A statutory body purchases crops at guaranteed prices, processes and stores crops, and markets crops locally and abroad. Also provides market intelligence for government and commercial firms.

Agricultural credit fund: Set up to assist small farmers by means of loans spread over a period of up to five years. These are granted for a variety of projects including cattle rearing, citrus cultivation, poultry and pig rearing.

Small farmers loans: Short-term loans are available to assist farmers who do not have sufficient collateral (Caribbean Yearbook 1978-1979).

THE BRITISH VIRGIN ISLANDS'

A. GENERAL AGRICULTURAL SITUATION

Agriculture contributed about 9 percent of the Gross Domestic Product of the British Virgin Islands in 1977 (Quarterly Economic Review, 1979:44).

Approximately 22,500 acres of the most fertile land is owned and cultivated by small farmers, with the average holding being about 18 acres. About 70 percent of the land is privately owned. In general, soils are light and food crops are rotated with pastures.

B. AGRICULTURAL PRODUCTION

1. Crops

The crops currently produced are sugar cane, limes, bananas, coconuts, mangoes, and ground provisions. These find a ready market in the U.S. Virgin Islands.

2. Livestock

The principal agricultural industry is raising livestock for export. The ultimate aim of the Department of Agriculture is to encourage development and maintenance of good pastures for the expanding livestock industry. The government maintains a stock farm where improved stock are bred for sale and distribution to farmers. Several breeds of sheep and goats are maintained to improve local stock.

THE CAYMAN ISLANDS

A. GENERAL AGRICULTURAL SITUATION

There is very little cultivable soil in the Cayman Islands except in the Cayman Brac and in scattered pockets. The government plans to drain some swamp land to increase the supply of agricultural land. All land is individually owned and legislation has been enacted whereby the government guarantees title to all lands and facilitates simple and expeditious transfers or dealing in land. The demand for land is fairly high and estates are being subdivided (Caribbean Yearbook 1978-79).

In 1970 agriculture employed about six percent of the working men and less than one percent of the women. The estimated mean age for men in agriculture is 52 years and for women 43 years (Working Document Series 1978).

B. AGRICULTURE PRODUCTION

Production is limited activity based on beef, cattle, ground provisions and free crops such as mangoes, citrus, avocados, breadfruit and coconuts. Coconuts flourish in all three islands. Some of the agricultural enterprises in the territory are one-egg production, general farming of pork products, vegetables, and milk, banana growing, one hydroponics unit producing tomatoes, some cattle ranching, and a government-run experimental farm.

The Agricultural Department was established in 1966 (Caribbean Yearbook, 1978-1979:97).

DOMINICA

A. GENERAL AGRICULTURAL SITUATION

In 1977, the agriculture in Dominica accounted for 34.2 percent of the Gross Domestic Product of the island at factor cost. (Agricultural Statistics: Caribbean Countries 1978:18.) According to an agricultural employment survey in 1970, agriculture employed 5,732 male and 1,947 female workers and accounted for 46.6 percent and 27.2 percent, respectively, of the male and female working population over fourteen years of age. The estimated mean age of employed workers in agriculture is about 50 years for men and about 45 years for women. The greatest number falls in the 30-59 age category. (Working Document Series, 1978.)

B. LAND TENURE AND LAND USE

Agricultural land in Dominica occupies about 47,000 acres, about 25 percent of the total land area. Of the total land area, 9.4 percent of the land is arable, 13.3 percent is planted to permanent tree crops, 2.7 percent is devoted to meadows and pasture, 46 percent to forest land, and 28 percent is devoted to unproductive land. (Agricultural Statistics, 1978:23.)

Seventy-two percent of the farms are less than five acres and occupy twelve percent of the agricultural land area. Twenty-three percent are holdings of 5-25 acres and occupy 21 percent of the land. Less than 5 percent of the farms are over 50 acres in size. These occupy about 64 percent of the total land area. (Working Document Series, 1978:56.)

In 1961 about 76 percent of the farms were owned, 16 percent rented, and 6 percent mixed tenure patterns. Leases given to farmers were for three to five years under the mid-1970s resettlement schemes. Recent efforts to form cooperatives among young farmers have encountered serious difficulties (probably due to poor government administration). (Working Document Series, 1978: 61.)

C. AGRICULTURAL PRODUCTION

1. Main Food Crops

Unpublished Ministry of Agriculture data for 1976 show that the principal domestic food crops, in descending order by value of production, were dasheen, tannia, yams, plantains, cucumbers, cabbages, tomatoes, and sweet potatoes. Ground provisions were the major source of farm income for 44 percent of small farmers interviewed by Weir in 1976; for plantains it was 16 percent (Working Document Series, 1978:65).

2. Main Export Crops

a. Bananas

Bananas account for about 75 percent of the total agricultural export of Dominica. Weir (1976) found bananas to be the major source of

DOMINICA (continued)

cash income for 47 percent of the small farmers he interviewed (Working Document Series, 1978:65).

Bananas grow almost exclusively in pure stands on small farms but may be interplanted with permanent crops. Bananas are sold almost exclusively to the United Kingdom market through the Dominica Banana Growers Association (Caribbean Yearbook, 1978-1979:393).

b. Limes and other citrus

Limes, oranges, and grapefruit are also of economic importance. Green limes are exported to the United Kingdom, while oranges and grapefruit are raised for the region and export to the United Kingdom.

Large farms dominate citrus fruit production. The government gives as much assistance as possible to the citrus industry. Under the Citrus Development Plan, the government heavily subsidizes fertilizer and provides free spraying services. The Dominican Citrus Growers Cooperative Association looks after the interest of farmers in the industry (Caribbean Yearbook 1978-1979:394).

c. Other export crops

Copra is produced mainly for export to Barbados. Cocoa and vanilla are also produced for export.

d. Livestock

Livestock is less important than crop production. Fifty-one percent of farmers do not sell or keep livestock. The principal types of livestock are goats, pigs, and cattle. These are listed as major source of income for 15 percent, 14 percent, and 12 percent of farmers interviewed (Weir, 1976. Working Document Series 1978:65).

A government livestock pasturage scheme was started in 1964 to improve the cattle industry, emphasizing beef production. Practical encouragement by the government is given to the pig and poultry industries.

D. AGRICULTURE DEVICES INCLUDING LABOR

Relatively little use is made of machinery and labor-saving equipment by small farmers in Dominica. Only 15 percent of small farmers interviewed in 1966 used their savings to purchase such tools as hoes and machetes. A much higher proportion used these tools. Weir (1976) found only three of 100 small farmers interviewed purchased mechanical equipment (Working Document Series 1978:74).

The 1966 survey also found that 58 percent of small farmers interviewed sought credit for fertilizer, and 38 percent purchased fertilizer out of their savings. Weir (1976) found that 67 percent of small farmers used

DOMINICA (continued)

fertilizer on bananas. Except for bananas, fertilizer applications were thought to be inadequate. Percentages reported by Weir were 67 percent for ground provisions, 34 percent for plantains, citrus 23 percent, and vegetables 16 percent.

Chemical use was high (45 percent) for bananas, even though the government spraying program protects most banana trees. Only for one other crop--plantain (18 percent)--did more than 10 percent of farmers use chemicals. (Plantains are closely related to bananas so the same chemicals can be used for both.)

A 1966 survey found that 60 to 90 percent of farmers use family labor. Weir (1976) found that family labor was used regularly by 42 percent of the small farmers interviewed and irregularly by another 9 percent. (Working Document Series 1978:81.)

E. AGRICULTURAL EXTENSION SERVICE

A USAID survey team in 1977 found that the ratio of agricultural extension field instructors to farmers was 20:7965(1:398). But an earlier survey revealed that small farmers had little contact with the extension instructors even though the instructor/farmer ratio was relatively favorable.

Most extension workers were described as more than 40 years old, possessing only a primary education and having little technical training. Most farmers obtained agriculture information from their neighbors. It was reported that progressive estate management influenced small scale farmers to adopt certain practices.

Weir (1975) found that the service had little direct contact with small farmers. One of 100 farmers surveyed reported "regular" exposure to field demonstration, three others said they occasionally went to field demonstrations. Twenty-two percent said they regularly used printed materials to obtain information while a relatively high 63 percent said they listened regularly to radio information programs. (Working Document Series 1978:86-87.)

The extension service additionally provides the following support services:

Credit: A 1966 survey of 96 small farmers found that 60 of them sought (and presumably obtained) credit. The main lenders were production associations (principally the Dominican Banana Growers Association). The chief use for credit was to purchase fertilizers. In terms of other sources of agricultural credit, it was estimated that only two percent of credit union savings were channeled into agricultural activities. Weir (1976) reported that only 10 percent of the 100 farmers he interviewed had ever applied for credit from a commercial bank. Money-lender credit is not very popular in Dominica (Working Document Series 1978:91-92).

DOMINICA (continued)

Marketing: Marketing problems are serious in Dominica. They were identified by farmers as a major impediment to increased production. Major problems indicated were lack of market demand, low prices, and poor transportation facilities, including access roads (Weir, 1976). The most important crop marketing outlets for small farmers are producer-associations and "higlers." The Dominica Marketing Board operates several buying depots. Farmers expressed dissatisfaction with the prices offered by the DAMB and preferred the convenience of being able to sell to private buyers (higlers) who come to the farm gate. (Working Document Series 1978:86.)

GRENADA

A. GENERAL AGRICULTURAL SITUATION

In 1977, agriculture accounted for 18.9 percent of the Gross Domestic Product at factor cost in Grenada. (Agricultural Statistics 1978:14.) In 1970, it employed 5504 men, and 3097 women, 34.2 percent and 31.9 percent respectively of the labor force on the island over 14 years of age. The estimated mean age for farm workers is 53 years for men and 52 years for women. (Working Document Series 1978.)

B. LAND TENURE AND LAND USE

Agricultural land in Grenada occupies about 42,000 acres, about 50 percent of the total land acreage; 59 percent is in meadows and pastures, 11.8 percent forested, and the remaining unusable land makes up 8.9 percent. (Agricultural Statistics 1978:23.)

Eighty-nine percent of the farms are less than five acres in size, and one percent of the farms have over 100 acres.

C. AGRICULTURAL PRODUCTION

1. Main Food Crops

A wide variety of food crops is grown for local consumption. These include eddoe, dasheen, pumpkin, pigeon peas, corn, and cassava. Several thousand acres are grown almost exclusively by small holders, cultivating small patches of land, usually on steep slopes. Production is usually below demand and out-of-season prices are extremely high. (Caribbean Yearbook 1978-1979:415.)

2. Main Export Crops

Cocoa, nutmeg, mace, and bananas are the chief crops grown for export. Other important crops are sugar cane, coconuts, citrus (mainly limes) and cotton.

Cocoa: About one-fifth of the total production originates from small farmers and the remainder is from medium and large growers. Industry production declined in the mid-1960s due to hurricane damage. The Grenada Cocoa Association was established to improve the situation. The Cocoa Industry Board acts as an advisory body to the Department of Agriculture.

Nutmeg and Mace: Production appears to be equally divided between small and large farms. The Grenada Cooperative Nutmeg Association is a statutory body which processes and markets all nutmeg and mace.

Bananas: Since 1955 bananas have become a major crop in Grenada. Farmers expanded banana export while the cocoa and nutmeg industry recovered from hurricane damage. Small farmers produce about 25 percent of the exports.

GRNADA (continued)

The Grenada Banana Cooperative Society (GBCS) was established in 1954 and is a statutory body of banana producers. The organization primarily markets bananas and promotes improvements in the industry.

Sugar Cane: Efficiency, particularly among small-scale producers, is low. Production has been on the decline since the early 1960s.

Coconuts: Coconuts are casually grown by most estates. Several areas are under pure stands, but almost half the crop occurs as isolated or scattered trees. There is no association or organized body to promote the interests of the coconut industry.

Cotton: Sea Island cotton is grown in Carriacou, one of the Grenadines, and its lint is sold to Trinidad. The Carriacou Development Board promotes the cotton industry.

Limes: Lime production is nearly equal in Grenada and Carriacou. The industry has received several setbacks due to hurricane damage. No association is exclusively concerned with the welfare of the lime industry.

Livestock: Livestock production is an important part of the economy but local demand for meat and milk are still not being met. Meat and milk are mainly produced on small farms (Caribbean Yearbook 1978-1979: 413-41).

D. AGRICULTURAL DEVICES INCLUDING LABOR

There is very little machinery used in Grenada. Unpublished census data for 1974-75 shows only small tools, machetes, hoes, etc., are used.

A survey found that fertilizer was mainly used by commercial farmers and mini-estates. Over 60 percent of farmers interviewed used fertilizer. (Working Document Series 1978.)

E. AGRICULTURAL EXTENSION SERVICE

A USAID survey in 1977 found that there were 24 field instructors to 12,173 farmers, yielding an extension agent-farmer ratio of 1:507. The present extension agency was organized in 1952, with financial support coming from the Ministry of Agriculture. The program objectives of the extension service include:

- Encouraging efficiency in the production of major export crops (cocoa, nutmeg, bananas).
- Increasing the range of crops exported.
- Promoting and encouraging self-sufficiency in food-crop livestock products and fisheries.

GRENADA (continued)

- Promoting internal and external marketing of locally produced foods.
- Developing agro-industries.
- Introducing up-to-date practices for efficient farming.

1. Experimental Programs or Pilot Projects for Farmers

Demonstration food-farms in districts, rice, onion, soya bean production experiments, small-scale farm machinery practice, and a pilot project for expansion of the banana industry.

2. Special Programs Exclusively for Small Farmers

Weekend training courses at the farm school, production of planting materials for food-crop expansion, provision of spraying equipment for pest, disease, and weed control, and credit facilities through the Agricultural Bank.

3. The Major Problems Encountered by the Extension Service

Lack of a proper marketing organization for internal and external marketing of food crops, lack of good feeder roads to farms, high cost of farm supplies and machinery, lack of guaranteed prices for food crops produced, and inability of farmers to secure credit (McCabe and Swanson, 1975: 471).

A government census in 1974 found that extension agents were a relatively minor source of information about improved farm practices. The following were the main sources used by farmers: radio broadcasts (79 percent), friends and neighbors (77 percent), family tradition (75 percent), McDonald Almanac (74 percent), estate experience (76 percent), and extension instructors (24 percent).

Contact with extension personnel tends to increase significantly with degree of commercialization.

JAMAICA

A. GENERAL AGRICULTURAL SITUATION

Agriculture in Jamaica accounts for about 9.1 percent of the Gross Domestic Product while employing about 33.6 percent of the labor force. "The Agriculture Sector Study" initiated by the government in the mid-seventies set an objective for increased food production. This project set short-term and long-term objectives.

B. LAND TENURE AND LAND USE

The short-term objective is to achieve rapid increase in food production by providing small farmers and others in genuine need of more land with supplemental land tenancies. Land is leased by the government from private land owners for a minimum period of five years (with an option, where possible, for a second five-year term) and re-leased to small farmers in lots of one to five acres.

C. AGRICULTURAL PRODUCTION

An area officer must approve crops to be planted. Crops for an area are determined to a great extent by the Agricultural Marketing Corporation.

Cash disbursements are not made to tenants. Credit is available to them in the form of services and materials, which is debited to each farmer's account. Initially, 8000 farmers participated in this scheme, and approximately 1,000 acres were brought under cultivation.

The government-sponsored "Food Crop Scheme" produces a wide range of crops on approximately 50,000 acres on 18 properties scattered throughout the country. At first, each property was to be operated as a single unit but with the encouragement of group cooperative activities, a system of long-term lease-hold of small-farm properties was developed.

There is a self-supporting farmer development program, and loan assistance is available to farmers for definite periods.

1. Major Production Areas

a. Sugar

The largest agricultural activity involves sugar. Private and public sectors and the government play a major role in setting policy.

Sugar production is hampered by many problems, including low tons-of-cane-to-sugar ratio and field and factory inefficiency.

JAMAICA (continued)

b. Bananas

About 33,000 growers cultivate over 80,000 acres of land. Most of the farms are 0-5 acres. The banana industry has two major goals: producing a sufficient quantity of export to maintain the market in the United Kingdom; and increasing the proportion of fruit exported to take advantage of premium world prices.

Estimate of total on-farm employment in the banana industry is approximately 55,000 people.

