

THE ROLE OF VALUES AND CHANNEL ORIENTATIONS
IN THE DIFFUSION AND ADOPTION OF NEW IDEAS
AND PRACTICES
A
PUERTO RICAN DAIRY FARMER'S STUDY

Thesis for the Degree of Ph. D.
MICHIGAN STATE UNIVERSITY
Otis Oliver-Padilla
1964



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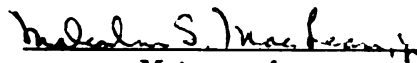
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IN THE DIFFUSION AND ADOPTION OF NEW IDEAS
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OTIS OLIVER-PADILLA

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ABSTRACT

THE ROLE OF VALUES AND CHANNEL ORIENTATIONS IN THE DIFFUSION AND ADOPTION OF NEW IDEAS AND PRACTICES: A PUERTO RICAN DAIRY FARMER'S STUDY

by Otis Oliver-Padilla

Intra-cultural variations in value orientations have been the conceptual scheme underlying this study. This scheme postulates that a given society contains variously-oriented subgroups characterized by a rank order of preference given to a set of basic principles which direct behavior in the solution of human problems.

Basic values or value orientations were the basis for the construction of a model to fuse the existing diffusion models with value orientations. The study dealt with the relationship between value orientations and differences among Puerto Rican dairy farmers in the diffusion and adoption of dairy practices.

The model was tested with 233 dairy farmers from two major dairy areas of the Island. One area - Region I - had mainly farmers with short experience in the business, relatively small scale of operations and relatively little education. This region was also characterized by larger concentration of dairy farmers - 173 distributed among four municipalities. The second area (Region II) had a preponderance of farmers with long experience in the business, larger scale of operations, and higher educational levels. Only 76 dairy farmers are located in

this region's 12 municipalities.

The first part of this study sought to identify dominant value patterns among the dairy farmers of both regions. To do this, we had respondents rank 48 value statements into 11 piles ranging from those with which they agreed least to those with which they agreed most. The statements posed different alternatives for the solution of human problems.

The data were submitted to factor analysis. A two-factor solution was selected. The solution produced one pure factor (Factor I) and a bipolar factor (Factor II). Three types of dairy farmers were differentiated among the population studied - tradition-oriented, transitionally oriented, and progressive oriented.

The remainder of the dissertation is concerned with the relationship between value orientations, communication channel orientations and the diffusion and adoption of dairy farm innovations. Simple correlation analysis was a primary analytical tool.

The data showed a relationship between value orientations and communication orientations. Being progressive-oriented was positively related to being impersonal and extra-community channel oriented. Being traditional was related to egocentric and intra-community channel orientation.

Value orientations were related to dairy farmers' predispositions toward exposure to mass media. Progressive-oriented dairy farmers were the most frequently exposed to the media channels, especially to farm magazines and the press. The traditional oriented dairy farmers were generally less exposed to mass media.

Value orientations related to organizational activity. Progressively oriented persons tended to belong to many organizations, while traditional persons tended not to.

Value orientations were not related to advice seeking or advice giving among these dairy farmers.

Value orientations were related to participation in the stages of the adoption process. Being progressively oriented was positively related to degree of participation in stages of the adoption process, while traditional persons tended to participate less heavily in the stages.

Scale of operations was related to value orientations. Being progressive was positively related to large scale of operations. Being traditional was negatively related to large scale of operations.

Value orientations were related to incidence of information and opinion leaders. The highest number of leaders was found among the progressive dairy farmers.

Value orientations were not related to time of awareness about dairy practices.

Value orientations were related to time of adoption of dairy practices. Being progressive was positively related to earlier adoption of practices. Being traditional was negatively related to earlier adoption.

Value orientations were related to degree of adoption of farm innovations. Being progressive was positively related to degree of adoption. Being traditional was negatively related to degree of adoption of practices.

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By

Otis Oliver-Padilla

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Table of Contents

Chapter		Page
I	INTRODUCTION	1
	The Problem	3
	Purpose of the Study	4
	Frame of Reference for the Study	4
	Definition of Terms	8
	The Content	12
II	RELATED LITERATURE AND RESEARCH	15
	Diffusion Research in Agriculture	15
	Non Agricultural Diffusion Research	37
	Conclusion	42
III	THE THEORETICAL MODEL OF DIFFUSION	45
	The Model	47
	Hypotheses	52
IV	DESCRIPTION OF THE AREA	55
	The Situation	55
	The Setting	64
V	METHODOLOGY	77
	The Procedure	77
	Field Work	103
VI	THE RESULTS - VALUE PATTERNS AMONG THE PUERTO RICAN DAIRY FARMERS	107
	Identifying the Types	107
	The Consensus Item Array	109
	Type I - Progressive - Broad Value Emphasis	110
	Types II and III - Broad Value Emphasis	117
	Type II - Traditional - Dominant Value Patterns	118
	Type III - Transitional or Intermediate - Dominant Value Patterns	123
	Summary	128

Table of Contents - continued

Chapter		Page
VII	RESULTS - VALUES, COMMUNICATION ORIENTATIONS AND THE DIFFUSION AND ADOPTION PROCESSES	134
	Values and Communication Orientations	134
	Value Orientations and Exposure to Mass Media	139
	Channel Orientations and Frequency of Exposure to Mass Media	140
	Value Orientations and the Diffusion and Adoption Processes	142
	Communication Orientations and Diffusion Process	144
	Values and Dairy Farmers' Social Behavior	146
	Channel Orientations and Dairy Farmers' Social Behavior	148
	Participation in Diffusion and Adoption Stages	151
	Channel Orientations and Participation in Adoption Stages	152
	Other Findings	153
	Interaction Patterns in the Regions	154
	The Information Leaders	155
	Opinion Leaders	163
VIII	CONCLUSIONS	176
	Values, Communication Orientations and the Diffusion Process	185
	Frequency of Exposure to Mass Media	188
	Values, Communication Orientations and Social Behavior	193
	LITERATURE CITED	199

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List of Tables

Tables	Page
1. Mean differences in scale of operations among regions . .	71
2. Economic importance of the two regions as milk producing areas	74
3. Value items most accepted by Type I - progressive	111
4. Value items most rejected by Type I - progressive	113
5. Value items most accepted by Type II - traditional	118
6. Value items most rejected by Type II - traditional	120
7. Value items most accepted by Type III - transitional . . .	123
8. Value items most rejected by Type III - transitional . . .	125
9. Dairy farmers distribution by municipalities and percentage of dairy farmers using person-channels as sources of first knowledge about practices	155
10. Comparison between general characteristics of the dairy farmers population from Region I and information leaders from the areas	158
11. Comparison between general characteristics of the dairy farmers population and opinion leaders from the areas . .	174

List of Illustrations

Illustration	Page
1. Mechanization	66
2. Holstein Freisian is the most common breed in the Island	67
3. Standards of living of the Puerto Rican dairy farmers	70
4. Region II - Dairy farm	72
5. Region I - Dairy farm	73
6. The researcher explaining the interviewers the purpose of the study and discussing the questionnaire . .	105
7. Sociogram 1 - information leaders among Hatillo dairy farmers - Region I	160
8. Sociogram 2 - information leaders among Arecibo and Manati dairy farmers - Region I	161
9. Sociogram 3 - information leaders among dairy farmers of Region II	162
10. Sociogram 4 - sources of influence in Hatillo municipality - Region I	169
11. Sociogram 5 - sources of influence among Arecibo dairy farmers - Region I	170
12. Sociogram 6 - sources of influence among Manati dairy farmers - Region I	171
13. Sociogram 7 - sources of influence among Camuy dairy farmers - Region I	172
14. Sociogram 8 - sources of influence on Region II	173

List of Appendices

Appendix	Page
A. The value instrument and instructions for the interviewers	203
B. Factor analytic data on value orientations	219
C. Correlational data	229
D. Sociometric data	234
E. Maps of the regions and municipalities included in the study	245

CHAPTER I

INTRODUCTION

Ethnic groups and social classes represent only two of the many possible types of variantly oriented subgroups in a total society. Some societies have many types, others few, but not even the very small nonliterate and folk societies are without one.

(Kluckhohn, 1961)

Each society is characterized by a rank order of preference given to a set of basic principles which guides or directs the behavior of its members in the solution of human problems. These basic principles and the rank order of preference given to them by the components of the society are the basic values or dominant value orientations of the social system. They are learned through the process of socialization; transmitted from parents to sons and from generation to generation through the continued interaction (relationships) among the members of a social system. They set the standards of behavior to be expected from every individual belonging to a system, and deviations from them are discouraged. The sharing of a set of common value orientations by the majority serves the purpose of integrating the society and perpetuating the system.

The apparent uniqueness of dominant value systems for each culture has led social scientists to focus their attention on cross cultural variations, ignoring the fact that intracultural variations are present in all societies at all times. Most of the anthropological research has been concerned with analyses of dominant value systems

among societies rather than with variant values within them. Societies have been portrayed as homogeneous clusters of people with patterns of behavior resulting from the sharing of common value systems. For example, when referring to the Anglo and Latin American cultures in this hemisphere, the tendency is to stress the striking differences in their dominant value patterns and the similarities of dominant value orientations within them. Moreover, when programs of technological change are planned for either of these societies, the frame of reference used is the dominant value system characterizing these societies.

For example, in 1960 during the administration of the late president of the United States, John F. Kennedy, the Alliance For Progress program was initiated to assist the 21 Latin American republics in the solution of their social, educational and economic problems. The Alliance For Progress was planned and organized, using as framework the general concept that all Latin America is a homogeneous conglomerate of people sharing a common set of value systems. Apparently little consideration was given to the fact that there is a great deal of intracultural variation among the Latin Americans; that even within each one of these 21 republics there are many subcultural groups, i.e., indians, mestizos, white people; Christian catholics and Christian protestants; Christians and non-Christians - all of them deviating to some extent in their value systems from the dominant patterns of these societies.

The apparent failure of this program in fulfilling its aims is a clear indication of the important role that intracultural variations

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in value orientation seem to play in the introduction of technological change. As many social scientists say, people are people everywhere, but different people have a rank order of preference for a set of basic principles which guides and directs their behavior.

The study of intracultural variation is the subject of central interest in this investigation; how these intracultural variations in value orientations influence individual's behavior towards the adoption or rejection of technological change is the major problem posed.