2. Major Export Crops

a. Citrus

Of the three million boxes of citrus annually produced, 50 percent is consumed locally. Factories processing citrus for export operate below capacity. Export demand for citrus products is now in excess of supply. There is definite need for increase in production.

b. Cocoa

Cocoa is chiefly planted by small farmers. Average acreage is about 1.3 acres per farm. Production is on the increase and doesn't seem beset by any serious problems.

c. Coconut

Copra production is on the decline, with a corresponding decline in the value of copra produced. The major problem appears to be a shortage of labor in reaping. Farmers receive government assistance.

d. Coffee

Although there is very strong demand for Jamaica Blue Mountain Coffee, there has been a decline in production. Local production is unable to meet export requirements.

e. Main Food Crops

There is a downward trend in rice output. Experiments with high-yield varieties are going on.

f. Root crops

Most root crop production shows increases, particularly bitter cassava. This is because of improved marketing. Other major root crops are sweet potato, Irish potato, yam, sweet cassava, and dasheen.

JAMAICA (continued)

g. Animal products

Meat, milk and poultry: Production in all categories of meat has declined. The most pronounced decline is in beef and poultry, due mainly to poor practices.

Fish: Fish production is holding steady--particularly because the government provides loans for the purchase of equipment such as outboard motors.

The Agricultural Marketing Corporation (AMC) continues to purchase large quantities of domestic agricultural products from farmers. However, the AMC also imports large quantities of rice, pulses, meat, and dairy products.

MONTSERRAT

A. GENERAL AGRICULTURAL SITUATION

Agriculture in Montserrat contributes 12 percent of the Gross Domestic Product at factor cost. (Agricultural Statistics--Caribbean Countries 1978:18.) It employs about 20.3 percent of the labor force comprising 518 men (20.1 percent) and 253 women (20.7 percent). (Working Document Series 1978:30.) The estimated mean age of farmers and farm workers is 51.4 for men and 50.3 for women. Over 30 percent of those classified as farmers, farm managers, and supervisors are women. Women head 43 percent of all farm households. Over 50 percent of farm operators derive most of their income from farming. (Working Document Series 1978:12.)

B. LAND TENURE AND LAND USE

Agricultural land in Montserrat comprises about 5,000 acres which is 20 percent of the total land area. Twenty percent of the land is used for crops, the other 10 percent is used for meadows and pastures. Forty percent of the land is in forest and another 40 percent of the land is unsuitable for any use. (Agricultural Statistics: Caribbean Countries 1978:23.)

Ninety percent of the farmers have holdings of less than five acres, yet these occupy only 19.8 percent of the agricultural land area. Less than 1 percent of the farms have holdings over 100 acres and these occupy 58 percent of the land area. The average number of plots per farm is 1.6.

Forty-eight percent of the farms are owned, about 20 percent are rented, and thirty percent are mixed tenancy (Working Document Series 1978:60.)

C. AGRICULTURAL PRODUCTION

1. Main Food Crops

Vegetables including tomatoes, peppers, carrots, and onions, are grown in large quantities. The island enjoys a useful vegetable export trade. (Caribbean Yearbook 1978:293.) A 1972 unpublished Montserrat census found that virtually all food crops are produced on farms of less than ten acres. The most important food crops, in descending order by acreage, are sweet potatoes, dasheen, hot peppers, yams, and carrots. Breadfruit and mangoes are also grown.

2. Main Export Crops

Sea Island Cotton, which was for many years the principal agricultural export, is still cultivated but production fluctuates. In 1974, the government undertook a ten-year revival program.

Lime orchards have suffered in recent years. The government has taken steps to rehabilitate the industry.

MONTSERRAT (continued)

Bananas are an important tree crop. Small quantities are exported.

Coconut is produced in small quantities. (Caribbean Yearbook 1978: 293.)

Livestock production has increased as the acreage under cotton has fallen. The expansion of cattle husbandry, however, has generally been uncontrolled. Efforts are now being made to organize the industry by improving the quality of the stock, establishing improved pastures, and introducing better management techniques. (Caribbean Yearbook 1978:294.) Livestock operations were dominated by small farms. Farms of less than 10 acres account for 84 percent of the pigs, 69 percent of the cattle, and more than half of other livestock except for horses being produced. Cattle is a major source of income for 23 percent, and sheep 16 percent of the farmers. (Working Document Series 1978:69.)

D. AGRICULTURAL DEVICES INCLUDING LABOR

1. Machinery

Unpublished data from the 1972 agricultural census shows that only 2 out of 1,159 holdings had tractors, plows, and harrows. Seven holdings reported having a total of 12 crop sprayers. Small farmers can rent tractors at low cost from the Ministry of Agriculture which also provides equipment for land clearing, crop spraying, and planting. The 1972 census data show that 144 holdings used mechanized power exclusively and an additional 38 employed both animal and mechanical traction. Weir (1976) found that 38 of 51 small farmers interviewed incurred some expenses for machinery. (Working Document Series 1978:75.)

2. Fertilizers and Chemicals

Unpublished data from the 1972 census showed only 8.6 percent of farmers used fertilizers. Use varied according to farm size; greatest use in larger farms. Weir (1976), however, found a higher incidence of fertilizer use among small farmers; 31 percent using fertilizer for cotton, ground provisions and vegetables; 23 percent used fertilizer for bananas and 15 percent for tomatoes, onions, and carrots.

Twenty-three percent of farmers used agriculture chemicals on vegetables and 15 percent used them on cotton, ground provisions, and tomatoes. Chemicals were not used on citrus, carrots, or plantain (Working Document Series 1978:78).

3. Family Labor vs. Hired Labor

Weir found that family labor was used regularly by 38 percent of farmers interviewed and irregularly by 8 percent. About 60 percent of farms hired labor (Working Document Series 1978:82).

MONTSERRAT (continued)

E. THE EXTENSION SERVICE

The USAID survey team of 1977 found five field instructors to 1,247 farmers, yielding a ratio of 1:249. Weir (1976) in survey of small farmers found that a "substantial portion" of the 51 small farmers interviewed used the Ministry of Agriculture as a source of plants and seeds, and advanced market information (45 percent). Four percent rented equipment from the Ministry for a low, subsidized fee. None of the 51 farmers surveyed said that they were even occasionally exposed to demonstrations or printed material. Only a small number, about 15 percent, said they seldom received technical information from the extension service. Forty-seven percent said they obtained information from the radio and all of them claimed to be regular listeners (Working Document Series 1978:85).

1. Credit

A sizable number of small farmers receives credit from the Development Finance Corporation. Weir (1976) found that 92 percent of the 51 farmers interviewed had never applied for credit. A few farmers with one to five acres sought credit for fertilizer and chemicals, labor expenses, materials and livestock. Asked about how they would use additional credit, 39 percent said they would purchase fertilizer and chemicals, 6 percent said they would buy land and 15 percent would use money to clear and prepare land.

2. Marketing

The lack of market demand was cited (Weir, 1976) by 16 percent of the farmers, and low product-price by 24 percent as the most important problems in marketing. The Development Finance and Marketing Board was found by Weir to be the most important marketing outlet. DFMB had only one buying depot and farmers bringing their produce there were believed to incur significant transportation costs. (Working Document Series 1978:94.)

ST. KITTS-NEVIS (ANGUILLA)

A. GENERAL AGRICULTURAL SITUATION

In St. Kitts-Nevis, agriculture accounts for 36 percent of the Gross Domestic Product at factor cost. (Agricultural Statistics 1978:19.) In 1970 agriculture employed 2,089 men and 1,386 women who comprise 36.7 and 30.1 percent respectively of the labor force over 14 years of age. (Working Document Series 1978:30.)

The agricultural land in St. Kitts-Nevis occupies about 38,000 acres, about 41.7 percent of the total land area. Of the total land area, 22 percent is arable land, 16 percent is planted to tree crops, 2.8 percent is planted to meadows and pastures, 16.7 percent is covered with forest, and 41.7 percent is unsuitable for any use. (Agricultural Statistics: Caribbean Countries 1978:23.)

B. LAND TENURE AND LAND USE

Ninety-five percent of farm land is in holdings of less than five acres. These farms occupy 39 percent of the land area. Less than 1.0 percent of the farms are over 100 acres and occupy 42 percent of the land. Those farms between 5 and 100 acres occupy 19 percent of the land.

Fifty percent of the land is owned, 21 percent is cash rented, 5 percent is farmed by share tenancy, 11 percent is under mixed tenancy arrangements, and 12 percent to other forms (mostly rent free). (Working Document Series 1978:56-60.)

C. AGRICULTURAL PRODUCTION

1. Main Food Crops

Most food crops are produced on farms of less than five acres with root crops, particularly sweet potatoes, being by far the most important crop. (Working Document Series 1978:6.) Considerable effort has been made by government and private sectors to step up production of food crops (mainly, sweet potatoes, yams, peanuts, and onions, and smaller quantities of cabbages, carrots, and tomatoes). (Caribbean Yearbook 1978:307.)

2. Export Crops

Sugar cane is the principal export crop for St. Kitts. Sea Island cotton is the main export product from Nevis. Considerable numbers of sheep and goats are produced and traded with neighboring islands.

D. AGRICULTURAL DEVICES INCLUDING LABOR

The sugar industry utilizes a moderately high degree of mechanization. Government provides free plowing services for sugar industry workers who grow food crops, and charge other farmers a nominal fee. A 1975 census shows little use of other agricultural equipment.

ST. KITTS-NEVIS (ANGUILLA)
(continued)

E. THE EXTENSION SERVICE

The present agriculture extension agency was first organized in 1956. Its financial support comes from the Ministry of Agriculture. An USAID survey in 1977 found that there were 12 extension field staff members to 4,524 farmers, yielding a ratio of 1:377. Farmers in St. Kitts also have access to NACO, the sugar corporation.

ST. LUCIA

A. GENERAL AGRICULTURAL SITUATION

Agriculture is the main industry in St. Lucia. It accounts for over 21 percent of the Gross Domestic Product and employs nearly 40 percent of the nation's work force over 14 years of age. The farming population is made up of about 8,000 males and 2,500 females who comprise 46 percent and 25 percent, respectively, of the working population. The mean age for men employed in agriculture is 43.6 years and that for women is 43.8 years.

Approximately 75,000 acres of agricultural land make up 49 percent of the total land area of the island; 26.6 percent of the agricultural land is arable, 19.7 percent is in tree crop cultivation, and 4.9 percent is meadows and pastures. Forest land occupies 18 percent, with unusable land making up the remaining 32 percent.

B. LAND TENURE AND LAND USE

A great majority of the farmers (over 80 percent) have holdings of five acres and less, only 14 percent of the total land area. The number of medium sized farms (between 5-100 acres) is relatively small--about 15 percent of the total number of holdings. The number of farms over 100 acres accounts for less than one percent of the total number of farms, yet occupies over 50 percent of the total land area.

Over 75 percent of the farms are owner-operated and about 20 percent are cash-rented. The land tenure system called "family land system" still operates in St. Lucia. In this system, heirs have equal rights to inherited land. Lacking clear title, farmers have virtually no access to credit.

C. AGRICULTURAL PRODUCTION

1. Main Food Crops

Farms with less than 10 acres raise most of the food crops. Farms of this size account for 90 percent of sweet potato production, 95 percent of the pigeon pea production, 89 percent of the production of other root crops, and 57 percent of the export banana production.

2. Main Export Crops

Banana is the major export crop, making up 82 percent of the agricultural exports. St. Lucia cultivates about 20,000 acres of bananas, and produces about 43,000 tons of fruit. St. Lucia is a member of WINBAN.

Another important export crop produced in St. Lucia is cocoa, which is cultivated on large and small holdings. Recently there has been a decline in production, so the government is assisting farmers to better prepare cocoa beans for export. Citrus fruit is also grown commercially, but production has been on the decline. Farmers are now increasing acreages to boost production.

ST. LUCIA (continued)

Coconut is another important crop. The Coconut Growers Association handles the affairs of coconut growers and the Copra Manufacturers Association operates a factory to make edible oil and soap.

Sugar cane is still grown on a reasonable scale, although it is now superceded by the better yielding banana crop.

Livestock: There is a steady increase in the cattle population on the island, accompanied by improved quality of beef and dairy. A government program aids pasture improvement. Pig rearing is profitable among peasant farmers and estate owners.

D. AGRICULTURAL DEVICES, INCLUDING LABOR

The level of technology used by small farmers in St. Lucia is relatively low. Technology is used more for export crops than for domestic food crops.

Fertilizer is widely used in banana production. Seventy-eight percent of small farmers use fertilizer. Fertilizer is used more on large farms than on small farms.

E. AGRICULTURAL EXTENSION SERVICE

St. Lucia has both private and public extension programs. The private extension program is run by WINBAN, of which St. Lucia is a member. The extension wing of WINBAN is a farm-growers' action program for bananas. There are 30 extension workers in this system. These workers will be absorbed into the government extension system by 1983. They are thoroughly trained in banana production, but do not necessarily have other agricultural training. WINBAN is interested in increased training of these people. WINBAN facilities and services are superior to those of the government. Good communication techniques being employed, for example, weekly radio programs, slide shows for farmers, leaflets, newspaper columns, are all used by WINBAN.

The regular agricultural extension service is run by the St. Lucia Ministry of Agriculture. In 1978 there were 14 field instructors for 10,938 farmers, yielding a ratio of 1:781. This is a relatively favorable ratio compared with the rest of the Caribbean, but there is a definite problem in the quality of service provided. One reason for this is that extension workers perform duties which are not agriculture extension. For example, extension workers are used as enumerators for the Agricultural Statistics Department. Their job descriptions do not include this type of activity. Other problems are caused by their poor technical training and inferior physical facilities which leads to poor morale. Extension workers occupy poorly equipped and ventilated offices. There is little storage space for papers and materials. Even district offices lack proper space for display of extension information. Housing is also poor. Most extension workers are forced to live far from where they work. Audiovisual equipment and teaching materials are almost non-existent in most districts.

ST. VINCENT

A. GENERAL AGRICULTURAL SITUATION

Agriculture accounts for 27.9 percent of the St. Vincent's Gross Domestic Product at factor cost. (Agricultural Statistics 1978:12.) In 1970, agriculture employed 4,357 men and 1,676 women, 32 percent and 23 percent respectively of the labor force. The estimated mean age for men in agriculture is 45 years; for women, it is 46 years. (Working Document Series 1978:2.)

B. LAND TENURE AND LAND USE

Agricultural land in St. Vincent covers about 47,000 acres, about 56 percent of the total land area--38.2 percent is arable land, 14.7 percent is planted to tree crops, 2.9 percent others. (Agricultural Statistics: Caribbean Countries 1978:2.) About 88 percent of the farms have holdings of less than five acres, 23 percent of the land area. Seventy-two percent of the farms are owned, 19 percent are cash rented, 3 percent have share tenancy, and 4.4 percent involve mixed tenure. (Working Document Series 1978:601.)

C. AGRICULTURAL PRODUCTION

1. Main Food Crops

A variety of food crops is grown, particularly root crops, fruits, and mixed vegetables. Farms of less than 25 acres produce most of the food crops, some of which is exported.

2. Main Export Crops

The chief export crops are bananas, arrowroot, and coconuts. Other export crops include nutmeg, mace, and cocoa.

a. Bananas

Farms with less than 10 acres account for 57 percent of the acreage in bananas; their production was higher than those of the larger farms. Bananas are listed by 49 percent of small farmers as the major source of income. (Weir, 1976.) Almost all bananas grown are exported to the United Kingdom. Fruit not suitable for the export market because of size and blemishes is reserved for local markets. The St. Vincent Banana Growers Association, a member of WINBAN, is the advocate for banana growers on the island.

b. Arrowroot

Small-farm holdings account for some 80 percent of production of arrowroot; the remainder from a few estates. Recently, a mechanical harvester was acquired with the help of British Development Division in the Caribbean, for the reaping of arrowroot. (Caribbean Yearbook 1978:450.) The St. Vincent Cooperative Arrowroot Association is the statutory body responsible for affairs in the arrowroot industry.

ST. VINCENT (continued)

c. Coconuts

Estates are responsible for nearly 90 percent of the total copra production. Coconut oil is sold in the Caribbean region. The whole nuts are sold to the United Kingdom and the United States. Local factories refine coconuts for cooking oil and stock feed.

3. Other Export Crops

a. Cotton

Sea Island cotton, which used to be a major export crop, has declined in production in recent years because of economic factors.

b. Sugar

The only sugar refinery on the island was closed in 1962 because of an industrial dispute. In the late 1970s the government started a revitalization program and has imported cane plants from Barbados. (Caribbean Yearbook 1978:451.)

D. AGRICULTURAL DEVICES INCLUDING LABOR

A 1972 government census found on farms a total of 35 tractors, 13 plows, 7 rotary tillers, 9 harrows, 5 cultivators, and 159 sprayers and dusters (Weir, 1976). Fourteen percent of the 97 small-farmers interviewed rented machinery or equipment from the Ministry of Agriculture. Sixty-five percent of the 97 small farmers interviewed in the Weir study used agricultural chemicals on bananas, but less than 10 percent used them on other crops.

Family Labor vs. Hired Labor: Family labor is used regularly by 44 percent of farmers and irregularly by 12 percent. Approximately 75 percent of farmers use wage labor. (Working Document Series 1978:83.)

E. AGRICULTURAL EXTENSION SERVICE

A USAID survey in 1977 found that there were 27 field instructors for the 7,794 farmers on St. Vincent (a ratio of 1:289). Small farmers were found to have little contact with the extension service of the Ministry of Agriculture. Less than fifty percent of farmers interviewed obtained seeds from the Ministry of Agriculture, 12 percent received advance marketing information, and 12 percent rented equipment. Twenty-seven percent were aware of information from radio broadcasts, 12 percent used printed material, and 6 percent had attended one or more demonstrations.

1. Credit

Ninety-two percent of the farmers interviewed by Weir (1976) had never applied for credit. Those farmers who obtain credit from commercial banks use it for fertilizers, chemicals, hire labor, and land. Credit from the development bank is used for labor, materials, and livestock. Additional

ST. VINCENT (continued)

credit is available. Its use will be made by 58 percent of the farmers for fertilizer and chemicals, 31 percent of the farmers for different crops, 23 percent for land clearing and preparation, and by 18 percent for land purchase.

2. Marketing

The St. Vincent Marketing Board operates profitably because it handles high demand export crops (coconuts, carrots, sweet potatoes, ginger) and limits its crop purchases to amounts it knows in advance it can sell. In his 1976 survey, Weir found that 35 percent of the farmers interviewed identified marketing as a major problem. Low market prices and poor access roads were cited as important marketing problems. Producer associations, private produce dealers, and the St. Vincent Marketing Board were of roughly equal importance as marketing outlets for small farmer crops (Working Document Series 1978).

TRINIDAD AND TOBAGO

A. GENERAL AGRICULTURAL SITUATION

Although agriculture provides employment for about 13 percent of the Trinidad and Tobago labor force, its percentage of the Gross Domestic Product has declined in proportion to the ever-increasing value of Trinidad's oil exports. In recent years, agriculture has provided only three percent of the Gross Domestic Product. About half of the crops and livestock grown are consumed locally, the remainder being exported (Quarterly Economic Review: Annual Supplement, 1979:22).

B. LAND TENURE AND LAND USE

Trinidad has free-hold land ownership. State lands are leased for 25 years with a 25-year renewal option. Large areas of state land are being developed by the government under a State Land Project.

Although agriculture is a main source of income and employment it has decreased during the last decade. Government policy encourages agricultural development to reduce food imports.

C. AGRICULTURAL PRODUCTION

1. Main Food Crops

Rice occupied about 20,000 acres, grown chiefly by peasant farmers. The paddy is stored at home, and gradually milled into rice for domestic consumption. The Department of Agriculture produces and distributes pure line seed paddy to farmers. The local production of rice is insufficient for the territory's requirements.

Root crops such as vegetables, pigeon peas, beans, and maize are produced, but are insufficient to meet local demand. The bulk of these crops are bought by highlers and hucksters in wholesale lots directly from farmers and then offered for sale in local markets. Guaranteed prices are offered by the government. These guarantees are honored by The Marketing Board. The Marketing Board is a statutory body established by the government to facilitate local marketing of these crops.

2. Export Crops

Sugar cane has always played a major part in the nation's economy. The industry employs about 17,000 people and is a major source of income for a large number of small holders. About 95,000 acres are cultivated to sugar cane; about half is worked by companies and the remainder by about 12,000 small farmers. Small farms, in contrast to the estates, make little use of mechanization or modern methods of crop control and harvesting. This is reflected in the differential in yields per acre. Several organizations represent the interests of the sugar industry.

Bananas are intercropped mostly with cocoa and sold on the domestic markets.

TRINIDAD AND TOBAGO (continued)

Livestock: Goats, swine, and donkeys are usually raised by small farmers. Small farmers may also have cattle. Sugar estates often keep horses and water buffalo, and sometimes cattle. Government livestock farmers also raise cattle. Milk production is done almost exclusively by individual owners rather than large companies. A large dairy goat project was started in 1969, and there has been a rapid expansion of the poultry and beef industries over the last six years. Considerable areas are cultivated to pangola grass for grazing. Heifers, piglets, chicks, goats, Jamaica Red cattle, and Yorkshire, Large Black, and Berkshire breeding sows have been obtained. The University of the West Indies assists farmers with these livestock projects.

Citrus: About 11,000 acres, 7,900 acres of which are commercially planted. Fruits are converted to juice. The pulp is used for livestock feed. A government development plan in 1960 promoted widespread improvement in the industry. The Cooperative Citrus Fruit Growers Association of Trinidad and Tobago was established to look after the interests of the industry.

Cocoa: 100,000 acres, approximately half of which is owned by small holders. Plantins issued to growers are developed from strains resistant to prevalent diseases in the territory.

Coffee: Mostly planted in association with cocoa. The products are handled through the same channels as cocoa. The government purchases most of the coffee crop.

Coconuts are planted over some 40,000 acres on estates and small holdings. The bulk of growing is on estates. The copra is converted by oil factories into a number of products. (Caribbean Yearbook 1978-1979:516-520.)

APPENDIX C

THE UNIVERSITY OF THE WEST INDIES FACULTY OF AGRICULTURE
ST. AUGUSTINE, TRINIDAD, W.I.

ACADEMIC STAFF LIST

Dean of Agriculture

Prof. J. A. Spence, B.Sc., Ph.D. (Brist.), Dip. Agric. Sci. (Cantab.), DTA.

Faculty of Agriculture Representative (Jamaica) Vacant

Associate Dean (Academic Affairs)

R. F. Barnes, B.Sc. (Lond.), A.R.C.S.

Associate Dean (Research)

C.W.D. Brathwaite, B.Sc. (UWI), M.Sc., Ph.D. (Cornell).

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Professor of Agricultural Economics - Vacant

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G. O'G. Alleyne, M.A. (Cantab.), Dip. Agric. Econ. (Oxon), Ph.D. (UCLA) - Lecturer..

S. C. Birla, B.Sc., M.Sc. (Agra), M.S. (Illin.), Ph.D. (Illin.) - Senior Lecturer.

C. A. Pemberton, B.Sc., M.Sc. (UWI), Ph.D. (Manitoba) - Lecturer.

R. H. Singh, B.Sc., M.Sc., Ph.D. (Manitoba) - Research Fellow.

Department of Agricultural Extension

T. H. Henderson, BICTA; M.Sc. (Cornell), Ph.D. (Wis.) - Director.

P. I. Gomes, M.A. Soc., Ph.D. (Fordham) - Lecturer in Agricultural Sociology.

J. Seepersad, M.Sc. (U.W.I.) - Lecturer in Agricultural Extension.

Department of Crop Science

- L. A. Wilson, B.Sc., M.Sc. (Lond.), Ph.D. (Brist.) - Head of Department and Professor of Crop Science.
- R. A. I. Brathwaite, B.Sc. (Poona), Ph.D. (UWI) - Lecturer in Crop Production.
- T. U. Ferguson, B.Sc., Ph.D. (UWI) - Lecturer in Crop Production
- W. O'N. Harvey, B.Sc. (UWI), M. Agric. Eng. (Reading) - Lecturer in Agri. Engineering.
- D. Raj. Kumar, B.Sc., M.Sc. (UWI), Ph.D. (Adelaide) - Lecturer in Crop Production

Department of Livestock Science

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- F. G. Youssef, B.Sc. Hons. (A'IN SHAMS), Ph.D. (Reading) - Senior Lecturer in Animal Nutrition.
- K.A.E. Archibald, DICTA, M.Sc. (UWI), Ph.D. (Lond.) - Lecturer in Animal Production.
- R.K. Pastogi, B.V.Sc. & AH., M.V.Sc. (U.P. Agric. Univ.), Ph.D. (Minnesota) - Lecturer in Animal Science.

Department of Soil Science

- N. Ahmad, AICTA; M.Sc. (UBC), Ph.D. (Nott.), - Head of Department and Professor of Soil Science.
- A. L. Donawa, B.Sc., M.Sc., (Manit.), Ph.D. (Waterloo) - Lecturer in Soil Microbiology.
- S. Griffith, B.Sc., M.Sc. (Guelph), Ph.D. (UWI) - Lecturer in Soil Chemistry
- F. A. Gumbs, B.Sc. (Reading), M.Sc., Ph.D. (McGill) - Senior Lecturer in Soil Physics.
- C. C. Weir, B.S.A., M.S.A. (Tor.), Ph.D. (Manit.) - Honorary Lecturer in Soil Science.

University Field Station

Manager - Vacant

Department of Biological Sciences

- R. F. Barnes, B.Sc. (Lond.), A.R.C.S. - Head of Department and Senior Lecturer in Botany.
- C. D. Adams, B.Sc. (Lond.), B.Sc. (Spec. Bot.), Ph.D. (Lond.) - Reader in Botany.
- R. P. Ariyanayagam, B.Sc. (Univ. of Poona), M.S. (Univ. of Philippines), Ph.D. (Cornell) - Senior Lecturer in Botany,
- C.W.D. Brathwaite, B.Sc. (UWI), M.Sc., Ph.D. (Cornell) - Senior Lecturer in Botany.
- G. Charran (Mrs.), B.Sc. (UWI), Ph.D. (UWI) - Lecturer in Botany.
- F. W. Cope, B.Sc., Ph.D. (Lond.), A.R.C.S. - Emeritus Professor of Botany and Plant Pathology.
- J. B. Davidson, B.Sc. (Dalhousie), M.Sc., Ph.D. (Toronto) - Lecturer in Biochemistry.
- E. J. Duncan, B.Sc. (UWI), Ph.D. (St. Andrews) - Senior Lecturer in Botany.
- D. G. Hughes, B.A., D.Phil. (University of York) - Lecturer in Biometrics.
- L. Marin, B.Sc. (McGill), M.Sc., Ph.D. (Tor.) - Lecturer in Botany.
- C. R. McDavid, B.Sc., Ph.D. (Wales) - Lecturer in Botany.
- G. V. Pollard, B.Sc., Ph.D. (UWI) - Lecturer in Biological Sciences.
- V. Scoon, B.A. (York), Ph.D. (Shef.) - Lecturer in Biochemistry.
- K. Wignarajah, B.Sc. (Univ. of Ceylon), Ph.D. (Univ. of Liverpool) - Temp. Lecturer in Botany.
- Prof. J. A. Spence, B.Sc., Ph.D. (Brist.), Dip, Agric. Sci. (Cantab.) D.T.A. - Professor of Botany.

APPENDIX D

ACADEMIC PROGRAMS OF THE FACULTY OF AGRICULTURE

ACADEMIC COURSE OF STUDY FOR THE DEGREE OF BACHELOR OF SCIENCE IN AGRICULTURE

PART I

Candidates admitted to the Part I will be required to pass the following courses:

<u>Course Number</u>	<u>Course Title</u>	<u>Unit/s</u>
101	Physical and Organic Chemistry	2
102	General Biochemistry	2
103	Genetics	1
104	Plant Form and Function	2
105	Microbiology and Mycology	2
106	Agricultural Zoology	2
107	Animal Physiology	2
108	Introduction to Agricultural Sociology	1
109	Introduction to Economics	2
110	Essential Mathematics	2
111	Elementary Geology	1
112	Meteorology and Ecology	1
113	Principles of Animal Production	1
114	Principles of Crop Production	2
115	Practical Skills*	0

PART II

Candidates admitted to the Part II will be required to pass the following courses:

<u>Course Number</u>	<u>Course Title</u>	<u>Units</u>
201	Plant Breeding	1
202	Plant Physiology	1
203	Plant Propagation	1
204	Crop Production I	1
205	Applied Entomology	1
206	Plant Pathology	1
207	Soil Physics & Soil and Water Conservation	1
208	Soil Chemistry and Plant Nutrition	2
209	West Indian Soils	1
210	Pedology	1

* The practical skills course is run during summer vacation.

<u>Course Number</u>	<u>Course Title</u>	<u>Units</u>
211	Fertilizer Technology	1
212	Animal Nutrition I	2
213	Animal Health I	1
214	Agricultural Communication	1
215	Farm Management	2
216	Economics of Agriculture	1
217	Agricultural Policy and Development	1
218	Statistics and Field Experimentation	2
219	Pesticide Technology	1
220	Animal Breeding and Genetics	1

PART III

Candidates admitted to the Part III will be required to pass the following courses:

<u>Course Number</u>	<u>Course Title</u>	<u>Units</u>
301	Crop Production II	1
302	Crop Protection	2
303	Animal Production	2
304	Forage Production and Utilization	1
305	Farm Machinery	2
306	Farm Mechanization	1
307	Commodity Utilization	1
308	Economics of Agricultural Enterprise	1
309	Agricultural Marketing	1
310	Agricultural Extension I	2
312	Project	2

Candidates admitted to the Part III will be required to pass a further nine elective units, selected from the list below. Electives are offered subject to availability of specialist staff and time. Faculty Board may require candidates to take particular groupings of electives which may be termed options.

<u>Course Number</u>	<u>Course Title</u>	<u>Units</u>
320	Weed Science	1
321	Tropical Fruit Production	1
322	Ornamental Horticulture	1
323	Tropical Vegetable Production	1
324	Root Relations	2
325	Soil Science Seminars	2
326	Soil Water Relations	1
327	Soil Microbiology	1
328	Soil and Land Use Survey	2
329	Advanced Soil Chemistry	1
330	Forage Agronomy	1

<u>Course Number</u>	<u>Course Title</u>	<u>Units</u>
331	Applied Animal Physiology	2
332	Animal Nutrition II	2
333	Animal Health II	2
334	Crop Entomology	1
335	Crop Pathology	2
336	Crop Physiology	2
337	Principles of Post Harvest Technology	2
338	Veterinary Entomology	1
339	Land Development Engineering	1
340	Farm Buildings	1
341	Microeconomic Theory	1
342	Macroeconomic Theory	1
342	Agricultural Marketing Economics	1
344	Agribusiness	2
345	Natural Resource Economics	1
346	Agricultural Finance and Farm Credit	1
347	Linear Programming in Agriculture	1
348	Production Economics	1
349	Agricultural Project Appraisal	1
351	Agricultural Extension II	1
354	Fisheries	1
355	Fish Farming and Mariculture	1
356	Forestry	1
357	Biological Conservation	1
358	Environmental Pollution	1
359	Computer Science	2
360	Land Surveying, Irrigation and Drainage Technology	1 2
361	Plantation Crops	1
362	Introduction to Quantitative Economics	1
363	Human Nutrition and Food Planning	2
364	Biometry	2
365	Quantitative Genetics	2
366	Food Technology	2

Other courses may be offered from time to time as may be approved by the Board of the Faculty of Agriculture.*

POSTGRADUATE COURSES IN AGRICULTURE

The following is a list of postgraduate courses currently offered by the Faculty:

600	Literature Review
601	Special Research Project

* U.W.I. Faculty of Agriculture Information Booklet for the Academic Year 1979-80.