The Problem

Agents of technological change are not always successful in their efforts to induce people to accept innovations. The purpose of their programs may be commendable and the time and efforts devoted to them may be great, yet the programs fail to take effect. Contrary to change agents' expectations, the people to whom the new ideas are proposed react negatively or with indifference. On the other hand, some technological programs are highly successful in spurring people to action in the direction hoped for by the change agents.

Wide variations exist in the attitudes of individuals toward technological change, cross culturally, between different social systems within a given culture and among individuals belonging to the same social system. Two main questions have been the object of intensive investigation by social scientists:

What are major variables influencing the diffusion of innovations?

What are major variables influencing the adoption of innovations?

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The search for answers to these questions has generated a great deal of research in agriculture, medicine, political science, education, and anthropology. About 500 studies on diffusion and adoption of innovations are reported by Rogers (1962) (1) in his book, Diffusion of Innovations. However, as stated by Rogers (1962) (1), "the challenge for future research is to expand the area of digging and to search for different objectives from those of the past." And this has been one of the major aims of the present study - to dig more in an area little investigated by social scientists concerned with diffusion of innovations.

Purpose of the Study

The purpose of this study was to investigate the influence of value and communication channel orientations on the diffusion and adoption of farm innovations among Puerto Rican dairy farmers. Moreover, we studied Puerto Rican dairy farmers' predispositions toward technological change. We did so in a framework which integrates within a single conceptual scheme the theory value orientations postulated by Kluckhohn and Strodtbeck (1961) (2) and the diffusion models constructed by Beal and Bohlen (1957) (3), Emery, Oeser and Tully (1958) (4), Wilkening, Tully and Presser (1962) (5), and Deutschmann and Fals Borda (1962) (6).

Frame of Reference for the Study

In this section the writer presents a general view of some basic assumptions underlying this investigation, the methodology used and

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the area where the study was conducted. A more thorough report on these matters will be presented in Chapters III and V.

Basic Hypotheses

Three basic hypotheses were postulated in the construction of the theoretical diffusion model used as framework for this study:

1. That even within a given culture there are meaningful variations in dominant value orientations among people.
2. That a close relationship exists between individuals' value orientations and their communication channel orientations.
3. That these two variables, value orientations and communication channel orientations, account for most of the variance in individuals' attitude toward innovations.

Proceeding from these premises, we investigated how Puerto Rico dairy farmers varied in their dominant value and communication channel orientations, and how these variations related to attitudes toward proposed innovations.

The Setting

The study was conducted in two major dairy regions of Puerto Rico - the Northern region with 173 dairy farmers and the Northeastern region with 76. These two areas were studied for comparative purposes. In both regions all dairy farmers were interviewed, except for 16 who could not be reached or would not cooperate.

Methodology

The study was divided into five main parts:

Part I - this was devoted to finding dominant value orientations among Puerto Rican dairy farmers and grouping them into clusters

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according to these orientations. We predicted the finding of three different typologies, each possessing different dominant value orientations. To test and verify our predictions, four value-orientation areas were investigated - (1) Time Orientation - Past, Present and Future, (2) Man-Nature Orientation - Subjugated to, Harmony With, and Mastery Over Nature, (3) Activity Orientation - Being, Being in Becoming, and Doing, (4) Relational - Lineal, Collateral, and Individual.

A measuring instrument of 48 value orientation statements - 12 for each value area and 4 for each value direction - was used.

Part II - This was concerned with finding communication channel orientations as related to value orientations and adoption of innovations. We predicted a close relationship between value, channel and adoption. Ten dairy practices were used as frame of reference, and the communication hypothesis was tested by measuring the means (channel-sources) used by farmers in getting their information before the adoption of innovations. Through use of the Deutschmann Channel Orientations Model (1962) (6), farmers were classified as egocentric, intra-community, extra-community or impersonally oriented according to the communication patterns they exhibited.¹

Indices were constructed for measuring value and communication channel orientations. Scores were produced for correlational purposes.

¹See section entitled - "Definition of Terms."

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The data were collected by means of a questionnaire and personal interviews.

Part III - This part was concerned with the rate of adoption of new dairy farm practices and how they relate to value and communication channel orientations. The same ten dairy innovations were used as frame of reference. The measurement instrument used for data collection consisted of statements constructed to assess the degree, time, and stability of adoption.²

Part IV - This was concerned with farmers' social behavior and its relationship to value and channel orientations. The major aim was to study degree of exposure to agents of change, giving and seeking advice, informal social relations, informal discussion of farm topics, and membership in formal organizations. The data were collected by means of a questionnaire and personal interviews. Indices were constructed so as to allow correlation with value and channel orientations.

Part V - This part dealt with sociometric choices of respondents. Sociometric questions were constructed for that purpose. For analytic purposes, sociograms were constructed to discover possible sources of influence in the regions studied.

Analytic Tools

The major analytic tools used in this study were: (1) Q-factor analysis, (2) analysis of variance, (3) simple correlation.

²See section entitled - "Definition of Terms."

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An overview of the purpose and procedure followed in this investigation has been presented. A set of terms has been presented which need to be defined more fully. This will be done in the following section.

Definition of Terms

In this section the major concepts used in this investigation will be defined to facilitate the interpretation of the information to be presented in the following chapters. The first set of concepts to be defined are the ones concerned with value orientations. (2)

A. Man-Nature Orientation - the attitude of man toward nature designations. Three value directions were investigated:

1. Subjugation to Nature - man believes that there is little or nothing a man could do to avoid nature designations. Natural processes are accepted as inevitable.
2. Harmony With Nature - there is no real separation of man, nature and supernature. One is simply an extension of the other, and a conception of wholeness derives from their unity.
3. Mastery Over Nature - natural forces of all kinds are to be overcome and put to use by human beings.

B. Time Orientation - the cultural interpretation of the temporal focus of human life. Three directions were studied:

1. Past - attention is given to past events or experiences. This orientation places primary emphasis upon the maintenance, or the restoration of the past.
2. Present - little attention is given to what has happened in the past, and the future is seen as both vague and unpredictable.
3. Future - emphasis is placed on the future - a future which is anticipated to be better.

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C. Activity Orientation - it is the modality of human activity giving rise to a value orientation system. The range of variation in solutions suggested for it is the threefold one of Being, Being in Becoming, and Doing.

1. Being - orientation toward the release and indulgence of existing desires. In this orientation, the preference is for the kind of activity which is a spontaneous expression of what is considered to be given in human personality. It is a non-developmental conception of activity.
2. Being in Becoming - the activity which has as its goal the development of all aspects of the self as an integrated whole.
3. Doing - its most distinctive feature is a demand for the kind of activity which results in accomplishments that are measurable by standards conceived to be external to the acting individual. The aspect of self-judgment or judgment of others which determines nature of activity is based mainly upon a measurable accomplishment achieved by acting upon persons, things or situations.

D. Relational Orientation - man's relation to other men. This orientation has three subdivisions:

1. Lineal - here, group goals are primary, and one of the most important goals of the group is continuity through time. Continuity of the group through time and ordered positional succession within the group are crucial issues when lineality dominates the relational system.
2. Collateral - this calls for a primacy of the goals and welfare of the laterally extended group. The group in this case is always moderately independent of other similar groups, and the problem of a well-regulated continuity of group relationships through time is not highly critical.
3. Individuality - here, individual goals have primacy over the goals of specific Collateral or Lineal groups.

The second set of concepts to be defined in this section is the one related to the communication patterns of people belonging to a given social system. These communication patterns are what Deutschmann (1962) (6) called "Communication Channel Orientations."

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A. Communication Channel Orientations - by this we are referring to the tendency of individuals to use certain specific channels as their major sources of information. Four channel orientation categories were postulated by Deutschmann in his diffusion model:

1. Egocentric Channel - by this we are referring to the tendency of individuals to obtain information on a kind of "see-for-yourself" basis. All individuals have some tendency to operate this way, but some are strongly oriented to this channel of communication. It is a particularly non-social channel in that in its purest form, it requires no other person than the receiver for "communication" to take place.
2. Internal to Community Channel - the tendency of individuals to obtain information on a kind of "a member of my group said" basis. Again most persons use this channel, but some are very strongly related to it. It is social and usually, in a geographical sense, a local channel. But in its purest form, it is essentially communication within one's most relevant social group. For some persons and for some kind of societies, there can be such a channel not made up of geographically contiguous persons.
3. External to Community Channels - the tendency of some individuals to obtain information on a kind of "some other person than a member of my group said..." basis. It is also a social channel, but is less personal than the Internal Community. It makes for communication events - the complex of telling and receiving messages which are psychologically more distant from the self and the group.
4. Impersonal Channel - the tendency of individuals to obtain information from the various increasingly available impersonal sources. Mass communication sources ordinarily fall here, although in a communication-rich society we can expect to find channels which will have the form of mass communications, but functionally will be serving as intra-community channels.

In addition to these concepts, other terms need to be defined.

These are the following:

A. Diffusion - the process by which an innovation spreads. (1)

1. The Diffusion Process - the spread of a new idea from its source of invention to its ultimate users or adopters.

2. Stages of Diffusion - the psychological steps that occur in a person from the time he is exposed to an innovation until he finally adopts it. Four stages of diffusion have been tested in this study:
 - a. Awareness - when a person first becomes aware of an innovation.
 - b. Interest - when a person, after becoming aware of an innovation, seeks further information about it.
 - c. Trial - when a person uses a practice or innovation for the first time on an experimental basis.
 - d. Adoption - when a person accepts and continues using an innovation, if the idea or practice results in sufficient rewards or other types of personal or social satisfactions.
3. Time of Adoption - time a practice was started, where the farmer continues using it to the present.
4. Degree of Adoption - the proportion of practice being used by a farmer at the present.
5. Disadoption - where a practice is tried by a farmer but discontinued.
6. Time of Disadoption - time a farmer stopped a practice.
7. Farmer Categories - classifications into which farmers are put according to their combined value and communication channel orientations. Three farmer categories were used in this study:
 - a. Progressive - farmers exhibiting more orientation toward modernism.
 - b. Intermediate - farmers in a stage of transition - intermediate between modernism and traditionalism.
 - c. Traditional - farmers rooted to traditions in their orientations toward innovations.
8. Social Behavior - interaction patterns exhibited by individuals belonging to a given social system.
 - a. Advice Seekers - individuals who usually seek advice from other community members before adopting a practice.

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- b. Advice Givers - individuals usually sought for advice by other community members in community affairs. Usually they are persons of a higher social status or prestige.

In this section the basic concepts underlying the diffusion model used as a theoretical framework for this investigation have been defined.

The Content

Chapter I - this chapter has presented the problem which generated this investigation, its purpose, its basic assumptions and a general discussion of the terminology used. In addition, the basic concepts used in the construction of our theoretical model were defined.

Chapter II - here, the reader will be exposed to diffusion theory and research relevant to the present study. Five major approaches will be covered in the review of the literature on diffusion: (1) the five-stages or American diffusion model, used mainly by United States rural sociologists, (2) the communications act approach used by Australian diffusionists, (3) the communication channel orientations approach postulated by Deutschmann and Fals Borda, (4) the typologies approach explored by Wells and MacLean, and (5) the values approach explored by Polson and Spencer. Furthermore, some of the diffusion studies, especially those testing the two-step flow hypothesis, will be reviewed here, despite the fact that they were outside of agriculture. Certain studies conducted in India and the Netherlands will also be reported in this chapter. One study by Kluckhohn and Strodtbeck (1961) will receive special attention. This

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investigation was concerned with the major concept used as framework for this study - value orientations.

Chapter III - this chapter develops the theory underlying this investigation. Special attention is given to the construction of a diffusion model to explain the diffusion and adoption processes under a general theory of variations in value orientations.

Chapter IV - this chapter begins with a general description of the agricultural agencies operating in Puerto Rico and their functions as agencies of technological change. It then proceeds to present factual information about two programs especially devoted to assisting dairy farmers in their farm operations - pasture improvement and artificial breeding. This will be followed by a thorough discussion on the development of the dairy industry and its advancement from an unimportant position to the second major agricultural industry in the island. Then, a description of the specific setting where the study was conducted will be given - municipalities comprised, ethnic differences among farmers belonging to the two regions, differences in farming techniques and scale of operations found in both regions, and the communication facilities existing in these areas.

Chapter V - this chapter is concerned with the methodology used in this investigation. A thorough discussion of the planning, organization and procedures used will be reported. In this chapter major consideration will be given to the construction of the measurement instrument, collection of data and statistical tools used for its analysis.

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Chapter VI - VII - these chapters will be devoted to reporting the major findings, relating them to existing relevant literature in the area of diffusion.

Chapter VIII - here, the major findings of this study will be summarized, conclusions will be stated, generalizations made and areas for future research suggested.

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CHAPTER II

RELATED LITERATURE AND RESEARCH

This chapter presents some relevant literature on the area of diffusion of innovations. It begins by giving factual information about the diffusion process, paying particular attention to agricultural diffusion research generated in the United States and other parts of the world. It then proceeds to focus on diffusion research generated outside agriculture, paying particular attention to studies concerned with "two step flow" and "opinion leadership." These studies are relevant to an understanding of the diffusion process, and their findings can be generalized to the diffusion of farm technology. The last part of this chapter will summarize the major contributions of diffusion research to an understanding of the variables affecting the diffusion and adoption of farm technology.

Diffusion Research in Agriculture

The role of technological agriculture change agents is to expedite the flow of information from research centers such as agricultural experiment stations to farmers who may be able to use this information to increase their yields. To do this, change agents should use a channel or channels which connect them to the greatest number of farmers who need the information. But which channels should they use? It will be easier to decide this question if one knows as

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much as possible about the diffusion process and about the major variables affecting this process. And agricultural diffusion research has worked for 20 years to provide change agents the tools necessary to implement their programs.

The study of farm-innovation diffusion has its roots in the rural sociology tradition. Since Ryan and Gross's (1943) (7) pioneering study of hybrid seed corn in two Iowa communities, hundreds of studies have been conducted by rural sociologists. This research led to a diffusion model and toward a diffusion theory. However, after these initial steps, diffusion researchers got into a rut. Study after study followed practically the same pattern of replication without further attempts to investigate new variables. Diffusion theory was at a dead end. Aware of this problem, some students left the flock and began working from different angles. New variables have been investigated and new concepts developed. Today the trend is continuing. Efforts are being devoted toward these goals and relevant findings on these new approaches will be reported in this chapter.

The Adoption Model

In the United States the studies of Beal and Bohlen (1957) (3), Beal (1958) (8), Coop, Sill and Brown (1958) (9), Lionberger (1960) (10) et. al. have generated what is known today as the American diffusion model or diffusion theory. Under this model, and for the purpose of reporting the findings in a way easily understandable by the general public, farmers have been arbitrarily classified into five categories - (1) innovators, (2) early adopters, (3) early majority,

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(4) majority and (5) non-adopters. In addition, this model or theory attributes to the adoption process the following five stages:

1. Awareness - the person first becomes aware of a new idea or innovation.
2. Interest - he is then receptive and may even seek information about it.
3. Evaluation - he estimates its worth to him.
4. Trial - satisfied that it might work for him, he tries it out on a small scale.
5. Acceptance - this follows if the idea or innovation results in sufficient economic rewards or other types of personal or social satisfaction.

The five-stage concept, as postulated by American diffusionists, has been a center of interest, but also of controversy, among diffusion students. While some research tends to support this postulate, other research doesn't. For example, Rogers (1962) (1) cites studies such as those of Beal and Rogers (1960) and Coop, Sill and Brown (1958) that tend to support the validity of a five-stages adoption process.

In the first study cited by Rogers (1962) (1), Beal and Rogers investigated the adoption of two farm innovations among farmers of an Iowa community. Their findings suggest that most of the respondents went through a series of stages from awareness to adoption. Similar findings were obtained by Coop, Sill and Brown (1958) in their study with 175 Pennsylvania farmers. However, the same evidence, as reported by Rogers, indicated that adopters do not always pass through a five-stage process before adoption. In the Beal and Rogers study, for example, some farmers skipped one or more stages, especially the trial stage. The conclusions stated by Rogers (1962) (1) are:

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to summarize the present evidence, there seems to be support for the validity of the adoption-stages concept, but the findings are not conclusive. There is very little evidence as to exactly how many stages there are in the adoption process. Nevertheless, until more evidence is available, it seems conceptually clear and practically sound to utilize the five-stage adoption process.....

Evidence failing to support the five-stage concept has been reported by Deutschmann and Fals Borda (1962) (6) and by Deutschmann and Mendez (1962) (11) in their Latin American studies. In a study conducted in an Andean village in Colombia, Deutschmann and Fals Borda (1962) (6) found that farmers do not always follow the adoption stages as postulated by American diffusionists. Similar findings are reported by Deutschmann and Mendez (1962) (11) in their Cholena study. Here, they investigated the adoption of new foods and drugs among Cholena peasants.

In summary, more than 200 studies show that some people do and some do not follow the five stages of adoption.

In the investigation reported in this dissertation, we attempted to refine the five-stage concept by identifying the farmers who followed the five stages of adoption, the circumstances, and reasons why. In our study we used as frame of reference the concept of value orientations. We predicted a close relation between value orientations and their predispositions to move through the five stages or to skip one or more of them. We predicted that farmers with orientations toward modernism will tend to follow the postulated stages, while those oriented toward traditionalism will tend to skip some of them.

The Role of Information Sources

Another area intensively investigated by diffusion students has

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been the one concerned with the role of information sources during the five stages of the adoption process. The bulk of research in this area has attempted to investigate the use of different sources of information by adopters during the awareness, interest, evaluation, trial and adoption stages. Two major generalizations have been drawn from studies of innovations in different populations such as farmers, consumers, and physicians - (1) that at the awareness and interest stages the major sources of information are mass media and government officers, and (2) that during the evaluation, trial and adoption stages neighbors and friends are the main sources of information. (From Report No. 18, Iowa State College, 1957.)

The research findings have led to the development of a model of the process of communication of change and adoption. The occurrence of two steps has been hypothesized:

1. New information comes first to individuals of a community from "outside" through weak, but operating, channels of communication between members of the community and the more developed world.
2. Subsequent flow of information is accomplished through the continued operation of such channels, but importantly augmented by the flow of messages about the innovation in "local" channels. (Deutschmann and Mendez, 1962) (11).

The research to be reported here will include not only the findings from the United States research, but also from research conducted in the Netherlands and India. In addition, some research dealing with these variables in Latin America will be reported here.

Research Findings

Beal and Bohlen (1957) (3) conducted a study to determine which

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sources were the most common and how influential each of them were at a particular stage of the adoption process. Their findings suggest that the most common sources during the awareness stage were mass media; during the interest stage, again mass media, followed by government agencies; during the evaluation stage, neighbors and friends; and during the trial stage, in ranking order, neighbors, friends, government agencies, mass media and salesmen.

Identical results were obtained by Beal (1958) (8), and in a replication of the Beal and Bohlen study by Coop, Sill and Brown (1958) (9), the only difference in this latter study being that, in the interest stage, the farmers interviewed ranked face-to-face contacts as most important, followed by mass communication. Other studies reporting similar findings are Wilkening (1956) (12), Beal and Rogers (1957) (13), and Rogers and Beal (1958) (14).

A. W. Van den Ban (1961) (15), in a study attempting to analyze the process by which Dutch farmers get information about new farm practices, reported mass media as the most important source of information in their awareness of innovations; 75% of the farmers mentioned mass media as their major source of information during this stage. The same percentage of farmers stated that in the decision making stage their main source was personal contact with other farmers and extension officers. Van den Ban's findings deviate from the United States research findings in one important aspect -- while in the United States government agencies are considered mainly as important during the awareness and interest stages; in the Netherlands, government agencies appear to play an important role during the

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evaluation, trial and adoption stages. According to the present investigator, these observed differences can be explained by the cultural differences between Dutch and United States farmers. In Van den Ban's study, for example, intracultural variations, rather than farm size or socio-economic status, accounted for most of the variation in Dutch farmers' rate of adoption and exposure to agents of change. If intracultural variations accounted for such differences, it is reasonable to attribute to cross cultural variations the differences between United States and Dutch farmers, pointed out above.

In India, Wasudeo Rahudkar (1962) (16) investigated the communication of farm information in an Indian community. His findings tend to support the major generalizations made by American diffusionists. However, while in India mass media and extension services are used as primary sources of information by large farmers, the same principle is not applicable to small farmers. As it was stated by Rahudkar,

the whole diffusion process becomes "Y" pattern of communication in Indian culture. The farm information from Extension agencies and mass media first reaches the large farmers who are the first adopters of the practice in the village. This information is later transmitted to the smaller farmers, who are later adopters of a new practice.