AGRICULTURAL EXTENSION

- 602 Principles of Rural Sociology
- 603 Diffusion and Adoption of Innovations
- 604 Extension Programme Planning
- 605 Social Psychology for Extension Workers
- 606 Extension Organization and Administration
- 607 Research Methods in Extension
- 608 Agricultural Extension

BIOLOGICAL SCIENCES

- 610 Crop Physiology
- 611 Plant Pathology
- 612 Statistics
- 613 Applied Entomology

CROP SCIENCE

- 620 Crop Production I
- 621 Crop Production II
- 622 Agricultural Engineering
- 623 Principles of Crop Utilization

LIVESTOCK SCIENCE

- 630 Grassland Agronomy
- 631 Tropical Animal Science
- 633 Tropical Veterinary Science
- 634 Animal Breeding
- 635 Advanced Animal Nutrition I
- 636 Advanced Animal Nutrition II
- 637 Advanced Animal Nutrition III

SOIL SCIENCE

- 640 Soil Chemistry and Fertility
- 641 Soil Moisture Management
- 642 Soils of the West Indies
- 643 Tropical Soil Science
- 644 Advanced Soil Physics
- 645 Soil Microbiology
- 646 Soil and Water Conservation

AGRICULTURAL ECONOMICS & FARM MANAGEMENT

- 650 Microeconomics
- 651 Macroeconomics
- 652 Quantitative Methods
- 653 Research Methodology
- 654 Economic Development I
- 655 Economic Development II
- 656 Elective as Approved by the Department
- 661 Economic Theory
- 662 Agricultural Development and Policy
- 663 Production Economics and Farm Management

AGRICULTURAL ECONOMICS & FARM MANAGEMENT (continued)

664	Agricultural Marketing
665	Economic Development and International Trade
666	Resource Economics
667	Quantitative Methods II

* U.W.I. Faculty of Agriculture, Postgraduate Studies, 1979-80, p. 16-17.

APPENDIX E

CARDI'S RESEARCH PROGRAM (1979-80)

I. COMMODITY PROGRAMS

A. General Objectives and Procedures

The general aim of the commodity research program is to find ways to remove constraints to production and improve efficiency and productivity by:

1. Introduction and screening of new lines/varieties, under controlled conditions at a research station.

2. Evaluation of a few selected lines/varieties using the best known production technology, under controlled conditions at a research station.

3. Verification of recommendations (and alternatives) developed at research stations, carried out on commercial farms.

4. Modification of techpaks (and alternatives) in light of conditions and results on commercial farms, carried out mostly on commercial farms, but may also require some laboratory work.

B. Commodities Included in the Research Program

1. Food legumes and cereals: maize, cowpea, bean, peanut, soybean, wheat, and sorghum.

2. Vegetables: onion, garlic, carrot, tomato, hot pepper, cabbage, and eggplant.

3. Root crops: cassava, yam, sweet potato, tannis, dasheen, white potato, and arrowroot.

4. Other crops: pineapple, sugar cane, banana, nutmeg, and papaya.

5. Livestock and forage crops: cattle, sheep, goats, and forage crop improvement.

II. SMALL FARM CROPPING SYSTEMS PROGRAM

A. The Windward and Leeward Island Program (1978-82)

This program will include:

1. Data gathering and analysis of existing farming systems.

2. Adaptation of existing technology to current systems to improve benefits and testing of adaptation.

3. The synthesis of new systems which are more beneficial (in socio-economic terms) and their proof by on-farm demonstration (CARDI, 1979, p. 17).

B. Jamaica

This program will study the production systems in St. Elizabeth Plains, South Manchester, and St. Andrew Hills.

C. Barbados

Production systems in the rainfed regions in the Scotland district area will be studied.

D. Belize

Farming systems in the new settlement areas of the Belize River Valley will be developed.

E. Guyana

The Berbice River Basin is the target area.

For a description of the various research studies being undertaken under each section of the commodities research program, see the CARDI Work Programme, 1979-81, pp. 22-98.

SCHOOL-ON-THE-AIR India

TARGET AUDIENCE:	Indian farmers
OBJECTIVE:	To impart a systematic knowledge of agricultural science to farmer listeners via radio broadcasts
MEDIA:	Radio, supplemented by written correspondence
DONOR/SPONSOR:	All India Radio
DURATION:	Initiated in August 1975; ongoing
CONTACT:	Dr. Pradip K. Dey (Project Director), Farm Radio Officer, All India Radio, Calcutta, India

DESCRIPTION:

In 1975 All India Radio developed a strategy to deal with the complex problem of delivering, in a short period of time, modern farming information systematically through channels acceptable to the rural farming population of West Bengal. The radio station chose literate farmer listeners with access to radios as the target audience for a broadcast series on agricultural science information. Its staff assumed that if systematic knowledge of agriculture were imparted to the farmer listeners, they would become "contact farmers" and disseminate modern agricultural innovations to villagers hitherto incapable of interpreting, or without access to, complex information on modern agriculture.

The *School-on-the-Air* for farmers broadcast six courses between late 1975 and early 1976. Each course consisted of five half-hour lessons. The curriculum was planned with the help of the Agricultural Department of the State Government of West Bengal, which also selected the broadcast trainers or teachers.

Trainers prepared the lessons and read them over the radio every Sunday between 7:00 and 7:30 p.m. The delivery pace was slow so the farmer listeners could write down important points. Key points, as well as unit numbers and measures, were repeated several times throughout the broadcast. At the end of each program, questions were broadcast. Before the listeners mailed responses to these questions to the radio station, their requests for clarification on points broadcast during the program were answered. Trainers marked each paper, and at the end of the year the radio listener received a certificate of appreciation along with his grades.

RESULTS:

Although All India Radio feels that a large number of farmers may have benefitted from the broadcast programs, only 114 actively participated in the correspondence course during the first "school year." These trainee farmers were surveyed at the end of the training session to ascertain their interests and expectations, and their potential for becoming contact farmers. Most participants, the survey showed, were between the ages of 20-29, educated at the high school level, and of middle income status. About 53 percent were closely associated with cultivation, while 35 percent were students or teachers. Most reported listening to the lessons on their radios, and most were prone to greater social participation after hearing the broadcasts.

Overall, participants generally took a total of three out of the six courses offered during the training session. Listeners were interested primarily in courses on the cultivation of wheat and summer paddy, two widely cultivated and remunerative winter crops in West Bengal. They reported that their strongest motive for participating in the course was to learn more about scientific farming, but that the desire for realizing increased profits came second.

After the first-season responses were analyzed by members of the Department of Agriculture of West Bengal, the 1976-77 School-on-the-Air was altered to stress the most popular subjects, and broadcast times were changed. The 1976-77 courses subsequently drew a higher number of active participants (155-180, depending on the course). According to the project director, the evaluation showed that the likeliest participants in the farmers' School-of-the-Air courses will be prospective farm leaders — potential contact farmers.

NOTE:

To measure listeners' potential for becoming contact farmers, researchers compared the participants' socio-personal characteristics with those of potential farm leaders identified by past investigators.

Studies do not confirm that feedback from listeners altered future broadcasts, nor that broadcast trainers directly asked radio listeners to reach out to disadvantaged farmers with the innovative broadcast information.

While farmers originally listed making monetary gains as the second most important reason for listening to the radio broadcasts, a follow-up study showed that expectations for realizing such profits dropped during or after the course.

REFERENCES:

"Agricultural Broadcasting: A Novel Approach in Calcutta," Pradip K. Dey, *Combroad*, No. 34, January-March 1977.

"Identification of Participants of the School-on-the-Air for Farmers," *Indian Agriculture*, Vol. 20, No. 2, 1976.

Clearinghouse on Development Communication
June 1977

THE RADIO FARM FORUM PILOT PROJECT Thailand

TARGET AUDIENCE:	Thai farmers and the agricultural extension service
OBJECTIVE:	To test the effectiveness of the radio forum concept in increasing two-way communication between farmers and Thai agricultural extension agents
MEDIA:	Radio and publications, reinforced by interpersonal communications
DONORS/SPONSORS:	The Department of Agricultural Extension (DOAE) of the Ministry of Agriculture and Cooperatives of the Royal Thai Government, and the UNDP/Development Support Communication Service
DURATION:	Conceived in 1968; first executed in 1975; currently being expanded to cover five provinces in 1977 and 15 provinces in 1978
CONTACT:	Mr. Pote Chumsri, Department of Agricultural Extension, Ministry of Agriculture and Cooperatives, Rajadamnern Avenue, Bangkok, Thailand

DESCRIPTION:

Although the *Radio Farm Forum Project* was conceived in 1968, implementation of the project was delayed several years while the DOAE was reorganized. In 1975, a pilot project was conducted to test the applicability of the radio forum concept to Thailand's farming region. After the study area was systematically selected, listening groups were formed with the cooperation of the village headmen. This was followed by peer-selection of four Radio Farm Forum leaders in each of the eight village groups in the project. Finally, training programs for the local forum leaders were activated.

When the parts of the project were in place, weekly radio programs were broadcast. After each half-hour program, village listening groups discussed the content of the program and of supplementary printed materials prepared by DOAE. They were encouraged to comment on both the programs and the literature and to find local practical applications for the ideas and practices both mentioned. Problems that could not be worked out among the village listening groups were referred via the weekly reports prepared by the RFF leaders to the extension officer of the DOAE and to other people or organizations able to offer assistance.

Responses to the listening groups took three basic forms. Radio broadcasts and publications were used to answer some questions, while DOAE field staff and other specialists visited the villages to solve other problems. A third type of contact involved whole groups in trips to seed stores, to university research stations or to demonstration plots, and in both short seminars and film-showing sessions.

RESULTS:

The *Radio Farm Forum Project* increased the flow of information between farmers and extension agents in both directions. The extension agents saw the value of making regular and frequent contacts with farmers and enjoyed the sense of continuity the program gave them. For their part, farmers tended to rely increasingly upon agents once they came to feel that the agents were dealing with their problems and needs on a timely basis. Moreover, because the messages dealt with specific problems, the farmers tended to remember them. Accordingly, the agents came to take more and more satisfaction in their work. In short, a felicitous self-reinforcing dynamic evolved.

More generally, the project succeeded in organizing interest groups to solve shared problems and in demonstrating the effectiveness of reinforcing consistent messages through various communication channels. It showed the agents that the program was feasible and the farmers that it was desirable. Indeed, farmers from areas adjacent to the radio project inquired about and requested similar programs.

NOTE:

- The *Radio Farm Forum Project* successfully combined with an FAO-sponsored project to improve irrigated agriculture in northeastern Thailand. In seeking the joint cooperation of various government departments (the Ministry of Commerce, the Rice Bureau, etc.) and of various international agencies, the project may also have opened up or strengthened intra-governmental and inter-governmental communications lines.

- Farm forums in many cases became forums for other local problems.

- Village headmen were enlisted to help lend legitimacy to the project, and students from the local university and agricultural college helped conduct the field surveys.

The success of the *Radio Farm Forum Project* prompted the Thai Government to consider integrating the radio forum approach into other activities. The project itself also led to the government's self-appraisal of its capacity to evaluate such efforts.

REFERENCES:

- "Summary Report on the Radio Farm Forum Pilot Project," (RB # 336), Supalak Purnasiri and Robert S. Griffin, UNDP/DSCS, Bangkok, Thailand, November 1976.

Clearinghouse on Development Communication
June 1977

MALI LIVESTOCK II PROJECT

Mali

TARGET AUDIENCE:	Malian farmers and herders
OBJECTIVES:	To introduce conservation techniques and range-management practices and to improve breeding and production techniques in order to raise the nutritional and economic status of Malians and generate foreign exchange
MEDIA:	Radio, cassette tapes, audio-visual materials, and interpersonal communication
DONORS/SPONSORS:	Agency for International Development and the Government of the Republic of Mali
DURATION:	Preliminary phase begun in April 1977; ongoing through June 1979; 2nd phase planned for 1979-1981
CONTACTS:	Boubacar Sy, Director General, Office Malien du Betail et du Viande (OMBEVI), B.P. 1382, Bamako, Mali; Benedict Tisa, 45 Haddon Avenue, Westmont, NJ 08108, USA; Almouzar Maiga, Thurston F. Teele, or Philip W. Moeller, c/o Chemonics, International Consulting Division, 1120 19th St., N.W., Washington, D.C. 20036; Robert Reeser, Bamako (ID), Department of State, Washington, D.C. 20520

DESCRIPTION:

Negotiations between the U.S. Agency for International Development and the Malian Government on the *Livestock II Project* got under way in drought-ridden Mali in early 1977. More than a relief effort, the project they designed was to provide a basis for self-sustaining agricultural development and to reduce the suffering associated with resettlement schemes. Its specific objectives are to promote the adoption of range-management, livestock-production, and agricultural practices that will increase productivity on existing croplands and enable Malians to farm land that is presently uncultivated. Its three fronts reflect three different but mutually reinforcing approaches to problems that the project designers feel are economic, social, and technological: it has (1) a program in the Dilly region that is concerned with developing, testing, and applying new techniques for dealing with dry lands and livestock problems; (2) a program and facilities in Bamako for training extension workers; and (3) in the southernmost region a "new lands" program focused on the development of underutilized lands (a chief feature of which is tset-se fly control). At the moment, the project staff includes twelve long-term specialists and a variety of short-term consultants.

The training component of the *Livestock II Project* may eventually encompass programs for five different kinds of audiences: existing cadres of livestock extension workers, recent college-level graduates of the *Institut Polytechnique Rural* (IPR) in Katibougou, graduates of IPR's middle-level program in Bamako, graduates of the *Ecole des Infirmiers Veterinaires*, and eighth or ninth-graders from non-technical schools. The courses for these groups are designed to prepare enrollees to assume greater responsibilities — the graduates of the *Ecole des Infirmiers Veterinaires*, for example, will become more well-rounded livestock and range-management advisors, and the youngest trainees will become village-level change agents. Some trainers and administrators are to receive initial training in the United States, and refresher courses are to be conducted periodically at the Sortuba project center for others.

The project's communication specialist, whose full-time services will be required for at least two years, assumes a battery of responsibilities. Some of these tasks are ongoing, while others relate to specific stages of the project's development. Open-ended activities include materials production, facility and equipment maintenance, and coordination of the center's business with that undertaken in the field in Dilly. Sequential activities comprise reviewing available production resources, procuring equipment, field-testing materials (charts, tapes, slides, etc.), stockpiling audio-visual aids, and conducting a thorough evaluation of the communication component at the close of the project's second year in 1979. Perhaps most important, the communication specialist will train change agents in communication methods and in the use of A-V materials in extension work.

RESULTS:

Still in its preliminary phase, the project has not been evaluated. The results of pre-project research, however, have revealed many social and economic factors that are sure to determine the eventual success or failure and the duration of the project.

The pre-project analysis of socio-cultural factors (part of which consisted of personal interviews conducted in six villages with different ethnic identities) indicated that the habits and the needs of the villagers range widely. Some villagers are migratory, some are not. Some are dependent solely upon livestock or agriculture for a living, while some live in mixed economies. At the same time, interaction and cooperation among the many ethnic groups appears to be extensive. Investigations of socio-cultural factors (including human and animal disease patterns, nutritional status, range-management techniques, and knowledge of such subjects), though fairly thorough, were impeded by language differences and by researchers' use of some terms unfamiliar to rural Malians.

The chief findings of the consultant who examined the communication component of the project — that new visual media will have to be introduced slowly and via the agricultural extension agents, that project workers can expect very little for granted with respect to the villagers' exposure to modern media, that indigenous media and traditional performers should be used, that the literacy rate is low among the target population, and that the credibility of the staff promises to be a problem and a challenge — show that Mali's needs and problems are typical of those of many developing countries.

NOTE:

- Most of the people trained as change agents are recruited from the areas in which they will later work, and many are already in government employ in agencies other than OMBEVI.
- Visual aids are not used solely as teaching devices. They are instrumental in data-gathering, eliciting feedback, and winning local support for project activities.
- OMBEVI, FAO, Radio Mali, and *Alphabetization Functional* collaborate in the operation of the *Mali Livestock II Project*.
- With tape-recorders, one consultant suggested in a first-term report, change agents could help establish an oral library, contribute more significantly to evaluation and monitoring activities, and learn at home at self-selected paces.
- A pre-project survey on women's contribution and role in agriculture was conducted to help project planners focus on the needs of rural Malian women.
- Many Malian staff-members have received overseas training in such countries as Cuba, the United States, and Germany. According to one consultant, these Malians have a keener understanding of the "expatriot mentality" than most expatriot staff-members have of local culture.
- Even before the visual aids used in this project were pre-tested, the target audience was surveyed to determine how familiar and receptive it was to photographs and drawings as media. In general, people responded most positively and actively to realistic pictures of familiar activities, objects, and settings.
- Each technical-assistance specialist has a Malian counterpart who will eventually take over his or her job.