His findings suggest that the generalization made by American diffusionists about the role of information sources has to be taken with caution when applied to a different culture, especially if agents of technological change are dealing with underdeveloped societies with few existing communication facilities.

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stage, mass media - magazines, newspapers, radio, television - are most frequent source of information about new ideas and practices."

The findings failed to support the general principle or concept postulated by American diffusionists. On the basis of his findings, he concluded -

the data did not support the hypothesis and, in fact, cast considerable doubt upon the value of this type of generalization. Although it might be held that the basic theory has not been challenged - that previous writers had called attention to the need for taking into account situational factors such as availability of mass media - I would maintain that results such as those presented in this paper indicate serious limitations in the present theoretical scheme covering information sources in the adoption process.

Myren suggests that the generalizations made by American students on diffusion theory can be applied with confidence only where high levels of development exist. However, Deutschmann indicates that the discrepancy between Myren's findings and other diffusion studies is at the descriptive level and not at the conceptual level. His position is that the diffusion model constructed in the United States by diffusion students can be easily applied to other situations and cultures. His assertion is supported by two studies conducted by Deutschmann and McNelly (1962) (18) in two different Latin American communities - one in Saucio, a small isolated Colombian village, the other in San Jose, Costa Rica - one of the most advanced capitals in Latin America. Despite the contrast between the two communities studied, the findings obtained were very much alike in the following ways: (1) in both communities the researchers found a close association between higher educational, income and occupational levels and the opportunity for exposure to mass communication channels, (2) in both communities, higher

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exposure to mass communication channels was associated with a higher predisposition towards the adoption of technological change. Both studies provided support to the hypothesis that exposure to mass communication channels affects the information levels, the attitudes and the behavior of individuals by making them more sensitive to technological change.

In summary, the bulk of research dealing with the role of information sources during the diffusion and adoption processes tends to support, with few exceptions, the principle or generalization that mass media are major sources of information during the awareness and interest stages, while friends and neighbors constitute the major sources of information during the evaluation, trial and adoption stages.

The study reported in this dissertation is also concerned with testing the validity of this general principle postulated by American diffusionists. However, our scope is broader. We have studied not only the role played by information sources, but also the variables related to people's use of these sources. We have studied the role of the information sources, using as a frame of reference the Deutschmann Communication Channel Orientations (1962) (6). Under this conceptual scheme the communication event is seen from the point of view of the receiver. The key variable is the way in which the receiver regards the source of the message in relationship to himself. Here, the communication system depends strongly upon the social structure in which the receiver is located and the perceived psychological nearness of the source to the receiver in that social complex. Under this

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conceptual scheme, farmers are classified according to their communication channel orientations - as egocentric, intra-community, extra-community or impersonally oriented. The predictions tested in our study are that Puerto Rican farmers with predominant egocentric orientations will be the latest to know about innovations, while those with impersonal orientations will be the earliest to know. The same prediction is made in relation to adoption. The results will be reported in Chapter V.

Farmer Categories

Other problems faced by diffusion students have been the development of standard criteria for classifying adopters into categories. A classificatory system, argue the diffusion students, is necessary to communicate research findings meaningfully and accurately. But despite the clamor for a consistent classificatory system, the present situation is one of confusion. Students in this area find it very difficult to relate some findings to others because of the arbitrary terminology.

At present, the most accepted and widely known classificatory system is the one used by rural sociologists. Under the system, farmers have been classified as: (1) innovators, (2) early adopters, (3) early majority, (4) majority, and (5) non-adopters or laggards.

Innovators adopt first. They are characterized by higher education, larger farms, greater incomes, higher social status, and wider travel than the average farmer. They are experimenters, always trying new things. "To be venturesome is almost an obsession" with

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them. (1) They are active and influential, not only in their own communities, but often beyond. They usually belong to formal organizations and have many informal contacts both inside and outside their community; therefore, they have more potential sources of information than other farmers. Beal (1958) (8) found that most of the innovators' new ideas come from government agencies or mass media. They seek advice from other farmers, but primarily from those who are progressive like themselves. According to Lionberger (1960) (10) innovators perform an important function in diffusion. By assuming risks others are not willing to take, they provide the local trial necessary to legitimize a new idea in the eyes of other more cautious farmers.

Next come the early adopters. Compared with late adopters, they are usually younger and have more schooling. They participate in formal activities of the community and in agricultural cooperatives and government agency programs. They furnish many formal leaders (elected officers) for the community. They are usually considered the "influentials" of the community and are sought out for advice. Beal (1958) (8) found that, at the awareness and interest stages, they were influenced primarily by mass communication; at the trial stage, by government and commercial sources; and in the adoption stage, by agency sources and mass media. The influence of friends and neighbors was less important to them than to the late adopters.

In the third category, known as early majority, are those who adopt new ideas and practices earlier than the average farmer, but are close to average in many other respects. They are a little above the average in social and economic status. In formal groups they are less

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active than the early adopters, but more active than the late adopters. Their leadership is usually informal rather than by elected office. They associate mainly with members of their own community and place a high value on the opinions of neighbors and friends. Although influenced by the norms of the groups in which they are active members, they are usually receptive to change. Like the innovators and early adopters, they are heavy users of the mass media. They are influential in their social groups and are sought out for their advice. Because they are normally the ones to receive new information and pass it to less active farmers, they are considered key communicators. As such, according to Lionberger (1960) (10), "they are in a position to select what they transmit, to shade their own interpretations, and to incorporate either positive or negative recommendations." In other words, they are gate-keepers, controlling the information which reaches the less active farmers in their social groups.

The next category, termed the majority, are older and less well educated than farmers in the early majority. They participate less in formal groups, belong to fewer organizations, are less active in organizational work, and hold fewer positions of leadership. Although receptive to new ideas, they are too mated to their social systems to seek new ideas actively. Most of their new information comes from other persons, usually from opinion leaders. They are inactive in government programs and don't look often to the change agencies.

The last category, the late-adopters, includes the oldest and least educated. These men participate least in formal organizations, farm cooperatives, and in government programs. Their mental rigidity

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The category system described above uses as criterion the concept of innovativeness. This concept as defined by Rogers is "the degree to which an individual adopts new ideas earlier than other members of his social system."

This category system performed its function during the initial stages of development of diffusion theory. It provided diffusion students with a framework for reporting their findings in a way the general public could understand. However, at the present stage of development, the classification system needs to be refined or a new system developed. In our opinion, a category system with a broader scope will allow more valid generalizations of the concept of innovativeness.

In the present study the concept of innovativeness has been investigated under the framework of value and communication channel orientations. A close relationship was predicted between value orientations, communication channel orientations and innovativeness. Using this as a frame of reference, we studied innovativeness and classified farmers into three broad and more exclusive categories - (1) Progressive - farmers oriented toward modernism, (2) Intermediate - farmers in a stage of transition from traditional to modern orientation, and (3) Traditional - farmers rooted to traditions and old ways of farming. Results will be presented in Chapter V.

Other Factors Influencing the Adoption of Innovations

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indicated in the previous section, personality plays a role. Research also stresses the importance of: (1) farmer's education, (2) cost of the new practice, (3) area, (4) farming experience, and (5) the nature and number of the communication channels to which the farmer is exposed.

The findings of Young and Marsh (1950, 1955) (19) suggest that the higher the education level of farmers, the greater their rate of acceptance of innovations. Economic level is also important. Farmers in progressive areas served by modern facilities such as electricity and good roads have higher rate of adoption than those in isolated and more primitive communities. The findings also suggest that farmers with more education and higher incomes in adoption neighborhoods use a greater number of information sources, among which the mass media are very popular. Similar findings were obtained by Dickerson (1955) (20), Baker (1955) (21) and by Anderson (1955) (22).

Conclusion

In this section the reader has been exposed to rural sociology literature on diffusion most relevant to the present study. The major concepts postulated by them and research findings reported on this area have been discussed and their relation with the present study established.

However, there are other approaches to the study of diffusion of innovations which will be discussed in our next section. It will be our aim to familiarize the reader with some present trends in the study of the diffusion of innovations.

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The Australian Approach

The literature reviewed in the previous section has shown that both personal and mass communication are important in the diffusion of innovations, and that each has its own role in this process. Mass communication is especially influential in the awareness and interest stages, and it is particularly appropriate for reaching the opinion leaders and the early adopters. These people in turn pass on information by word of mouth to other members of the community, and they set examples to follow. Although personal communication is still a major force in securing the trial and adoption of new recommendations, mass communication appears more influential than many change agents seem to believe.

To test the role of information sources during the adoption process, Emery, Oeser and Tully (1958) (4) investigated the diffusion and adoption of innovations among dairy farmers under a general theory of communication. Departing from the models of Heider, Newcomb and Cartwright and Haray - that communication takes place between two people, A and B, about a referent X, when there is a positive attitudinal relation between A and B and the attitudes toward X have the same sign - Emery, Oeser and Tully constructed what is known as the Australian model of diffusion. This model is based on the following indices: (1) Index of Urbanization, (2) Index of Situational Motivation, (3) Index of Conceptual Skills, (4) Index of Exposure to Mass Media, and (5) Index of Scale of Operations. In addition they included intelligence as a determining condition without which certain things can not be done.

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Urbanization¹ was indexed by (1) family orientation - rural or urban, (2) post-primary education, (3) employment other than as rural laborer, and (4) war service.

Situational motivation was indexed by (1) age, (2) health, (3) cooperation and farming interests of the wife, (4) allowing sons to share responsibilities, and (5) maintaining economic progress and status. These factors, the authors stated, "influence and support the motivation of farmers - in the sense of choosing farm improvement as goals and persisting in trying to attain them." (4)

Conceptual skills were indexed in terms of planning, ideas about how credit should be employed, future operations, and ideas about education of sons. The rationale in the construction of this index was that, "if man sees how his problems are interrelated, if he understands how to commit himself financially, if he plans ahead, then he adopts new practices as a thinking, purposive individual; and then he will also carry out other sensible and far-seeing operations."

Scale of operations was indexed by input or resources of the farm and out-put or production.

Using this model as a theoretical framework, the researchers interviewed 36 farmers of Bairndale, Australia. Their findings show that

¹The concept of urbanization assumes that the attitude toward knowledge by members of an agrarian society differs in important respects from that displayed by members of an urban, industrial culture. For example, in agrarian societies knowledge must be learned and tested by personal practice and experience and transmitted by face-to-face communication. In an industrialized society knowledge is accepted as being instrumental rather than traditional. (Lerner, 1958) (23)

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farmers with high degree of urbanization are more receptive to information given through mass media, are more exposed to the media and are higher adopters than other members of the community; that situational motivation, conceptual skills and scale of operations are closely related to receptiveness for mass media, to degree of exposure to the media of mass communication and to the rate of adoption of dairy farm practices. This classic study corroborated findings of American diffusionists in relation to the role of information sources during the adoption process.

In another study, Wilkening, Tully and Presser (1962) (5) attempted to fuse the diffusion model constructed by Emery, Oeser, and Tully and the one by American diffusionists. They studied the communication patterns of 100 dairy farmers from Northern Victoria, Australia. Going further, they investigated the relationship between farm resources, farm out-put, social status and role, sources of information, and aspirations of the farmers to the adoption of selected group of innovations. In relation to the role of information sources during the adoption process, the findings in their study were quite similar to those obtained by American diffusionists.

Findings similar to those of Emery, Oeser and Tully were obtained in relation to scale of operations, situational motivation and conceptual skills of the farmers studied.

In the present study we investigated some of the concepts postulated by the Australian researchers such as scale of operations, conceptual skills, degree of exposure to mass media and the communication patterns of Puerto Rican dairy farmers. However, one major frame of

reference, as was stated previously, was value orientations and communication channel orientations. If our predictions were correct, we expected to obtain findings similar to those of American and Australian researchers and consequently to be able to conclude that value and communication channel orientations can be integrated into the existing diffusion models as major variables influencing the adoption of innovations.

The Typological Approach

In a previous section of this chapter the reader was familiarized with the efforts by rural sociologists to categorize the adopters by their predispositions toward innovativeness. These were the first efforts to approach the diffusion process and the adoption of innovations by using the typological approach. Under this approach five types have been suggested as existing in all social systems.¹ However, these categories do not represent pure types from which comparisons can be made. The categories proposed by diffusion students are not exclusive and characteristics attributed to farmers in one category overlap with characteristics of farmers under other categories. Consequently the need for a more refined typological approach to the study of diffusion has been recognized by many students in the field.

The study conducted by Wells and MacLean (1962) (24) is a good example of the present trend in diffusion research. They investigated readership patterns through elementary linkage analysis and patterns of certain occupational values, information sources, article preferences

¹These types were discussed in the section "The Rural Sociology Approach" presented previously in this chapter.

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and political issues through Stephenson's Q-technique. Their findings suggest that in any social system there are different clusters of people with different patterns of media habits and with different attitudes on "good" farming practices. For example, analysis of the group on a number of measures suggests a hard core of non-readers. As a group, they take fewer publications, rate them less interesting and useful, have somewhat less education, are a bit older, have lower gross farm income, and are less active in organizations - on the average - than any reader groups. The findings also suggest that there are clusters with similar styles of reading - the careful reader, the selective reader, the headline reader and the superficial reader.

In another phase of the study, Q-technique was used to secure data on occupational value beliefs, interest in and use of various agricultural sources, preferences for farm magazines, article topics and treatments, and important ratings of economic and political issues. Factor analysis yielded three clear typologies of people - Other Directed, Traditional-Independent, and Modern Rural Businessman.

This study, although exploratory, has provided some relevant data necessary to understand the adoption and diffusion process - it suggests the location of modal types of persons within a social system and their dominant or modal characteristics as a necessary condition for the introduction of technological change.

A similar approach to the one followed by Wells and MacLean was used in the present study. We investigated typologies among Puerto Rican dairy farmers by using a Q sample of statements expressing value orientations. Under this conceptual framework, we predicted clusters

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The Value Orientations Approach

Social scientists have tried to find out how value orientations influence individual and group behavior. Stogdill (1959) (25) cites vast literature on small group research dealing with the importance of value systems in the motivation of voluntary associations, with the ways in which individual value systems influence individuals' behavior in relation to group norms and goals, and with the ways in which individual values and group values interlock in order to permit the effective functioning of the existing groups in our society.

An attempt to relate value orientations to the diffusion and adoption of farm innovations was made by Polson and Spender (1959) (26). They analyzed "several value orientations which, due to the logical relationship to decision making and social changes, may enter into the explanation of the adoption of farm practices."

By using a sample of 188 farm operators from Cattaraugus County, New York, they investigated the relationship of value orientations to adoption of farm innovations. As hypothesized by the researchers, orientations toward achievement and belief in science were positively related to adoption, while traditionalism was negatively related.

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The current study stressed value orientations. We went beyond the hypotheses tested by Polson and Spencer (1959) (26) to look at the relationship of value orientations to farmers' communication patterns and social behavior.

The Communication Channel Orientations Approach

In the literature mentioned above, we found consistent relationship between individual predispositions toward the use of specific communication channels and attitudes toward proposed innovations. This apparent systematic relationship has led diffusion students to look at the communication event from the point of view of the receiver, instead of from the traditionally-used viewpoint of the source. Efforts have been made to construct a theoretical schema to bring together previous findings about the receivers' predispositions toward the use of specific channels, their social status and prestige, and what has been thought of as "psychological-geographical distance" between source and receiver in a communication event.¹

This path was followed by Deutschmann and Fals Borda (1962) (6) and by Deutschmann and Mendez (1962) (11) in two studies in Latin America. In these studies, the authors constructed a classification system to define the channels through which innovation messages flow -² egocentric, intra-community, extra-community, and impersonal. In this

¹Communication event is defined as the complex of the giving and receiving of information about an innovation.

²See section "Definition of Terms" in Chapter I of this dissertation.

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model the key concept is the communication channel orientation. This has been defined by Deutschmann et. al. (1962) (6), (1962) (11), as the way in which a receiver regards a source of a message in relationship to himself or as the tendency of individuals to use some available sources or channels of information more heavily than others. From the author's point of view, "channels of information are a complex resultant of individual habits and characteristics, social structure, and the growing modern impersonal methods of communication."³

Using as a basic concept the communication channel orientations, two studies were conducted in Latin America by Deutschmann et. al. The first was done by Deutschmann and Fals Borda (1962) (6) in Saucio, a Colombian village in the Andes, covering the diffusion and adoption of six farm practices. The second study, conducted by Deutschmann and Mendez (1962) (11) in Cholena, a Guatemalan village, used the same theoretical scheme as frame of reference. However, the population was different -- women -- and also the kind of innovations investigated - popular drugs and foods. In these studies the major assumption tested was that the latest to know and the latest to adopt innovations had predominant orientations toward egocentric channels, while the earliest to know about and to adopt innovations were predominantly oriented toward impersonal channels. Despite the different populations and types of innovations investigated, the postulated hypotheses were supported in both studies.

³See Deutschmann and Fals Borda, Communication and Adoption Patterns in an Andean Village, PIIP, San Jose, Costa Rica, (1962)

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The findings reported above suggest the relevance of communication channel to an understanding of the diffusion process. However, further research is needed to test and verify its generalizability on different kinds of situations. And this has been a major reason for using communication channel orientations as a major concept in the present investigation - to test the validity and generalizability of the concept under the Puerto Rican situation.

Non-Agricultural Diffusion Research

Up to now we have been concerned with agricultural diffusion research and its contributions to diffusion theory. But the story of diffusion theory will not be complete unless we venture outside of agriculture.

In recent years students from other disciplines have been digging in this area. In this section we will be concerned with two major concepts postulated by non-agricultural diffusionists--the two-step flow and opinion leadership. Using as a frame of reference these two concepts, non-agricultural diffusionists have attempted to explain how information flows during a communication event.

The Two-Step Flow and Opinion Leadership

When an agent of change releases information through the mass media, he should remember that it is likely to be extended beyond the media by word of mouth. Frequently one person tells another what he has learned from the media, giving the message what might be termed a secondary exposure.

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Lazarsfeld, Berelson and Gaudet (1948) (27) studied what influenced 600 voters of Erie County, Ohio, in the 1940 presidential elections, they found that "personal contacts appear to have been...more effective than mass media in influencing voting decisions." Similar findings were obtained by Berelson, Lazarsfeld and McPhee (1954) (28) when they investigated the decision making process of voters in Elmira, New York, during the 1948 presidential elections. Moreover, when Katz and Lazarsfeld (1955) (29) asked 800 women of Decatur, Illinois, what influenced their decisions in marketing, public affairs, movie going, and fashions, they found the primary determinant to be personal relations developed through oral communication.

When a message originates in the mass media, therefore, its impact may be increased through subsequent person-to-person communication. This will be especially true if the message is designed originally to impress the more influential members of the social system which the agents of change wish to reach - the persons who are called "influentials," "opinion leaders," and sometimes "gatekeepers." These people are in a position to determine whether information modified by their own perspective will be passed on to other members of the group.

According to the "two-step flow hypothesis" of Lazarsfeld, Berelson and Gaudet (1948) (27), ideas often flow (step one) from the mass media to the opinion leaders, and then (step two) from them to the less active sector of the population.

Opinion leaders are likely to be more exposed to the mass media than are those whom they influence. Merton (1949) (30) found this in his study of interpersonal influence on communication in a small

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community, and Katz and Lazarsfeld (1955) (29) got further support in their Decatur study. The influentials in both studies exceeded other members of their group in the time devoted to the media, and particularly in time devoted to content therein closely associated to their sphere of influence.

Who are these leaders and where are they located? In the Merton study (1949) (30) influentials were located by asking residents to name the persons to whom they turned for advice when making personal decisions. Persons named by four or more residents were the influentials. These, he discovered, could not be classified as a single group, standing apart from the rest of the community. They were scattered throughout the community and were of different types. Two particularly evident types were "local" and "cosmopolitan." Local leaders were more likely to be native sons, while cosmopolitan leaders were relatively newcomers. Local leaders were more concerned with knowing a large number of townspeople, while cosmopolitan leaders were more restrictive in their associations, tending to belong to organizations which represented special skills and interests, such as professional societies. Both types of leaders spent more time with mass media than did the average person in the community. But the local leaders focused more on local events or on subjects of general interest, whereas the cosmopolitan leaders were most interested in information about events outside the community. The local leaders seemed to exert their influence in a variety of areas, whereas the cosmopolitan leaders seemed to restrict their influence to fields such as national or international politics in which they were consulted as experts.