REFERENCES:

- "Final Report: Livestock and Ranch Development in the Dilly Area — Media and Communications Aspects," Benedict Tisa, Chemonics, January 1978.
- "Final Report: Livestock and Ranch Development in the Dilly Area — Sociological and Communications Aspects," Walton Johnson, Chemonics, August 1977.
- Assorted unpublished project documents, unsigned and undated.

Clearinghouse on Development Communication
April 1978

RADIO EDUCATIVE/PILOT PROJECT IN COMMUNICATION MEDIA IN ADULT EDUCATION Senegal

TARGET AUDIENCE:	Senegalese farmers, livestock producers, fishermen, and others (roughly two million people)
OBJECTIVES:	To provide food producers with practical information and with the opportunity to express their opinions systematically and effectively; to provide technical training
MEDIA:	Radio, correspondence, film, and interpersonal communication
DONORS/SPONSORS:	The Senegalese Government (sole supporter since 1973) and UNESCO (until 1973), with technical assistance in the preliminary stages from the governments of Canada and France
DURATION:	Initiated in 1968; ongoing
CONTACTS:	Boubacar Sock, EARO UNICEF, P.O. Box 44, 114 Nairobi, Kenya; Henry R. Cassirer, Les Moulins, 74290 Menthon-St. Bernard, France; and Radio Educative, Office de Radio/Télévision du Sénégal (ORTS), B.P. 1765, Dakar, Senegal

DESCRIPTION:

Senegal was the only African nation to take UNESCO up on the offer made in the early 1960s to establish "a pilot center for the production and testing of audio-visual materials and equipment for adult education" in Africa. The project that subsequently emerged had two dimensions: *Radio Educative Rurale* (now called simply *Radio Educative*) and a five-year television component (which ended in 1969). The TV broadcasts, 121 programs in all, were directed to 250 women in Dakar and remained strictly experimental. The radio broadcasts, in contrast, were originally intended for a potential audience of 800,000 (the farm population in the three Wolof-speaking administrative regions reached by the pilot broadcasts) and later became nationwide. The primary aims of the project were: to test the use of modern media in the context of adult education in Africa, to create a demonstration center of possible use to other developing countries, to train local people to become technicians and producers, and to help restore to ordinary people the sense of personal power eroded during decades of colonial rule.

The complexity of its mandate and numerous administrative bottlenecks within the Senegalese bureaucracy together kept the radio component from getting into full swing until 1968, when President Senghor himself intervened. Calling for government reorganization and cooperation, Senghor provided the missing ingredient: committed leadership. Under his guidance, *Radio Educative* became an information duct, a change agent, and a government watchdog.

Under the project design finally implemented, 57 radio listening groups were established in the pilot provinces of Thies and Diourbel in the Sine Saloum. Programming was to focus on topics of local and pressing concern — namely, the production and marketing of groundnuts, the responsiveness of government agencies to the peasant farmers' needs, the ways in which debts are incurred and repaid in the villages, and other critical social and health problems. The groups were led by regional staff members of the department of "Animation Rurale" (which has since merged with other government departments) or by animators recruited as volunteers in the village, each of whom took a three-day training course in group dynamics. The third element of this communication system, farmer feedback, took the forms of recordings made in the field and letters. Members of listening groups dictated letters, with the handful of literate members doing double duty as scribes, to the higher-ups in government and to the President himself. In these letters, the peasants aired their complaints, exposed what they believed to be cases of government ineptitude, and took the government to task for standing behind unfair or short-sighted policies — all of this they did without fear of censure and with the intention of making themselves heard.

RESULTS:

The most meaningful indicator of *Radio Educative's* initial impact is probably its effect on national policy. As a direct outcome of the "radio dialogue" begun in 1968, a flood of letters poured into government offices, a flood that eventually moved President Senghor to standardize the price given to groundnut producers (to the great advantage of the producers in remote areas, who were once discriminated against in the marketplace) and to annul in 1970 peasant debts contracted in the purchase of seeds, agricultural equipment, and supplies.

A second indicator of *Radio Educative's* worth is its expansion and its continuation. *Radio Educative* has operated without any foreign assistance since 1973. While some observers feel that the growth in the number of people participating in listening groups has not kept pace with the growth in the number of individual listeners and that the potential of the broadcasts to promote community participation is thus not being realized, overall response has been excellent. More than 500 villages have sent in thousands of letters, and the "malaise" is showing some signs of crumbling in the face of incentives for action and participation.

Over time the listening audience has dispersed, with group listening giving way to individual listening. Reasons for this shift include the disappearance of *Animation Rurale* activity, *Radio Educative's* lack of personnel and transport, and the boom in cheap transistor radios. This tendency has not reduced the project's impact or emphasis on feedback, however.

NOTE:

- Since anyone who understands *Wolof* can profitably listen to *Radio Educative's* broadcasts, the actual audience has always exceeded the target audience. In addition, programs in *Peul*, *Malinke*, and other languages are now being prepared.
- About 70 percent of *Radio Educative's* programs are recorded outside the studio.
- Broadcasting in *Wolof*, which many Senegalese peasants speak, presented special problems to the less than astute moderator of a listening group since *Wolof* has a special feature: a code for transmitting messages intended only for the ears of the initiated.

Three *Wolof* concepts used to interpret the peasants' statements are "TAWAT" (complaining), "DIGUAT" (disputing), and "THIOW" (making a fuss about a problem).

Some government employees have complained about *Radio Educative*, claiming that peasants have no need to write the authorities when the authorities' representatives are on hand to hear them out or that it is disrespectful and counterproductive to challenge the existing administrative hierarchy.

At a pan-African communication conference in Dakar in 1977, Senegal's President Senghor said that "educational radio should above all help peasants to cultivate the most authentic African values — courtesy, a liking for work, and a sense of solidarity — at the same time that it instills in them the sense of thrift, organization and method, qualities more properly European."

In the early years of the project, some Senegalese viewed it as a UNESCO communication laboratory, while UNESCO employees tended to view the project as a joint venture of mutual benefit to both UNESCO researchers and the Senegalese people.

REFERENCES:

"Radio in an African Country: A Description of Senegal's Pilot Project," Henry R. Cassirer, in *Radio for Education & Development: Case Studies*, Vol. II, World Bank Staff Working Paper No. 260, May 1977.

Communication & Rural Development, Juan E. Diaz Bordenave, UNESCO, Paris, 1977.

"Senegalese Experience in Using Radio Broadcasting for Animating and Educating Basic Communities with a View to Development," Boubacar Sock, a presentation at IEC's Conference on Distance Learning, Dartington, England, September 1977.

Clearinghouse on Development Communication
April 1978

ASSISTANCE TO RURAL BROADCASTING Afghanistan

TARGET AUDIENCE:	Farmers in the Afghan provinces of Wardak, Logar, Kunduz, and Herat (approximately 17,500 people)
OBJECTIVES:	To improve rural broadcasting as a means of supporting rural development activities and to test the feasibility of establishing in Afghanistan a communication system involving radio, cassettes, and farmers' feedback
MEDIA:	Radio, tape recorders and cassettes, and interpersonal communication
DONORS/SPONSORS:	Food and Agriculture Organization of the United Nations; Afghanistan's Ministries of Agriculture and Education; Australia's FFH/AD; and Radio Afghanistan
DURATION:	Initiated in 1973; implemented in 1976; Phase I terminated in 1977; Phase II pending
CONTACTS:	Trevor L. Stockley, Rural Broadcasting Specialist, Ministry of Agriculture, Kabul, Afghanistan; Abdullah Naik, General President of the Extension Department, Ministry of Agriculture, Kabul, Afghanistan; S.Y. Wasiq, Director, Radio Afghanistan, Kabul, Afghanistan; and Fazel Rahim, Deputy Minister for Agriculture, Kabul, Afghanistan

DESCRIPTION:

The Assistance to Rural Broadcasting Project took shape in 1973 following meetings in Afghanistan of government officials with the Chief of FAO's Development Support Communications Branch. The project was designed to reflect the Afghan Government's desire to keep farmers apprised of improvements in agriculture and livestock-production techniques and to make them aware of the existence and availability of credit, equitable means of distributing irrigation water, and the possibility of forming farmers' cooperatives. By the time the political and logistical obstacles to implementation had dissolved, 1976, the project had acquired a second dimension — that of a communication support system for the national land reform then in progress.

Abandoning early plans to establish and then to test the feasibility of a rural radio forum in Afghanistan, the project directors decided that a communication system involving radio, cassettes, and farmers' feedback would meet local needs better than the conventional radio forum could. Accordingly, tape recorders and one hundred tapes were purchased, and a survey aimed at determining the kinds of information that farmers wanted and could use (and that project employees could provide) was carried out. In December 1976, tapes produced on the basis of the survey findings were circulated in two provinces.

The radio component of the communication system was already well-established in the project area when the project began. Radio ownership in rural Afghanistan is high and the Ministry of Agriculture's Department of Extension and Development has been contributing twenty minutes of programming to the nightly broadcast of "Village, Home and Agriculture." However, members of the production corps and listeners alike were far from satisfied with the quality and content of the broadcasts. To upgrade program effectiveness, then, a foreign consultant was brought into the Radio Unit of the General Directorate of Information and Publishing of the Department of Extension and Development to provide in-service training for one year to the seven full-time staff members. At the same time, additional recording equipment was bought and a staff vehicle was secured for use in making field trips and collecting farmers' feedback.

Fifty-six extension agents from eight extension units were selected to participate in the project. After being briefed and receiving radios, these agents conducted the sixteen meetings that served as the pre-project survey and visited villages on Wednesdays (when "Village, Home and Agriculture" was broadcast) to drum up interest in the radio broadcasts, to distribute cassettes (in Wardak and Logar only), and to solicit farmers' requests, criticisms, questions, and comments.

Reflecting both the strengths and difficulties encountered by staff members in this project, tentative plans for extension of the project beyond the pilot phase specify that the combination of radio, cassette recorder, and extension agent be retained, that a full-time technician/maintenance person be hired, that Radio Unit personnel be well-versed in either agriculture or extension work, that a filmstrip component be added to the media mix, and that more study be devoted in the future to measuring the rate at which farmers adopt improved practices.

RESULTS:

Records kept by the extension agents show that 3,883 of the roughly 17,500 farmers in the target area had heard at least one tape — a finding confirmed by an extrapolation of the figure (22.5 percent) reached in the evaluation survey. In contrast, two out of every three farmers in the area had heard programs on the national land reform, and four out of five of those who heard the message felt that all their questions had been answered satisfactorily.

In addition to exposure to the medium and the message, increases in knowledge, the correlation of contacts (with tapes and extension agents) with radio-listening habits, the relationship between the specificity of the message and the likelihood that the hearers will act upon it, the relationship between the tendency to provide feedback and the tendency to take action based on newly acquired information, and the relationship between the saliency of the message and the adoption of advice were all studied.

Not surprisingly, the spread of ideas proved easier to trace than the spread of improved agricultural practices. Moreover, little effort was made to measure changes in farming techniques since the project resources were limited. Research did, however, establish that farmers in the experiment acquired information that they considered useful, tended to value cassette-carried (as opposed to that passed from farmer to farmer) information more as they grew accustomed to the medium, and contended more or less unanimously that "Village, Home & Agriculture" had improved markedly during the year of the experiment. The evaluation survey also showed that half the farmers who had heard the tapes listened regularly to the radio broadcast, compared with three in ten of those who had not heard the tapes. As for the hypothesis that the more tailored a particular recommended technique is to local needs the more likely it is to be tried, it held good for only three of the five variables tested.

NOTE:

- The pre-broadcast survey revealed that farmers tended to be interested in topics that are seasonal, local, and related to decisions they have to make. Specifically, the cassettes carried information on the control of ryegrass in wheat, of rust and smut in wheat, on the pruning of fruit trees, and on the control of field mice.
- Field trips related to the project were far more than whirlwind tours. Some lasted as long as 25 days.
- Post-project research indicated that receptivity to the broadcast and taped messages had nothing to do with a farmer's age and that level of education correlated with willingness to try a new practice with respect to only one of the five variables measured.
- The FAO-employed consultants who conducted the in-service training for members of the Radio Unit developed a training manual, "Notes on Communicating Through Radio," and a glossary of technical terms.
- Wardak and Logar were selected as sites for the cassette experiment because agriculture extension programs in both were already active, farmers and village leaders were prepared to participate in the project, local authorities promised to cooperate, other development projects were under way, control groups could be identified for experimental purposes, and roads were good enough to permit year-round access by a vehicle with four-wheel drive.

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- "Assistance to Rural Broadcasting — Afghanistan, Terminal Report", TF.AF6.10(FH), Trevor L. Stockley, Food and Agriculture Organization of the United Nations, Rome, July 1977.
- "Development Communication in the Provinces of Wardak, Logar, Kunduz and Herat," Draft, F.A.O., Rome, October 1977.

Clearinghouse on Development Communication
April 1978

BEST AVAILABLE COPY

(It is standard procedure at the Clearinghouse to ask persons intimately involved with the projects described in this report to review the draft Profiles, strenuous efforts to obtain such comments before the publication deadline were in this case successful.)

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KIPSIGIS HOMESTEADS CATTLE-DIP MANAGEMENT PROGRAM Kenya

TARGET AUDIENCE:	Maneret dairy farmers near Sotik and Kipsigis (about 200 in all)
OBJECTIVES:	To use small media to provide cattle-raisers with educational and motivational information related to a tick-eradication program
MEDIA:	Cassette tape recorders, posters, photoessays, photographs, film, print, and interpersonal communication
DONORS/SPONSORS:	U.S. Peace Corps; the Government of Kenya
DURATION:	Begun in 1970; ongoing
CONTACTS:	Bruce E. and Alisa K.A. Lundeen, Arusha Appropriate Technology Project, P.O. Box 768, Arusha, Tanzania; Joseph Kenyua, Cattle-Dip Supervisor, Sotik, Kenya

DESCRIPTION:

The U.S. Peace Corps began the *Kipsigis Homesteads Cattle-Dip Management Program* in 1970 to make headway against the fatal strains of tick-borne cattle diseases so widespread in Kenya. The adult-education component of the project was later revised and expanded when it became apparent that the project had gone awry. Additional educational activities were needed because many of the local farmers clearly did not understand how dipping cattle controls ticks or why dipping cannot work unless it is done regularly. Indeed, some farmers did not dip any of their cattle, some did so in a hit-and-miss fashion, and some dipped only their upgraded animals, leaving the indigenous Zebu stock open to tick attacks. At the same time, the dipping facilities were not being maintained properly, and the Kipsigis Cooperative's management was not obtaining enough chemical concentrate to keep the dipping solution at the necessary strength.

Discussions with farmers and local veterinary workers confirmed the assumption that the farmers did not understand how dipping cattle controls ticks. They also revealed that farmers who did grasp the relationship were reluctant to pay dipping fees when the chemical solution was too weak to be effective. While veterinary extension workers had tried to remedy these problems by consulting with groups of farmers and with members of the Cooperative management, their lack of experience with nonformal adult-education approaches fitted them to do little more than chide uncooperative cattle farmers.

To fill this information gap, two Peace Corps volunteers worked with the veterinary extension agents to develop photobooklets (with Swahili captions and an accompanying taped narration in the local language), three-dimensional demonstration models, and other audio-visual aids for use at the dipping facilities and in farmers' meetings and Cooperative Committee sessions.

Care is exercised in all these learning activities to involve the Wazee (or "venerable elders"). These older farmers are called upon to tell of bygone animal-husbandry practices, and their stories prompt the other farmers to reflect upon changes (such as the introduction of graded animals) and their implications. All the farmers in the groups are free to ask and answer questions and to share information. Outside resource people participate in these discussions, too, but they take pains to refrain from introducing new information until the local people are ready and able to use it.

Outside of the meetings, the primary medium is the audio cassette recorder. Use of the recorder enables project workers to obtain farmers' reactions to the educational activities, to share the proceedings of these meetings with farmers unable to attend, and to record oral history related to agriculture.

RESULTS:

Through discussion, solutions that incorporated both knowledge within the community and new information relevant to the farmers' needs and situations were developed.