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In the Decatur study of Katz and Lazarsfeld (1955) (29), the opinion leaders were found, in the areas of marketing, movie going, and fashions, on every status level of the community, generally among the more gregarious people of their groups. They were not on a rung above the persons whom they influenced; rather, they exerted their influence "horizontally" on persons of their own social-economic level. The influenced persons were equally or almost as interested in the subject matter concerned as those who influenced them. However, in the area of public affairs, the women of high status were more likely to be public affairs leaders than women of low status. Persons designated as influentials were higher-up on the status ladder than the people who named them, and each successive group of experts stood higher than its predecessor. Apparently the position of opinion leaders depends partly on content area. That is to say, for some matters opinion leaders exert a horizontal type of influence, while for other matters opinion leaders exert a kind of vertical influence.

Merton's findings (1949) (30), like the ones of Larson and Hill (1954) (31) and Katz and Lazarsfeld (1955) (29) have provided support to the two-step flow concept postulated by Lazarsfeld, Berelson and Gaudet (1948) (27).

To summarize this hypothesis and the literature related to it, oral and mass communication are linked in the diffusion process. Information generated in the mass media is received by some individuals who re-transmit it personally to others who would not otherwise be exposed to it. These opinion leaders, influentials, or gatekeepers have to be taken into account in any attempt to influence people by means

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of the mass media. Furthermore, the findings suggest that people look for advice or attitudinal information within their groups, which indicates that opinion leaders are distributed through all strata of the population.¹

Recent investigations, however, have evidence contradicting the two-step flow concept. In one of these studies Deutschmann and Danielson (1961) (32) investigated the role of mass media and opinion leaders in the diffusion of three major news stories - Eisenhower's light stroke (in Lansing, Michigan, on November 1957); The Explorer I Satellite (in Lansing; Madison, Wisconsin; and Palo Alto, California); and of Alaskan statehood (in Lansing and Madison). The conclusions of these authors with respect to the two-step concept were the following:

1. Initial mass media information on important events goes directly to people on the whole and is not relayed to any great extent.
2. People talk about important news they have learned from the media.
3. At this stage, opinion leaders, who have more information, may do some relaying of information. But this is a supplementary relaying. When the subject comes up, the informed leader contributes the additional information he has on it - adding, subtracting, correcting, confirming, etc.

The Deutschmann and Danielson findings suggest that the relay function is supplemental in nature; that probably takes place at the same time as the reinforcement function, and is hard to distinguish from the latter.

¹The "horizontal" or "vertical" influence exerted by opinion leaders apparently depends on the content area. This was suggested by Katz and Lazarsfeld (1955) (29) in their Decatur study.

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They also suggested that "the Katz and Lazarsfeld two-stage flow hypothesis, as a description of the initial process, be applied to mass communication with caution and qualification."

In another study, reported previously in this chapter and dealing with the communication of new farm practices in the Netherlands, A. W. Van den Ban (1963) (15) found the diffusion of innovations among Dutch farmers to be a multi-step process instead of a two-step process as postulated by Katz, et. al. Moreover, he found that "in contrast to this hypothesis, both leaders and followers usually become aware of new practices through mass media, but in the decision-making stage of the adoption process, personal communication is their most important source of information.

Conclusion

A close look points up the similarity of findings from agricultural and non-agricultural diffusion research. For example, the two-step flow hypothesis has been supported and contradicted in both fields. In addition, both areas have provided similar findings on the role performed by different information sources. Another remarkable similarity is the apparent orientation of individuals within a social system to prefer certain channels over others as major sources of information.

In the present study the author attempted to test in Puerto Rico the generalizability of most of the concepts reported in this chapter. But in the search for new variables to provide a more complete portrait

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of diffusion, value orientations¹ have been used as a core concept. Going further, this author has investigated how variations in value orientations among Puerto Rican dairy farmers affect their predispositions to use communication channels and to accept innovations.²

The worth of value orientations as a core concept in the study of the diffusion and adoption processes was suggested by a cross cultural study conducted by Kluckhohn and Strodtbeck (1961) (2) in five communities of New Mexico. This looked at variations in value orientations among Zuni and Navaho Indians, Spanish Americans, Mormons, and Texans located in five different communities of New Mexico. Four orientations were investigated -- Time (present, past, future); Relations (lineal, collateral, individually); Man-Nature (subjugated, harmony, mastery over nature); and Activity (being, doing). The findings showed remarkable differences among the five communities with respect to the dominant value orientations and patterns of behavior. Although a dominant value-orientation pattern was apparent in each of the communities, there was also an indication of intra-cultural variations in value orientations. Moreover, these intra-cultural variations

¹Value orientations have been defined as the ranking order of preference given to a set of basic principles which guide or direct the behavior of individuals in the solution of human problems.

²In this study intracultural variations in value orientations among Puerto Rican dairy farmers were predicted; these variations accounting for different patterns of behavior and predispositions toward new ideas and practices.

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seemed to account for many variations in behavior patterns within each culture. The data reported by Kluckhohn and Strodtbeck (1961) (2) suggest that individuals within a given culture can be clustered on similarities in value orientation. The data also suggest that once location of these clusters makes it possible to predict behavior patterns.

Using these findings as a frame of reference, we assumed that in any attempt to explain individuals' predispositions toward technological change, variations in value orientations among people play a central role. Moreover, value orientation is a core concept for any attempt to explain diffusion and adoption processes. These assumptions were the main reason for the construction of the diffusion model¹ used as theoretical framework for this study.

This chapter has reported the major concepts investigated by diffusion. We have also tried to establish their relationship to two major concepts serving as framework for the construction of the diffusion model being tested in our present investigation.

The literature reviewed has provided a necessary background for a better interpretation of the theory underlying the present investigation and of the diffusion model constructed. The next chapter will explain our theoretical model.

¹The diffusion model used as theoretical framework for this study will be described in Chapter IV.

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CHAPTER III

THE THEORETICAL MODEL OF DIFFUSION

From the literature reviewed in the preceding chapter one can conclude that the diffusion and adoption of innovations are complex processes. Many variables account for the observed variation in exposure to channels of communication, in the rate of adoption, and in degree of acceptance of new technology.

Rural sociological research in the United States, India and the Netherlands showed that in these processes individuals pass through different stages before finally deciding to adopt or reject a new idea. Some persons pass through more stages than others. Also, people vary in their proneness toward adoption of new technology.

From the diffusion studies in Latin America and outside the agriculture field, we learned that some individuals are more oriented toward the use of some communication channels than others; that there is a relationship between communication channel orientations and a person's predisposition toward the adoption of innovations.

From the Australian researchers, we learned that the degree of urbanization, situational motivation, conceptual skills and managerial skills are directly related to attitudes toward some communication channels, to degree of exposure to these channels, and to rate and degree of adoption of new technology.

The exploratory studies on typologies and values reviewed

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previously suggest some relationship between communication channel orientations, adoption, and values. Moreover, these researches suggest more than one type of modal personality in social systems, and that groups of people sharing common values tend to follow similar patterns of behavior.

The cultural study reviewed provided further support to the view that value orientations are an important factor in human behavior. From this study we learned that variations in value orientation help explain how individuals in each society structure their world. That is to say, value orientations help determine behavior patterns.

To date, diffusion students have discovered orderly relations among events but have failed to provide explanations. The existing diffusion models have provided the bases for predicting that some people or groups will react in a certain way to a new idea in a certain situation. However, these models have not provided explanations.

Our major assumption is that if the existing diffusion concepts are integrated into a conceptual scheme using intra-cultural variations in value orientation, as a core concept one can both organize and explain. Using this approach to the study of diffusion of farm technology, we constructed a model which attempts to relate intra-cultural variations in value orientations to communication channel orientations, degree of exposure to mass media and other communication channels, rate of adoption of farm technology, and the degree of acceptance of innovations.

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The Model

The basic notion of this investigation is that every society has noticeable intracultural variations in value orientations among different sub-cultural groups; that each sub-cultural group has a dominant profile of value orientations which directs the behavior of its members in order to achieve homogeneity in the solution of human problems. Moreover, our theory postulates that individuals belonging to the same sub-cultural group in a given social system tend to be homogeneous in rank ordering of value-orientation alternatives. For example, in time orientation, some sub-cultural groups may be strongly oriented towards the future, others toward the past or present. The same assumptions are made for the man-nature, relational and activity orientations present in all societies. While some sub-cultural groups orient towards subjugation to natural forces, others prefer activities which allow mastery over these forces. While some groups value hard work and achievement, others consider effort as a means to an end rather than an end in itself.

With respect to relational orientations, our theory also postulates intracultural variations. We hypothesized that some sub-cultural groups value rigid authority, while others value the individual and flexible authority.

In brief, our theory postulates that intra-cultural variations in value orientation relate closely to the ways in which individuals structure their worlds.

According to our theory, the differences in communication channel orientations, exposure to communication sources, rate and degree

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of acceptance of new technology, and social behavior of individuals belonging to a social system can be explained if one knows the dominant profiles of value orientations. It is our hunch that by studying the different typologies in a given social system (community, municipality, region, etc.) one can find the answers to the following questions:

1. What are the reasons for the observed differences in the rates of adoption of farm innovations among individuals belonging to a social system?
2. What are the reasons for the observed differences in the degree of acceptance of new technology among individuals belonging to a social system?
3. What accounts for the variation among people in their communication channel orientations?
4. What accounts for the variation in observed patterns of behavior among individuals within a given culture?

Our model, or theoretical scheme, is based on the following rationale. From diffusion research we became aware of the variant patterns of attitudes among individuals with respect to new technology, communication channel orientations and social behavior. From cultural research we became aware of the relationship between variations in value orientations and variant patterns of behavior among individuals within a given society. These findings suggested the possibility of integrating cultural and diffusion variables to come out with a theoretical model which can provide a thorough explanation of the diffusion and adoption processes.

Our model is based on four crucial problems assumed by Kluckhohn and Strodtbeck (1961) (2) as common to all human groups or societies:

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(1) man-nature, (2) time, (3) relational, and (4) activity orientations. The model is based on the assumption that different groups of people vary in their rank ordering of preference for the alternatives in the solution of these crucial problems. These preferences for alternatives are considered in this model as valuable predictors of human behavior.