Management of the dips became more efficient, a greater emphasis was placed upon maintaining the correct chemical concentration in the dip tanks, an improved system of record-keeping was devised and put to use, and much-needed repairs to the dipping facilities were made. Many farmers began dipping all their cattle regularly, as well as adopting other improved animal-husbandry practices. As a result of these changes, veterinary records show, cattle deaths due to tick-borne diseases decreased substantially once the communication component of the project was functioning.

NOTE:

- Educational Field Days were held in the Sotik area, starting in 1970. These Days offered farmers a chance to learn more about animal diseases and animal-husbandry practices.
- To illustrate the idea that understrength solution will not kill ticks, project workers conducted a simple demonstration using only a test tube, colored liquid, and toy cows.
- The written records kept as part of this project show which farmers have dipped their cattle in a given week and how many of his cattle each dipped. Such records, along with calendars, have helped illiterate farmers in particular. They both show the importance of precise timing to effective planning.
- Language problems and production difficulties have limited the effectiveness of 16mm film in this project.
- The audio-visual aids developed in conjunction with the *Kipsigis Cattle Dip Program* reflect Andreas Fuglesang's finding that black and white photographs with insignificant details blocked out often convey information to illiterates better than do silhouettes, line drawings, or untouched-up photographs.
- Slides are displayed outdoors in plastic folders in the daylight, so projectors and darkened rooms are not essential to the program.
- Secondary-school students in Kipsigis listen to the tapes and look at the photoessays made for the Manaret farmers. This way, the two age and social groups keep in touch.

REFERENCES:

- "The Potential of Locally Produced Materials and Small Media in Community Development," Bruce E. Lundeen and Alisa K.A. Lundeen, unpublished paper, December 1977.
- "Kipsigis Homesteads," Bruce E. Lundeen and Alisa K.A. Lundeen, unpublished photoessay, undated.
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Clearinghouse on Development Communication
July 1978

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It is standard procedure at the Clearinghouse to ask persons intimately involved with the projects described in this report to review the draft Profiles, strenuous efforts to obtain such comments before the publication deadline were in this case unsuccessful.)

LEFATSHE LA RONA — OUR LAND

Botswana

TARGET AUDIENCE:	The adult population of Botswana
OBJECTIVES:	To involve the public (particularly its rural constituents) in learning about and commenting on land-use policies
MEDIA:	Radio, print, flipcharts, and interpersonal communication
DONORS/SPONSORS:	Botswana's Ministry of Local Government and Lands and other national governmental agencies, with financial assistance from the British Government
DURATION:	Begun in 1975; carried out primarily in 1976; follow-up stage completed in 1977
CONTACTS:	Mr. B.K. Temane and Mr. D. Noppen, Ministry of Local Government and Lands, Private Bag 006, Gaborone, Botswana; Ross Kidd and Alan Etherington, Department of Adult Education, OISE, 252 Bloor Street West, Toronto, M5R 1B2, Canada; and David Crowley, National Youth Bureau, 17/23 Albion Street, Leicester, LE1 66D England

DESCRIPTION:

LEFATSHE LA RONA — Our Land, a project of Botswana's Ministry of Local Government and Lands, has been both an experiment in participatory decision-making and an attempt to solve a land-use problem at the heart of a semi-arid country's economy. Botswana's traditional tribal grazing system — a series of White Papers issued by the government between 1971 and 1975 revealed — could not long withstand pressures exerted by increases in human and livestock populations. Under excessive strain, the communal grazing areas adjacent to villages were plagued by soil erosion, and uncontrolled grazing near surface water was contributing to the deterioration of the veld. At the same time, policies governing well-drilling tended to work against smaller cattle owners (as opposed to wealthy individuals). By 1975, the national government had identified means of reversing land degradation. It had developed a land-management policy based on the practices of stock controls, fencing, paddocking, early weaning, salt-and-bonemeal feeding supplementation, and rotational grazing. But it was also determined to preserve some of the values and features of the traditional land-tenure system and to protect the interests of those who own few or no cattle. Accordingly, it launched an educational and consultative campaign to explain and to get feedback on land-zoning policies and other aspects of the land-management program.

The "Public Consultation" staged by the national government took place in four phases. The first consisted of a two-month national speaking tour in the autumn of 1975. The President and his ministers attended more than 100 *Kgotlas* (community meetings) during this period, explaining public policy and fielding questions from villagers. The second phase, July of 1975 to February of 1976, comprised briefings and seminars for government officers and others. The third phase, the Radio Learning Group Campaign, was trial-run in December of 1975 and conducted on a full scale in 1976. The final phase, the analysis and use of the public responses culled during the Radio Learning Groups, took place in 1976 and 1977.

The Radio Learning Group Campaign involved a pilot project, leadership courses (held in May of 1976), materials preparation (from October of 1975 to March of 1976), radio broadcasts (from June through July of 1976), and follow-up radio programs based on responses to the earlier broadcasts and aired from July to December of 1976. A limited amount of vital information on the land-zoning proposals and their implications for people in various parts of the country was broadcast during this campaign to roughly 3,200 listening groups averaging 16 members each. Every group had a discussion leader recruited and trained by extension workers (in agriculture, community development, and health) who functioned in extension teams. Each group met twice a week for five weeks to discuss the broadcasts and the specially prepared materials (flipcharts, an illustrated popular version of the White Paper on zoning policy, pictures, and study guides). After each program, the group leaders mailed a report on the group discussion to the campaign organizers, who used the information to work out land-use plans and prepare "answer" programs for broadcast.

RESULTS:

Original plans called for the organization of between 4,000 and 5,600 groups, while 3,510 were actually established. The attendance record was comparably positive, with one participant in five attending all meetings and each listening-group member attending an average of six. According to one estimate, one adult in six was reached directly by the campaign.

The desired outcome of *LEFATSHE LA RONA*, a national consensus on the need for new land-use policies and the most effective ways for implementing such policies, appears to have been achieved. The Public Consultation (defined in the campaign as "government and people discussing together") revealed that the people of Botswana recognize the problem of overgrazing and see the presence of too many cattle as a major cause, that a large majority favored (though hesitantly) the principle of granting exclusive leasing rights to grazing land and also wanted such grazing land situated in the sand-velds where population density is low. About the formation of ranching groups, the people of Botswana are uncertain, though they acknowledge that this is a major mechanism through which a "small man" could benefit. Most RLG members opposed the setting of limits on the number of cattle that an individual farmer could hold. Most were also hesitant about adopting expensive, modern ranching methods but were interested in learning more about them and having access to the financing for them. These and other findings are being used by the national government and the regional Land Allocation Boards on an *ad hoc* basis in decision-making. They have not been used to form laws or nationwide policies, since conditions and listening-groups responses varied so much among Botswana's 11 districts.

NOTE:

- The main issues covered in the questionnaires used to gather feedback were grazing rights, zoning, the importance to present and future generations of caring for the land and respecting its limits, water rights, fencing, conservation in general, resettlement schemes, and the possibility of establishing farmer's groups.
- Radio was selected as the primary medium because almost four-fifths of the adult population of Botswana cannot read or write.
- Although the official national language, Setswana, was used for radio broadcasts, some adults intended to benefit from the radio programs don't speak Setswana. Other problems related to the translation of English-language materials into Setswana were also encountered.
- One observer of the interministerial media campaign has raised the possibility that the campaign was too intense, that "media overkill" came into play.
- Some members of the Radio Listening Groups were openly suspicious of the government's interest in their opinions. "Why, they asked, hasn't the government consulted us about other matters of public interest?"
- The cattle industry is the mainstay of Botswana's economy.
- Report forms returned to project headquarters were tabulated and analyzed by computer.

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- "Technical Notes 1-5 on the TGLP Campaign," Alan Etherington, Botswana Extension College, 1977 and 1978.
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Clearinghouse on Development Communication
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MASAGANA 99

Philippines

TARGET AUDIENCE:	Rice producers in 59 Filipino provinces (approximately 900,000 farmers, according to official estimates)
OBJECTIVES:	To increase rice yields by supplying farmers with credit, loans, agricultural inputs, and timely information on agricultural concepts and practices
MEDIA:	Radio, comics, booklets, flyers, bulletins, vernacular magazines, newspapers, posters, TV, and interpersonal communication
DONORS/SPONSORS:	The National Food and Agriculture Council of the Philippines (an organization composed of 17 Filipino government agencies and banks); the U.S. Agency for International Development; and the International Rice Research Institute
DURATION:	Pilot project and research conducted from 1971 to 1973; implementation phase begun in 1973; ongoing
CONTACTS:	Dr. Arturo Tanco, Secretary of Agriculture, Quezon City, Philippines; Domingo F. Panganiban, Director, National Food and Agriculture Council, Quezon City, Philippines; J.D. Drilon, Jr., Director, Southeast Asian Regional Center for Graduate Study and Research in Agriculture, U.P. at Los Baños, College, Laguna, Philippines; Kenneth F. Smith, OHP USAID Korea, c/o U.S. Embassy, Seoul, APO S.F., CA 96301, USA

DESCRIPTION:

President Ferdinand Marcos launched *Masagana 99* in May of 1973 in a nationally televised ceremony. Calling the project "a program of survival" in the wake of regional flooding in 1972 and of a national drought in 1972/3, Marcos rallied the nation to cooperate in a rice-growing scheme billed as a remedy to a production slump that threatened to deplete the Philippines' foreign exchange and work other economic injuries. The note of urgency reflected the fact that the rice shortage that year had been estimated at 700,000 tons. In terms of the number of farmers involved, the degree of government and private-sector collaboration, geographic sweep, the use of the mass media, reliance upon trained extension agents, the spread of new rice-farming technologies, and gains in rice-yields, the project Marcos announced was the largest and most comprehensive in the nation's history.

Masagana 99 has 11 elements. They include (1) a research-based technology package, (2) a scheme for the production and distribution of seeds, (3) a fertilizer allocation and distribution system, (4) a campaign aimed at controlling pests and plant diseases, (5) a credit scheme, (6) a program for distributing irrigation pumps and otherwise improving irrigation systems, (7) a program for increasing the number and reach of mobile agricultural extension agents, (8) a mass media campaign created to spread information and to educate the public on agricultural concepts and practices, and (9) a system of price supports coupled with procurement and grain-storage programs. The remaining two elements, administrative and cross-sectoral, are a focus on carefully defined target areas and a management unit charged with planning, implementing, and monitoring the overall program.

Radio functions as the mainstay of the mass media component of *Masagana 99*. Its heavy use reflects research findings that radio reaches up to 85 percent of the population and that three out of every four Filipino farmers own a transistor radio. Over 224 radio stations broadcast advice, jingles, and skits on agriculture ten times per broadcast day, while 125 radio stations carry over 50 local agricultural programs. Principal back-up media include instructional comics, booklets and bulletins in the eight major dialects of the country, newspapers (which voluntarily devote ample news space to the project), and instructional promotional posters. TV's role has been limited, consisting primarily of coverage of the project's opening ceremony and of occasional field activities.

The agricultural broadcasters involved in this project serve as more than disc jockeys. They act as information officers in the Provincial Action Committees (the project's basic administrative units), answer queries from listeners, tape interviews with both information suppliers and information users, conduct research related to the broadcasts, and attend community activities related to food production. In addition, they keep daily broadcasting logs, meet weekly with the provincial broadcasting authorities to plan and review programming, and stay abreast of the informational and educational activities of all agricultural and rural development agencies.

In 1977, *Masagana 99*'s emphases on realizing higher yields and including increasing numbers of farm families were intensified. Since then, the project has been known as *Masagana 99 + 10*.

RESULTS:

Despite transportation problems, inclement weather, distribution tie-ups, and pest infestations, rice yields in Masagana 99 area increased dramatically — 28 percent from 1973 to 1974, an additional 1 percent in 1975, and another 10 percent in 1976. In 1974/5, for example, yields averaged 3.3 tons per hectare in the project area and .77 tons in the areas not covered by the project. Predictably, initial production leaps of the magnitude realized in the project area boosted farmers' gross incomes radically. For example, at the end of the program's first year, one study shows, farmers in three participating provinces (in which individual landholdings averaged slightly over two hectares) enjoyed income gains of 118 percent. Since 1976, the total harvested crop has steadily gone up, and in late 1977 the Philippines exported 25,000 metric tons to Malaysia and Vietnam. Total rice exports, including 1977's and 1978's, are expected to total 149,000 metric tons. The repayment problem, which has plagued the program, has become less severe, but the number of farmers participating has dropped to 249,000, and inflation and cost increases in agricultural inputs have wiped out some of the gains made by the majority of participants.

The impact of the media and messages used in Masagana 99 has not been evaluated apart from overall impact of the project on production totals and income gains.

NOTE:

- The word *masagana* means bountiful harvest and the 99 of the project title refers to the target yield of 99 cavans (1 cavan equalled 44 kilos at the outset of the program but has since been adjusted to equal 50 kilos).

- The basic research related to this project was conducted by the International Rice Research Institute, the University of the Philippines at Los Baños, and the Philippines Bureau of Plant Industry. The pilot phase was implemented by the National Food and Agriculture Council of the Department of Agriculture and Natural Resources, whose efforts were supported by the Bureau of Agricultural-Extension, IRRI, BPI, and the U.S. Agency for International Development.

- The Management Information System developed in conjunction with Masagana 99 was designed to help project managers overcome numerous administrative problems that typically beset agricultural projects: weaknesses in links between information sources and decision-makers, difficulties associated with distinguishing causal factors of production from incidental factors, and problems bearing on the coherence and reliability of information culled from many sources. The MIS adopted includes baseline data, standard indicators on data, "on line" data from the field, regular sample surveys, set procedures for analyzing data, feedback and evaluation, carefully spelled out operating assumptions, and other analytical tools for decision-making.

The field staff reports to a Provincial Program Officer, who summarizes its comments and relays them first by radio and then by mail to the Management Committee Staff.

Purchases of consumer goods such as cook stoves, refrigerators, and motorcycles by farm families involved in Masagana 99 have increased so dramatically in some areas that the new variety of rice is sometimes called *Honda Rice*.

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Masagana 99: An Integrated Production Drive in the Philippines," J.D. Drilon, Jr., paper presented at the Seminar on Accelerating Agricultural Development and Rural Prosperity, University of Reading, September 1976.

An Agricultural Management Information System: Lessons from Masagana 99," Kenneth F. Smith, PASITAM Design Notes, No. 7, May 1976.

A Communication Behavior Study of Small Rice Farmers: Diffusion and Feedback in the Masagna 99 Rice Production Program in the Philippines," Hernando V. Gonzalez II, unpublished M.A. thesis, University of Hawaii, December 1977.

Masagana 99: A Renaissance in Agricultural Communication," Vicente C. de Jesus, paper presented to the 3rd Research-Media Workshop of the Philippine Council for Agricultural Research, Davao City, August 1975.

Masagana 99 Program: Farmers', Technicians', and Credit Agencies' Viewpoints," Eusebio P. Mariano, paper presented to the First Agricultural Policy Conference for Policy and Development Studies, U.P. at Los Baños, April 1975.

PLAN PUEBLA

Mexico

TARGET AUDIENCE:	Originally, <i>campesinos</i> in Mexico's Puebla Valley (approximately 100 participants in 1968 and over 8,000 out of a total population of 50,000 in 1976); now, <i>campesinos</i> in 11 Mexican micro-regions
OBJECTIVES:	To establish an eight-component agricultural program for stepping up corn production and to support that program with an agricultural information system
MEDIA:	Print, film, audio-visual aids, demonstrations, and interpersonal communication
DONORS/SPONSORS:	The Rockefeller Foundation working through the International Maize and Wheat Improvement Center (1967-73); Graduate College of Agriculture at Chapingo; the state government of Puebla; and Mexico's Ministry of Agriculture (sole supporter since 1973)
DURATION:	Begun in 1967; expanded in 1978; ongoing
CONTACTS:	Heliodoro Diaz Cisneros, General Secretary, Colegio de Postgraduados, Chapingo, Mexico; Delbert T. Myren, World Bank, 1818 H Street, N.W., Washington, D.C. 20433

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DESCRIPTION:

Plan Puebla was started in Mexico in 1967 with funds channeled through the International Maize and Wheat Improvement Center (CIMMYT) by the Rockefeller Foundation. A comprehensive attempt to help *campesinos* with tiny landholdings to increase their productivity, the program was designed to spread word of improved agricultural practices, chemicals, seeds, and technologies and to make sure that these ingredients could be obtained and used. More specifically, the research, informational, evaluative, and administrative components of the project together serve eight practical goals: (1) to introduce higher-yielding varieties of corn, (2) to develop and disseminate information on improved agricultural practices; (3) to open and maintain communication channels between *campesinos* and change agents; (4) to get adequate and timely supplies of agricultural inputs to easily accessible distribution points; (5) to make crop insurance available to *campesinos*; (6) to help bring the costs of agricultural inputs into line with the prices fetched by crops in local markets; (7) to stabilize the market price of corn; and (8) to insure *campesinos* access to low-interest credit. Naturally, an all-fronts program of this magnitude requires the close cooperation of research scientists, agronomists, educators, mass media specialists, anthropologists, administrators, government officials, and bankers — all of whom have been involved in both project planning and implementation.