Under this conceptual scheme, we predicted a wide range of variation among groups of Puerto Rican dairy farmers with respect to dominant profiles in value orientations. We expected to find some clusters of farmers oriented mainly toward modernism, some in a transitional stage from traditionalism to modernism, and some firmly rooted to a traditional view of the world.

To gain a frame of reference for comparative purposes, we constructed ideal types of farmers based on value orientations; the three ideal typologies will look as follows:

Orientations				
Clusters	Time Orientations	Man-Nature Orientations	Activity Orientations	Relational Orientations
I Modern	Future	Mastery Over Nature	Doing	Individual
II Transitional	Present	Harmony Nature	Being In Becoming	Collateral
III Traditional	Past	Subjugated To Nature	Being	Lineal

This study investigated dairy farmers' typologies and compared them against these ideal types. To integrate this typological model with the Deutschmann Communication Channel Orientations Model, we

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predicted a close relationship between value orientations and communication channel orientations. When the two models were fused into a single conceptual scheme, they looked as follows:

Farmers Ideal Types According to Value Orientations			
Communication Channel Orientations	I Modern	II Transitional	III Traditional
Egocentric			X
Intra-Community		X	X
Extra-Community	X	X	
Impersonal	X		

Our predictions were that Puerto Rican dairy farmers with predominant orientations to the use of egocentric channels will be highly traditional in their value orientations. Consequently they will be the latest to know about innovations and the latest to adopt them. We also Predicted that dairy farmers with predominant orientations toward impersonal channels will be the most modern, the first to know about innovations and the first to adopt them.

In the construction of our model, the third step was to fuse value orientations and communication channel orientations with the rest of diffusion concepts developed by diffusion researchers and cited in the preceding chapter. We predicted that the most modern farmers will be the ones with high degree of exposure to mass media, the first and higher adopters and the most influential leaders in their respective communities. In its final stage the model constructed looks as follows:

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The Value Model

Farmers ideal types according to value and communication channel orientations			
	Type I	Type II	Type III
	Modern	Transitional	Traditional
	1. Future	1. Present	1. Past
	2. Mastery over nature	2. Harmony with nature	2. Subjugated to nature
	3. Doing	3. Being in becoming	3. Being
	4. Individually	4. Collateral	4. Lineal
Channel orientations			
	1. Extra-community far	1. Intra-community	1. Egocentric
	2. Impersonal	2. Extra-community near	2. Intra-community
1. Exposure to mass media	High	Average	Low
2. Exposure to agents of change	High	Average	Low
3. Rate of adoption	Earlier	Average	Later
4. Degree of adoption	High	Average	Low
5. Participation in social activities	High	Average	Low
6. Sought for advice	High	Average	Low
7. Seeking for advice from friends and neighbors	Low	High	Low
8. Range of influence	High	Average	Low

With respect to age, educational and socio-economic levels a two-way relationship with value orientations was predicted. The hypotheses tested in this study were the following:

Hypotheses

1. Under the Puerto Rican situation, variations in value orientations among dairy farmers are related to communication channel orientations.
 - a. Dairy farmers with a rank order of preference for future, mastery over nature, doing and individual value orientations are the most impersonal and extra-community channel oriented.
 - b. Dairy farmers with a rank order of preference for present, harmony with nature, being in becoming, and collateral value orientations are the most intra-community channel oriented.
 - c. Dairy farmers with a rank order of preference for past, subjugation to nature, being, and lineal value orientations are the most egocentric channel oriented.
2. Under the Puerto Rican situation variations in value and communication channel orientations among dairy farmers are related to degree of exposure to channel-sources of information.
 - a. Farmers with a rank order of preference for future, mastery over nature, doing, and individual value orientations and for impersonal and extra-community channels are the most exposed to mass media and agents of change.
 - b. Dairy farmers with a rank order of preference for present, harmony with nature, being in becoming, and collateral value orientations and for intra-community channels are the most exposed to friends and neighbors within the community boundaries.
 - c. Dairy farmers with a rank order of preference for past, subjugation to nature, being, and lineal value orientations and for egocentric channels are the lowest in degree of exposure to mass media, agents of change, and friends and neighbors.
3. Under the Puerto Rican situation variations in value and communication channel orientations are related to time of awareness and time and degree of adoption of dairy innovations.
 - a. Dairy farmers with a rank order of preference for future, mastery over nature, doing, and individual value orientations and for impersonal and extra-community channels are the first to know, the first to adopt and the largest adopters of dairy innovations.

1. The first step in the process of the scientific method is to make an observation or ask a question.

2. The second step is to do background research to learn what is already known about the topic.

3. The third step is to form a hypothesis, which is a prediction or an educated guess about the outcome of the experiment.

4. The fourth step is to design and conduct an experiment to test the hypothesis.

5. The fifth step is to analyze the data and draw a conclusion based on the results of the experiment.

6. The sixth step is to communicate the results of the experiment to others in the scientific community.

7. The seventh step is to repeat the experiment to verify the results and to see if the hypothesis is supported or refuted.

8. The eighth step is to use the results of the experiment to make a prediction about the outcome of a future experiment.

9. The ninth step is to use the results of the experiment to make a prediction about the outcome of a future experiment.

10. The tenth step is to use the results of the experiment to make a prediction about the outcome of a future experiment.

- b. Dairy farmers with a rank order of preference for present, harmony with nature, being in becoming, and lineal value orientations and for intra-community channels are average in time of awareness and time and degree of adoption of dairy farm practices.
 - c. Dairy farmers with a rank order of preference for past, subjugation to nature, being, and lineal value orientations and for egocentric channels are the latest to know, the latest to adopt and the lowest in degree of adoption of dairy farm practices.
4. In the Puerto Rican situation, value and communication channel orientations are related to dairy farmers' social behavior.
- a. Dairy farmers with a rank order of preference for future, mastery over nature, doing, and individual value orientations and for impersonal and extra-community channels belong to more organizations and are the highest in advice giving.
 - b. Dairy farmers with a rank order of preference for present, harmony with nature, being in becoming, and collateral orientations and for intra-community channels are average in belonging to organizations and are the highest in advice seeking.
 - c. Dairy farmers with a rank order of preference for past, subjugation to nature, being, and lineal value orientations and for egocentric channels are the lowest in belonging to organizations, advice seeking and advice giving.
5. Under the Puerto Rican situation value and communication channel orientations are related to dairy farmers' predispositions toward following or skipping stages during the adoption process.
- a. Farmers with a rank order of preference for future, mastery over nature, doing, and individual value orientations and for impersonal and extra-community channels are the ones who usually follow more stages of the adoption process.
 - b. Dairy farmers with a rank order of preference for present, harmony with nature, being in becoming, and collateral value orientations and for intra-community channels rank second in the number of stages followed.
 - c. Dairy farmers with a rank order of preference for past, subjugation to nature, being, and lineal value orientations and for egocentric channels are the farmers who most skip stages during the adoption process.

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The above theoretical model should aid interpretation of the findings. Also relevant are the situations in which the study was conducted and the population investigated. The next chapter will deal with these areas.

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CHAPTER IV

DESCRIPTION OF THE AREA

This chapter provides background information about the area and population investigated. It begins by presenting a general picture of the dairy situation in Puerto Rico. It then proceeds to describe the two dairy regions involved in the research, with particular attention to the general characteristics of the populations investigated and the dominant type of dairy operations.

The Situation

The selection of a dairy farmer's population in the present investigation was not arbitrary. It was based on the author's knowledge of the present agricultural situation in Puerto Rico.¹

Three major factors were considered in the selection of the research population in the present study - (1) The dramatic economic and technological development of the dairy industry in the last 11 years. This seemed to provide an ideal population for testing the major hypotheses of the study, especially those concerned with diffusion and acceptance of innovations. (2) The availability of communication channels for the dairy farmers. Due to the electric facilities in the

¹The author has been an information specialist in the Puerto Rican Agricultural Extension Service for the last 14 years.

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dairy areas and the economic and educational levels of the dairy farmers, broader use has been made of mass communication channels to deliver information about new technology to them. This condition was ideal to test the communication channel orientations of this population and the role of mass communication channels during the different stages of the adoption process. (3) The availability of two adjacent, but quite different regions -- different with respect to educational, social, and economic levels. The situation seemed to provide a good setting for making comparisons and a sound basis for greater generalization.

Economic Development

During the last decade, the dairy industry has made remarkable progress. From a backward position in 1950, it has become a leading factor in the Island's economy. Development continues. Agricultural experts expect that dairying will soon surpass sugar cane as the most important agricultural enterprise in Puerto Rico.

During the year 1952-53 there were only 342 first-class dairy farms operating on the Island. Their production was 45.6 million quarts of milk. (32) Herd quality was poor; production costs were high; the yields were low. Lack of scientific management in dairying was keeping the industry behind other farm sectors. Today, the scene has changed. Last year, there were 659 first-class dairy farms operating. Production has risen to 206.5 million quarts of milk. Dairying contributed 56.2 million dollars -- at farm value during 1963. In other words, milk production and the dairy industry's contribution to the Puerto Rican economy is four times what it was 11 years ago. (32)

Today, the quality of the herds and the yields are very high, production costs are low. Every day many more farmers are shifting from other types of farming to dairying. For example, in 1962 there were 639 first-class dairy farms operating, while in 1963 there were 659, an increase of 3% in the number of dairy units. (33)

In this dramatic development of the dairy industry, the adoption of new technology has played an important role. At the present such innovations as artificial breeding, pasture improvement, better feeding methods, better breeds, farm records, mechanization, and disease and parasite control are widespread.

It is apparent that the rapid growth of the dairy industry has been influenced by favorable farmer predisposition toward the adoption of new technology. Also, diffusion and adoption of dairy innovations have been accelerated by the effective communication between the change agents and dairy farmers. For many years, agencies such as the Agricultural Experiment Station, the Extension Service, Vocational Agriculture, Farmers' Home Administration, Soil Conservation, and the Federal and State Departments of Agriculture, have been providing assistance to the farm population.

But what kind of assistance are the agencies of technological change providing to the Puerto Rican dairy farmers? How are these agencies functioning? What kind of programs are they conducting to help farmers improve dairy yields?

The Role of Agencies of Change

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look closely at their methods of operation and their technological programs. Because the present investigation is concerned with dairying, we will deal only with the technological assistance to dairy farmers.