The communication and evaluation components overlap in *Plan Puebla*. The same channels through which practical information drawn from agronomic research is coursed to farmers are also used to send feedback on project development and innovations-adoption back to researchers and administrators. The resulting process, more circular than two-way, is nonstop and participatory. Its manifold objectives are to increase farmers' awareness of their agricultural options, to enable *campesinos* to adjust their economic expectations upward, and to encourage the adoption of tools, seeds, and techniques needed to realize those expectations. A further critical communication objective is to supply agricultural researchers with psycho-social data (thus enabling them to tailor their recommendations to the prevailing culture, as well as to soil conditions and climate) and with access to the accumulated wisdom acquired by the *campesinos* through trial and error.

The mass media used in *Plan Puebla* include posters, handbills, other audio-visual aids, recordings broadcast in the villages from a sound truck, drama, and radio. During the project's third year, three films — "Do You Want to Increase Your Corn Crop?" and "Agricultural Credit" and "The Savings Account" — were also produced. The actors in all the films are *campesinos*, as are many of the speakers in the radio programs broadcast weekly during the growing season.

Two recent developments in the *Plan Puebla* include the completion of a training center for field-workers in 1976, and the expansion of the program to 11 micro-regions of Mexico in 1975. In addition, projects modeled upon *Plan Puebla* have been initiated in Peru (1971), Colombia (1971), and Honduras (1972).

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RESULTS:

While the effectiveness of the communication component of *Plan Puebla* could be measured in terms of farm-increases in awareness of new agricultural techniques and technologies, the best indicators of the project's success are corn yields, income gains, and improved living conditions. To wit, corn yields per hectare increased 33 percent during the first five years of the project, gross family income increased significantly (from U.S. \$666 in 1967 to U.S. \$825 in 1970, adjusted for inflation), the percentage of families who supplemented the local diet by eating once or twice a week tripled between 1967 and 1971, and nearly a third of the *campesinos* in the project area graded their homes during the first four years of the project. In addition, the project appears to have dealt the national unemployment and underemployment problem a sound blow: by recommending labor-intensive instead of capital-intensive practices, *Plan Puebla's* technical-assistance workers helped increase the number of days of work required per hectare in the area from 40.6 in 1968 to 52.7 in 1973.

Non-economic indicators of the project's impact include positive changes in attitude among farmers who traditionally been fatalistic and suspicious, support among farmers for group activities (including risk-sharing and long-range planning), a dramatic reduction in the number of *campesinos* who default on farm loans, and a steady increase in the rate of participation in project activities.

NOTE:

Without exception, *campesinos* who have themselves adopted the practices being recommended in *Plan Puebla* become the central actors in the demonstrations.

The benchmark study conducted in 1968 revealed that the inhabitants of the proposed project site were extremely distrustful of outsiders, ostensibly because part of the lingering legacy of Spanish colonization is a feeling of racial inferiority on the part of the Indians.

Dependence on formal leaders (elected officials and other prominent citizens) gradually dwindled in this project as informal leaders (people whose interest in the project itself set them apart from others) emerged.

Technicians who perform their work well for two or three years are offered university fellowships in Master's Degree programs in Chapingo.

The research branch of *Plan Puebla* has made methodological advances that are proving useful to scientists at work at the National Institute of Agronomic Research in Mexico City.

Farmers often spontaneously demonstrate pig-castrating, tree-pruning, and other useful skills in the course of a planned demonstration on another topic.

A *campesino* drama troupe has developed a skit depicting the plight of the *campesino* at the mercy of the bloodsucking middleman. Although its impact has not been evaluated, the play has enjoyed a long run.

Institutional problems have kept the majority of the *campesinos* in Puebla from participating in the credit scheme developed as part of the project.

REFERENCES:

"Plan Puebla: Ten Years of Experience in Promoting Agricultural Development Among Subsistence Farmers of Mexico," Heliodoro Diaz Cisneros, *Non-Formal Education and the Rural Poor*, Michigan State University, 1976.

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"The Puebla Project in Mexico," Heliodoro Diaz Cisneros, Leobardo Jiménez Sánchez, and Reggie J. Laird, paper presented at the Integrated Communication Conference, Cali, Colombia, 1974.

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THE TRAINING COMPONENT OF THE THABA BOSIU RURAL DEVELOPMENT PROJECT

Lesotho

TARGET AUDIENCE:	Agricultural agents who market improved seeds and fertilizers in the Thaba Bosiu area.
OBJECTIVES:	To provide job-related training and information to Village Distribution Point Agents.
MEDIA:	Print, radio, demonstrations, role-playing, and interpersonal communication
DONORS/SPONSORS:	The Government of Lesotho, the World Bank, and U.S. AID
DURATION:	Begun in 1976; ongoing under Ministry of Agriculture auspices
CONTACTS:	Paul Murphy, HECG, 29 Lower Baggot Street, Dublin 2, Ireland; Ken Tseko, Lesotho Distance Teaching Center, P.O. Box 781, Maseru 100, Lesotho; Lipholo Makhetha, LDTC, P.O. Box 781, Maseru 100, Lesotho

DESCRIPTION:

The Thaba Bosiu Rural Development Project (TBRDP) was established by the Lesotho Government with assistance from the World Bank and U.S. AID in 1973. It operates in a 121,000-hectare area containing 17,000 farm households near Thaba Bosiu Mountain (the summit on which the first King, Moshoeshe, held out against the Boers and the Zulus). The objectives of the project are to control erosion and to increase crop production, to encourage integrated farming, and to provide data for use in preparing similar projects in other areas. Project activities have included road-building, conducting agricultural research, creating credit programs to help farmers buy seed and fertilizer, establishing farm-supply stores and an asparagus-canning factory, and circulating timely agricultural information to farmers.

In late 1975, *TBRDP* asked the Lesotho Distance Teaching Center (an organization founded in 1974 to make radio-mediated and correspondence courses and various self-instruction materials available to out-of-school learners and to offer technical services and expertise to other educational organizations in Lesotho) to collaborate in the design and production of materials for training Village Distribution Point Agents (*VDPAs*), the villagers who sell the project's supplies for a 3 percent commission. LDTC subsequently conducted a preliminary survey of the agents' work and proposed a training package to *TBRDP*. After some discussion, the two bodies decided to produce illustrated handbooks in English and Sesotho, posters, newsletters, and radio spots for use in training three types of clients: agents whose present skills are inadequate and who are thus not meeting performance standards, competent agents who would perform better if given the chance to master new skills and knowledge, and new recruits. During a five-day training course in Maseru, these groups received illustrated handbooks (for at-home reading) that contain descriptions of the agents' duties and fine points on record-keeping. The second class of trainees also received over a half-year post-training period six issues of a newsletter for their own use and multiple copies of a single poster to distribute. At the same time, they were exposed to eight 60-second radio spots that were broadcast regularly over Radio Lesotho.

An evaluation in 1976 of the work of the Village Distribution Point Agents revealed that the training had not had the desired impact, ostensibly because the original training proposal had not been carried out fully. Accordingly, evaluators recommended that training materials be further integrated, that the training course make extensive use of role-playing activities designed to duplicate on-the-job problems and encounters, and that the handbook play a greater part in training sessions. An additional change proposed for later courses was the involvement of LDTC staff in planning, setting objectives, and working with the course organizers from *TBRDP*. The main objective of this collaboration would have been to prepare for the eventual withdrawal of LDTC expertise when *TBRDP* staff felt satisfied with both the training package and their own ability to use it. As it happened, LDTC assumed the role of materials producer and *TBRDP* of materials distributor: the goal of integrating these two functions was never realized.

By 1978, the training courses had been phased out, although many *TBRDP* staff members have been recruited by the Ministry of Agriculture to continue some of *TBRDP's* programs.

RESULTS:

An informal evaluation conducted by staff from the Lesotho Distance Teaching Center in 1976 revealed that about half the agents had read the entire handbook and half had read parts of it. Yet, only 6 of the 15 quizzed were capable of locating specific sections in the handbook and thus of using it effectively as a reference work. The newsletter had a warmer reception, with three-fifths of the respondents reading it word-for-word and keeping it for future reference. The poster, it seems, had not been put up in most offices, in some cases because it had not been received. Of the nine agents asked if they had tuned into the previous week's program-related radio broadcast, six answered yes but were hard-pressed to recall much information from the show. Over all, responses to questions on particular agricultural practices and information were divided, and performance on a test designed to gauge the VDPAs' knowledge of standard forms was poor. Most but not all agents appeared to understand the procedures for extending credit and for receiving consigned goods.

A comparable test was given by LDTC staff to the agents who completed the *TBRDP* training course in January 1977. While only three out of the 16 agents who had taken the test a year before had performed at high levels, 13 of the 16 taking the test in 1977 scored over 80 percent. The difference between these two sets of results is attributed by the curriculum designers to the effect of using mixed media, especially the combination of demonstrations and exercises. Commonly made errors, at the same time, appeared to reflect a lack of arithmetical skills or capabilities that may indicate improper employment-screening practices and not necessarily training failures.

OF NOTE:

- Part of LDTC's role has been to force the various divisions of *TBRDP* to clarify their procedures. Another is to act as a liaison between project administrators and the Village Distribution Point Agents, spelling out the VDPAs' duties and problems as part of an attempt to keep paperwork at a minimum. LDTC accepted these responsibilities reluctantly, questioning whether such matters should be left to an outside agency.
- A continuing problem besetting those in charge of the training course is materials distribution.
- Other than training needs, which in fact are accorded relatively low priority within the *TBRDP*, the Village Point Distribution Agents have other basic needs. They need ways, for example, to deal with the problems associated with taking responsibility for large sums of money, with overseeing rat-control measures, with minimizing thefts from the project stores, and with accounting for equipment and work clothes.
- Shifting responsibility for materials design from the *TBRDP* staff had advantages and disadvantages. The main disadvantage, a lack of commitment by *TBRDP* field staff, can probably best be combatted by keeping the staff thoroughly briefed.
- According to one evaluator, poor coordination among the divisions of *TBRDP* that were responsible for training VDPAs reduced the effectiveness of the course and the support scheme.

REFERENCES:

- "Evaluation of a Training Course for VDPAs of the Thaba Bosiu Rural Development Project," Lesotho Distance Teaching Center, January 1978.
- "Training Village Distribution Point Agents," Lesotho Distance Teaching Center, undated.
- "Evaluation of the *TBRDP*/LDTC Training and Support Program for VDPAs," Lesotho Distance Teaching Center, December 1976.

Clearinghouse on Development Communication
January 1979

RADIO HUAYACACOTLA

Mexico

TARGET AUDIENCE:	<i>Campesinos</i> and other inhabitants of a 177,000-square-kilometer region in eastern Mexico (roughly 11 million people)
OBJECTIVES:	To stimulate self-reliance, self-expression, cultural integration, and agricultural productivity
MEDIA:	Radio, print, tape recorders, audio-visuals, and interpersonal communication
DONORS/SPONSORS:	Sistema Educativo Radiofónico (through 1973); Fomento Cultural y Educativo (since 1975); U.N. Food and Agriculture Organization; Ashraf Pahlavi Foundation International (Paris)
DURATION:	Begun in 1965; ongoing
CONTACTS:	Information Officer, FFHC/AD, U.N. Food and Agriculture Organization, 00100 Rome, Italy; R. Etemad, Ashraf Pahlavi Foundation International, 41, rue Dauphine, 75006 Paris, France

DESCRIPTION:

Radio Huayacacotla, in operation since 1965, represents an attempt to use "two-way" radio as a stimulus to self-development. Unlike standard listening forums, the project enlists the active participation and cultivates the continuous feedback of the audience, most of which is engaged in agriculture and nearly a third of which is composed of illiterates. Long-term project goals are both practical and idealistic: encouraging self-reliance and self-expression; fostering the social integration of the disenfranchised by making them aware of the economic and social barriers they must work against; providing practical information related to social problems and income-generating activities; promoting activities aimed at raising living standards; and providing recreational opportunities and entertainment. Begun under the auspices of *Sistema Educativo Radiofónico*, the project was taken over in 1975 by *Fomento Cultural y Educativo*, an organization dedicated to improving the lot of marginal socioeconomic groups.

The three components of the *Radio Huayacacotla* project are the radio station itself, the work team (a coordinator, an agriculturist, a communications officer, three field workers, and two radio operators), and an advisor affiliated with the Education Research Center in Mexico. The project's radio programs, broadcast from 4 p.m. to 8 p.m. daily, include news, agricultural education segments, entertainment, and useful information on a variety of subjects. The social problems addressed in programs are selected and developed with the audience's help; listeners write to express needs, complaints, or curiosity. Topics explored in such problem-oriented broadcasts include men's respect for women, the social implications of illiteracy, and the roots of alcoholism. The agricultural programs are keyed to local conditions — no easy task since the broadcast sphere encompasses a variety of climatic and soil conditions. They are also linked to timely demonstrations performed by agronomists on small experimental plots located in *Huayacacotla*.

Three pilot schemes related to the agricultural broadcasts were recently established in a preliminary attempt to increase the project area and the effectiveness of agricultural education. Primarily information campaigns, the pilot projects are aimed at helping *campesinos* boost crop yields by adopting new techniques. The schemes are designed to promote fruit and vegetable production in particular and entail efforts to form farmers' cooperatives to expedite dried-fruit production and marketing.

RESULTS:

Available information makes no mention of either baseline surveys or formative evaluation conducted in conjunction with *Radio Huayacacotla*. Project documents, however, do contain testimonies to voluminous mail received from listeners, to an extraordinary vitality and political consciousness among project participants, and to the replicability of the project elsewhere in Mexico. In addition, the project program was broadened in 1975 primarily because the positive impact of the first decade of operation was deemed significant.

OF NOTE:

- Broadcasters and other workers associated with *Radio Huayacacotla* conduct their own informal studies of local social and economic problems to make sure that they do not lose sight of the plight and perspectives of the listening audience. They also live in the area they serve.
- All members of the work team are Mexican nationals.
- The geography of the broadcast zone includes highlands, forests, plateaus, mountains, and coastal regions. Each of the three pilot agricultural projects is situated in a different climate and at a different altitude.
- The zone covered by the project includes 25 percent of Mexico's towns. About one-eighth of the zone's population is made up of indigenous peoples, nearly all of which speak Spanish as well as their own Indian language.
- Crops grown in the project area include maize, beans, chili, barley, wheat, alfalfa, lettuce, carrots, potatoes, timber, coffee, tobacco, sugar cane, and fruit. Agricultural development in the area has been hampered by chronic shortages of insecticide and fertilizer.
- Agricultural inputs donated by aid agencies and foundations include a fruit dehydrator, seeds, fertilizers, pumps, and insecticides.

REFERENCES:

Unpublished project document, Ashraf Pahlavi Foundation International, Paris, cover letter dated January 1979.

"A Rural Radio Programme for Mexico," Beatriz Bracco, *Ideas and Action*, FAO, No. 199, 1977.

Clearinghouse on Development Communication
April 1979

APPENDIX G

EVALUTATION OF AGRICULTURE/AGRI-BUSINESS PROGRAM PLANNING PROCESS
VIA MEET-ME-BRIDGE FOR 1980-81

Prepared by Prof. James Duncan
Continuing and Vocational Education
University of Wisconsin, Madison, 1980

The primary tasks in program planning for the Agriculture/Agri-Business Extension program area for 1980 were accomplished during the period Jan-April 1980. The culmination of this planning process took place April 22-24, 1980 via the Meet-Me Bridge communications medium. (Meet-Me Bridge is a two-way audio system linking groups of people or individuals in different locations through the regular telephone system for instructional and administrative programs.)

Several critical phases of the planning process in Agriculture/Agri-Business were implemented during this period. The essential steps are outlined below:

1. Development and distribution during January of (a) the 1979-80 program planning situation and issue statements, and (b) the 1980-81 planning format for Agriculture/Agri-Business.
2. Community faculty met during February with local community groups and individuals to ascertain county problems, needs and priorities.
3. Community faculty prepared during February and March preliminary short written statements identifying high priority needs/problems and possible program strategies for every sub-program area of county concern.
4. Community faculty under the discussion leadership of district liaison agent and district representative at February/March district meetings determined needs, problems, priorities and preliminary program strategies at county/multi-county levels for every sub-program area.
5. District representatives prepared late March and early April written preliminary district program on form provided summarizing districts' plans. Copies to be sent to district director, district colleagues and statewide program heads.
6. Sub-program committee chairs/vice chairs drew up statewide needs assessment summary and developed preliminary 1980-81 program strategies to provide a basis for discussion during the sub-program committee meetings over Meet-Me Bridge. Sub-program committee chairs sent copies of preliminary statewide plan to each district representatives and any alternates by Thursday April 17.
7. Sub-program committees met for 2 hours April 22-24 over Meet-Me Bridge focusing on the development of a statewide program plan. The subcommittee developed (a) long-range sub-program goals, (b) 1980-81 sub-program objectives, and (c) statewide program priorities.
8. Sub-program committee chairs/vice chairs prepared by May 1 committee's final statewide program plan all final plans packaged and distributed to Agriculture/Agri-Business faculty by May 11.

9. Community faculty at May district meeting finalized 1980-81 program plans for each sub-program area for respective districts. Each district representative submitted written program to committee chairs by May 23 to be modified as necessary.
10. Individual plan of work of each Agriculture/Agri-Business faculty prepared and submitted in accordance with instruction from MIS.

Each of the 13 sub-program committees consisting of district representatives, alternates, and campus faculty concerned met for two hours over the Meet-Me Bridge during the period April 22-24, 1980. Sub-program committee discussion focused on developing and finalizing a statewide program plan. Using the district preliminary statewide program plan the committee developed (a) long-range (6-year) sub-program goals, (b) 1980-81 sub-program objectives, and (c) statewide program priorities and strategies.

The use of the Meet-Me Bridge for the planning of Agriculture/Agri-Business program for 1980-81 was a new venture for most of the faculty. The planning and coordination for the program planning process and the Meet-Me Bridge facilities were accomplished through the cooperation of Agriculture/Agri-Business program unit and the Instructional Communications Systems Office.

An evaluation instrument was developed around questions dealing with (a) participation in the Meet-Me Bridge sub-program discussion, (b) value received by the participants for planning next year's program, and (c) a rating of the Meet-Me Bridge system for the purpose of program planning. Each community and statewide faculty member was sent an evaluation instrument immediately following the planning meetings.

The following summary describes some of these results.

Community Program Faculty

Each community program faculty was asked to register to participate in the desired sub-program areas. All community programs faculty registered to participate in planning one or more sub-program areas. A total of 87 community programs faculty (70 percent) returned completed questionnaires. This return included 67 District Representatives, 8 District Liaison Agents and 12 who had no committee responsibility. Of the 87 respondents who returned questionnaires, 75 indicated that they participated in the Meet-Me Bridge planning. Of the 75 community programs faculty participating in the sub-program committee planning, 21 participated in 2 or more sub-committees. The number of community programs faculty participating in the sub-program committee ranged from 13 for Dairy to 4 for Poultry. The average number for participating in each sub-program committee was 8.

One question asked of the community programs faculty was "indicate value received personally from each session in planning your next year's program." The highest value scores were indicated by those participating in poultry and commercial fruits, with scores of 5.0 and 4.1 respectively using a 5.0 point scale. Scores of "value" among the other sub-program areas ranged down to 2.5

District representatives are crucial in the program planning process in that they are the communication link between community program faculty in specific sub-program areas and the statewide sub-program committee chairs. One question addressed to the district reps asked "the value received as a district representative in helping your colleagues in the district to plan program." The highest value scores were indicated by participants in Beef & Sheep and Commercial Fruits with scores of 4.0 (5.0 scale). Other value scores among the 13 sub-program areas ranged down to 2.33. One of the phases of the program development process for 1980-81 was a preliminary statewide program plan being developed by each sub-program area and sent to all Agriculture/Agri-Business faculty. One question was asked relative to this document. Responses to the question of "helpfulness in participating in the discussion" resulted in a score of 4.11 (5.0 scale). "Helpfulness of materials in planning" received a score of 3.90 (5.0 scale).

Questions were asked relative to the effectiveness of the Meet-Me Bridge communication linkage. The scores were calculated on a 5-point scale as follows: (a) "Satisfactory for this program planning session," 3.62; (b) "Effectiveness as compared to a workshop for statewide program planning," 3.00; (c) "Satisfactory for generating program ideas for next year," 3.37; (d) "satisfactory for making decisions on next year's program," 3.24; and (e) "audio reception" and "ease of communication" scores were 3.40 and 4.65 respectively.

Statewide Program Faculty

All statewide faculty in Agriculture/Agri-Business were asked to register for the sub-program area(s) for which they had program responsibility or interest. These program responsibilities were chairs or vice chairs of a sub-program area, a sub-program committee member, and faculty member in Agriculture/Agri-Business with Extension responsibilities and interested in participating in sub-program committees.

A total of 61 statewide programs faculty returned questionnaires. 20 were committee chair or vice chair, 29 were committee members and 12 had no committee responsibilities. Of the 61 responding, 53 participated in the Meet-Me discussion. This participation was divided among the 13 sub-program areas. The Dairy sub-program committee had a total of 14 participants followed by Pest Management, 13, and Forage crops with 11 participants. The number participating in Meet-Me committee meeting ranged down to 4 for one of the discussions. The average number of participants was 7.

The question on "value" received by the Statewide faculty from each session was asked. Those participating in Commercial Fruits indicated a value of 5.0 (5.0 point scale) followed by Commercial Vegetables and Soil and Water Conservation with scores of 4.0. The scores of all 13 sub-program areas ranged down to 2.3.

A question was asked of the sub-program chairs/vice chairs and campus committee members to indicate value received in helping to plan the statewide program. From the responses the highest value was indicated by those chairs/vice chairs participating in Commercial Fruits and Soil and Water Conservation.

Two questions were asked of the statewide faculty about the preliminary statewide program sent by the sub-program chairman. The question of "Help in participating in the discussion" received a score of 3.6 (5.0 point scale), "Helpfulness of the materials for planning" received a score of 3.5.

Each faculty member rated the communications system on four questions: (a) "Satisfactory for this program planning session," 4.0; (b) "Effectiveness in comparison to a group meeting," 3.6; (c) "Satisfactory for generating ideas," 3.5; and (d) "Satisfactory for making decisions on next year's program," 3.6. "Satisfaction with audio reception" received a score of 3.7 and "ease of connection" 4.5.

It should be noted that almost all of the faculty participated at the Central Studio (Old Radio Hall) and comparisons were made between community and statewide faculty where deemed appropriate. On the question of "Value received for planning next year's program" community programs faculty considered the participation in Meet-Me of slightly lower value than did statewide faculty. Among the 13 sub-program areas community programs faculty rated eight of the areas lower than did statewide faculty. Of the remaining 5 areas statewide faculty rated them higher in value than did community programs faculty.

Other comparisons show that community program faculty rated the preliminary statewide program plan higher than did statewide faculty. The ratings for the Meet-Me communication for these sessions show statewide faculty slightly higher than community faculty.

Audio reception and communication appeared satisfactory with slight differences between the faculty groups.

Comments on Value of the Meet-Me Bridge for Program Planning

The experience gained through the use of Meet-Me Bridge was highly valuable. We learned much as the basis for future use of this medium. There are several positive and negative aspects that have implications for Agriculture/Agri-Business programs. These are listed below under Advantages and Disadvantages.

Advantages

1. System seemed satisfactory for purpose intended.
2. Some discussion leaders were well organized, used input from districts effectively.
3. Statewide groups seldom accomplishes as much. More results than anticipated. Two hours did not permit waste of time.
4. Meet-Me eliminated unneeded conversation.
5. Meet-Me is better for refinement of already developed programs.
6. Expense saved made it worthwhile.

Disadvantages

1. Loss of personal, face-to-face contact; more structure needed; advanced preparation necessary; plans presented could have been more explicit.
2. Materials presented seemed to be more of the sub-program chairmen than committees.
3. District reps should get reports in, develop better objectives ,and get district director involvement.
4. One limitation is in being isolated and difficult to communicate at times. Disappointed in district reps' participation.
5. County staff and district reps must see their role in statewide programs. .

Finally,

It appeared that Meet-Me Bridge was appropriate for this task. We need face-to-face program planning every 2-3 years. We should know more about communication methods to help us use Meet-Me, i.e., understand terminology, learn how to determine goals via Meet-Me, etc.

Community Programs

Evaluation of Meet-Me
Ag/Ag Business Program Planning
April 22, 23, 24, 1980

1. Program responsibilities of participants.

Community faculty:

district representative or alternate (sub-program) . . .	67
district liaison agent	8
no sub-program committee responsibility	12

Statewide faculty:

sub-program committee chairman or vice chairman	0
sub-program committee member	6
not a sub-program committee member	10

2. Participated in Meet-Me Ag/Ag Business program planning?

Yes--75 No--12

3. Sub-programs participated in

Dairy	13
Beef/Sheep	11
Commercial fruit	10
Commercial vegetables	9
Farm business, management	9
Swine	9
Commercial horticulture	8
Forage	8
Pest management	8
Soil/water management	8
Corn/soybeans	7
Agri-business and marketing	6
Poultry	4

QUESTION 4

Indicate the value you received personally from each session in planning your next year's program

		5	3	1	
	<u>N</u>	<u>High</u>	<u>Medium</u>	<u>Low</u>	<u>Mean</u>
poultry and special animals production	5	5	0	0	5.00
commercial fruit	11	7	3	1	4.09
beef and sheep production and management	9	4	5	0	3.89
swine production and management	8	5	2	1	3.88
commercial vegetables	9	4	4	1	3.66
soil and water management	7	3	3	1	3.57
agri-business and marketing	6	2	3	1	3.33
corn and soybeans production	7	2	4	1	3.29
dairy production and management	13	3	8	2	3.15
farm business, management, finance	8	2	4	2	3.00
forage and small grains production	8	1	5	2	2.75
pest management	6	2	1	3	2.66
commercial, ornamental, home horticulture	8	2	2	4	2.50

QUESTION 5

Indicate the value received as a district representative in helping you and your colleagues in the district to plan

		5	3	1	
	<u>N</u>	<u>High</u>	<u>Medium</u>	<u>Low</u>	<u>Mean</u>
beef and sheep production and management	6	3	3	0	4.00
commercial fruit	8	4	4	0	4.00
corn and soybeans production	5	2	3	0	3.80
agri-business and marketing	3	1	2	0	3.67
swine production and management	3	1	2	0	3.67
commercial vegetables	8	2	6	0	3.50
pest management	6	2	2	2	3.00
poultry and special animals production	4	0	4	0	3.00
dairy production and management	9	1	6	2	2.78
commercial, ornamental, home horticulture	5	1	2	2	2.60
soil and water management	4	0	3	1	2.50
farm business, management, finance	3	1	0	2	2.33
forage and small grains production	3	0	2	1	2.33

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6. No respondents

7. The preliminary statewide program plan sent by the Subprogram Chairman

	Yes-----No					N	Ave
	5	4	3	2	1		
a. Helped me to participate in the discussion at Meet-Me	25	25	10	2	1	63	4.11
b. Materials were generally helpful in planning for next year	14	33	9	4	1	61	3.90

8. How would you rate the Meet-Me as a communications system for these sessions?

	Strongly-----Strongly					N	Ave
	agree	4	3	2	disagree		
	5				1		
a. Was satisfactory for this program planning session	12	33	20	7	2	74	3.62
b. Is as effective as a workshop meeting for statewide program planning	7	18	23	16	7	71	3.00
c. Was satisfactory for generating program ideas for next year	6	32	22	9	4	73	3.37
d. Was satisfactory for making decisions on next year's program	6	28	23	11	4	74	3.24

9. Meet-Me -- connection and reception

	Strongly-----Strongly					N	Ave
	agree	4	3	2	disagree		
	5				1		
a. Audio reception was satisfactory	17	27	15	8	7	74	3.40
b. Was easy to get connected into the Meet-Me system	53	13	5	1	0	72	4.65

Statewide Programs

Evaluation of Meet-Me
Ag/Ag Business Program Planning
April 22, 23, 24, 1980

1. Program responsibilities of participants.

Community faculty:

district representative or alternate (sub-program) . . .	8
district liaison agent	0
no sub-program committee responsibility	3

Statewide faculty:

sub-program committee chairman or vice chairman . . .	20
sub-program committee member	29
not a sub-program committee member	12

2. Participated in Meet-Me Ag/Ag Business program planning?

Yes--53 No--6

3. Sub-programs participated in

Dairy	14
Pest management	13
Forage	11
Agri-business and marketing	10
Farm business, management	10
Beef/Sheep	9
Corn/soybeans	9
Commercial horticulture	8
Commercial vegetables	8
Soil/water management	7
Swine	6
Poultry	5
Commercial fruit	4
Total	<u>114</u>

QUESTION 4

Value received personally from each session in planning next year's program

		5	3	1	
	<u>N</u>	<u>High</u>	<u>Medium</u>	<u>Low</u>	<u>Mean</u>
commercial fruit	4	4	0	0	5.0
commercial vegetables	8	4	4	0	4.0
soil and water management	6	3	3	0	4.0
agri-business and marketing	9	3	6	0	3.7
farm management	9	5	2	2	3.7
corn and soybeans production	10	4	5	1	3.6
pest management	13	5	7	1	3.6
commercial, ornamental, home horticulture	8	2	6	0	3.5
poultry and special animals production	5	2	2	1	3.2
beef and sheep production	9	2	5	2	3.0
dairy production and management	14	1	9	4	2.5
forage and small grains production	10	1	5	4	2.4
swine production and management	6	0	4	2	2.3

QUESTION 6

Indicate value received in helping to plan the state-wide program
(answered by sub-program chairmen)

		5	3	1	
	<u>N</u>	<u>High</u>	<u>Medium</u>	<u>Low</u>	<u>Mean</u>
commercial fruit	4	3	1	0	4.5
soil and water management	6	2	4	0	3.6
agri-business and marketing	8	2	6	0	3.5
beef and sheep production	5	2	2	1	3.4
farm business, management, finance	5	2	2	1	3.4
commercial vegetables	7	4	3	0	3.0
pest management	11	4	6	1	3.0
poultry and small animals production	6	1	4	1	3.0
forage and small grains production	8	2	3	3	2.8
ornamental, commercial, home horticulture	8	2	3	3	2.8
corn and soybeans production	6	0	5	1	2.7
dairy production and management	6	0	5	1	2.7
swine production and management	4	0	3	1	2.5

7. The preliminary statewide program plan sent by the Subprogram Chairman

	Yes-----No					N	Ave
	5	4	3	2	1		
a. Helped me to participate in the discussion at Meet-Me	15	13	12	4	5	49	3.60
b. Materials were generally helpful in planning for next year	11	17	10	6	4	48	3.52

8. How would you rate the Meet-Me as a communications system for these sessions?

	Strongly agree-----Strongly disagree					N	Ave
	5	4	3	2	1		
a. Was satisfactory for this program planning session	18	27	11	2	1	59	4.00
b. Is as effective as a workshop meeting for statewide program planning	12	17	14	7	2	52	3.57
c. Was satisfactory for generating program ideas for next year	8	23	11	10	1	53	3.51
d. Was satisfactory for making decisions on next year's program	11	24	13	6	2	56	3.64

9. Meet-Me -- connection and reception

	Strongly agree-----Strongly disagree					N	Ave
	5	4	3	2	1		
a. Audio reception was satisfactory	12	20	14	5	2	53	3.66
b. Was easy to get connected into the Meet-Me system	30	11	7	1	0	49	4.43