The Agricultural Experiment Station - It conducts research in a wide variety of agricultural areas. Typical studies related to dairying deal with adaptation of different breeds to tropical climates; development of superior forage crops; improving fertilizer formulas; developing and testing of new weed killers; and devising new feeding methods. In summary, Agricultural Experiment Station technicians provide new technology of potential value to dairy farmers. But the new technology must first reach the farm audience, and that's where educational agencies come in.

The Extension Service and Vocational Agriculture - These are the two major agricultural education agencies on the Island. Their task is to diffuse and encourage use of useful and practical information related to agriculture. Like other educators, they aim to produce desirable changes in human behavior - changes in knowledge, attitude, and ability which will help people benefit from new research and adapt to changing conditions. Their work is carried on through personal visits, training meetings, field days, result demonstrations, and the mass communication. These agencies are responsible for developing favorable attitudes toward new technology. (34)

Availability of new technology and its diffusion among the farm population are important, but they are not enough. New programs have been implemented to make adoption feasible where it requires risks and high cost. Here the service agencies come into action.

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Agricultural Service Agencies - In Puerto Rico, various agencies operate helping to make rapid adoption of new technology feasible. Two of these agencies are providing assistance for the control and eradication of dairy diseases. Sponsored by the State and Federal Departments of Agriculture, programs such as Brucellosis, Tuberculosis, Mastitis, and Parasite control are actively operating on the Island. Veterinary services are provided, free of charge, to help dairy farmers eradicate and control contagious cattle diseases. Periodically, dairy herds are examined to detect cases of Brucellosis, Tuberculosis, Mastitis and internal parasites. Positive cases of Mastitis and/or internal parasites are treated. Positive reactors to the Tuberculin or Brucellosis tests are killed, and compensation is provided their owners. Furthermore, when positive reactors to the Brucellosis test are found, a systematic program of calfhood vaccination is carried on.

Another program sponsored by these two agencies since 1950 is the Pasture Improvement Program. It compensates dairy farmers who apply certain specific soil conservation practices. For example, transportation and purchase costs are paid for lime used to correct the soil acidity. Dairy farmers pay only for lime application.

The renewal of pastures with new varieties recommended by the Experiment Station is also covered by the Pasture Improvement Program. Again, the dairy farmer is compensated for doing this practice. The same kind of economic help is provided for use of fertilizers on pasture lands, construction of artificial lakes to assure water supplies for the cattle, and other soil conservation practices such as

contour farming, barriers to control soil erosion and pasture rotation.

Working in close coordination with the Department of Agriculture (Federal and State) is the Soil Conservation Service. This agency provides technical assistance for proper application of those practices. The Extension Service has the responsibility of creating good will among the dairy farmers towards the program. (35)

An artificial breeding program is operating to help farmers improve herd quality. The program is sponsored by the State Department of Agriculture, but the Extension Service, Vocational Agriculture and the Experiment Station are also deeply involved. This program actually operates through artificial breeding cooperatives organized in the Island.

The Department of Agriculture operates a Center where the semen is collected, frozen and distributed to the cooperatives. Extension and Vocational Agriculture technicians promote the program and create good will toward it; while the Experiment Station is responsible for the selection of top bulls. (36)

In practice, the artificial breeding program is a good example of well-coordinated effort towards a desired goal - improvement of the dairy industry. In 1962, the total number of cows artificially inseminated was 20,190, compared with 17,045 in 1961. (37) The number of head receiving the service went up 18% in that time.¹

The artificial breeding and pasture improvement programs have

¹No figures are available for the year 1963-64.

provided valuable assistance, but they cover only some aspects of the dairy business. Other important programs are related to mechanization; construction of silos, milking parlors and resting rooms; and importing high-quality dairy herds from Canada and the United States. These aspects of the business, although very important, represent a high expenditure to the farmers. And here is where the credit agencies operating on the Island are playing an important role.

The Farmers' Home Administration, the Production Credit Association, the Puerto Rican National Farm Loan Association and the Credit Division of the State Department of Agriculture provide long-term, low-interest credit to dairy farmers. All phases of the dairy business are covered by the credit facilities of these agencies.

As was stated previously, diffusion and adoption have been accelerated by the effective communication between change agents and dairy farmers. Such communication has involved a wide variety of communication channels.

Communication Facilities

Aware that personal communication is no longer sufficient, change agents have been making broader use of the press, radio, television, and other mass communication channels. Mass media may multiply agent effectiveness, reaching many more people and areas never touched before.

Because of the low percentage of illiteracy in Puerto Rico (11.4%) the printed page has been considered an excellent channel for the diffusion of farm information. Newspapers, farm magazines and

technical bulletins have been used intensively. Wide coverage justifies these efforts. For example, the Island is served by two large Spanish language newspapers - "El Imparcial," and "El Mundo." These papers distribute 160,000 copies daily, and carry international and local news, including information dealing with agriculture. (38) In addition to the agricultural information published in their daily editions, one of the newspapers, "El Imparcial," used to print a special page in its Saturday edition devoted entirely to the farm population. To reach the farm population directly, Puerto Rican agents of technological change have been using the facilities offered by such farm magazines as Cafeteros de Puerto Rico, Soagrigo and Impex. Although these magazines are concerned with a wide variety of farm topics, prominence is given to dairy information. To reach the dairy population as a special audience the Agricultural Extension Service has published El Boletin Ganadero, a monthly magazine, distributed by mail to the dairy farmer population.

Technical publications are also used. Serving the dairy farmers population are such specialized bulletins as Nuevos Conceptos para la Explotacion Ganadera, La Brucelosis o Aborto Contagioso, Orientando Sobre Inseminacion Artificial, Mayor Produccion con Mejores Practicas de Ordeno, Administracion y Cuido de Los Pastos, and La Crianza de Novillas Para Reemplazos. These technical bulletins are distributed via direct mail, in meetings and through other farm activities.

In addition to the printed channels, agents of technological change are using radio and television. Through one educational and 31 commercial radio stations, change agents have been serving the farm

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population with radio programs, farm news, and radio spots for many years. Wide coverage by this media merits its intensive use by agricultural agencies. On the Island, there are 383,000 radio sets, including 181,000 located in rural homes. One daily Extension-produced radio program is broadcast every day, from Monday through Friday, through a network of 12 stations. The Department of Agriculture also produces a daily 30 minute farm radio program for a network of 8 stations. In 1963, the combined number of broadcasts of these two programs totaled 480. These two programs are produced at the state level. Local county agents also use radio intensively. For example, in 1963, 389 farm radio programs were produced at the local level. In addition to full programs, the agricultural agencies send regular farm releases and radio spots. Last year, for example, 1569 radio releases and 76 radio spots concerned with farm issues were produced by the Extension Service.¹

Television is also available. Since its combination of sight, sound, and motion provides a close equivalent to face-to-face communication, its usefulness for diffusion of agricultural information is obvious. Today, there are 10 television stations in Puerto Rico. Of the 184,000 television homes, 52,000 are located in the rural areas. (38) Up to now the only agricultural agency using television facilities has been the Extension Service. It has been producing television farm programs and has been providing information and films, both newsreels

¹No figures are available about the number of radio releases and radio spots produced by other agricultural agencies.

and documentary, since TV started on the Island.²

What has been the role of these media in the diffusion and adoption of dairy farm technology? What has been their contribution to the present advanced position of the dairy industry? These are some of the empirical questions investigated in the present study.

Up to now we have been concerned with two of the three factors which most influenced our decision to use dairy farmers in this study - the rapid growth of the dairy industry during the last decade and the availability of a well-developed communications system operating in the dairy areas.

The third factor, as stated at the beginning of this chapter, was the availability of two adjacent regions, similar in typography, climate and in communication facilities, but different with respect to the general characteristics of the farmers and scale of operations.

The Setting

The study was conducted in two of the major dairy areas of Puerto Rico - the Northeastern and the Northern regions. The Northeastern region comprises 8 municipalities - Bayamon, Vega Alta, Vega Baja, El Dorado, Toa Alta, Toa Baja, Buaynabo and Corozal. The total dairy farmer population in this region is 76. The Northern region comprises 4

²Television stations initiated their operations in Puerto Rico during the year 1952. Two stations, WKAQ-TV, Channel 6, and WAPA-TV, Channel 4, were the pioneers.

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municipalities - Arecibo, Hatillo, Camuy and Manati with a population of 173 dairy farmers. For both areas, the total number of dairy farmers is 249. This represents 38% of the Island's total dairy farmer population. Their importance as milk producing areas is emphasized by the fact that they produce 35% of the total annual milk production in Puerto Rico. The figures at hand show that the Island's annual total milk production is 206.5 million quarts and that 73.8 million quarts (about 35%) are produced in these regions. The data also show that of a total acreage of 129,291 acres being used in the dairy business, 44,388 acres are being used by the dairy farmers of these regions. This represents 34.3% of the total acreage devoted to dairy. (39)

The dairy business in both areas is characterized by a high degree of mechanization. It is estimated that 95% of the dairy farms possess milking machines, 50% of them tractors and other equipment necessary for the efficient operation of the dairy business.

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Picture No. 1. - Mechanization



This picture shows the kind of mechanization usually found in the dairy areas of Puerto Rico.

The quality of the dairy herd is very high. This is demonstrated by the fact that the average production per cow, per year, is 5,000

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quarts of milk with an average daily production of 16 quarts.¹ The most common breed in the dairy farms in these regions is the Holstein Freisian, although Guernsey, Jersey and Brown Swiss breeds have been introduced on the Island during the last few years.

Picture No. 2.
Holstein Freisian is the most common breed on the Island.



Typical dairy herd in the areas studied.

In both areas two important programs are operating at full capacity - the pasture improvement program which provides a compensation

¹These figures are from the dairies working under the DHIA records program.

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Climate and Soils

The two areas investigated are also similar in climate and soils. Both regions are located in the low-lands of the coast near the capital city of San Juan. The soils are generally fertile, usually of a sandy clay loam type with good drainage. The temperatures range from 74.4° F during the winter to 80.1° F during the summer, averaging 77.2° F for the year. The rainfall is very well distributed during the year with no specific rainy or dry seasons. The average rainfall is 86.5 inches. No irrigation is needed in these areas. The water supply for the dairy herds comes mainly from 4 rivers - Grande de Arecibo, Manati, Toa, and Bayamon - from water streams that pass across dairy farms, and from artificial lakes constructed by the farmers.³

Communication Facilities

Both regions are connected by a network of paved roads with

¹The pasture improvement program compensates the dairy farmers for the use of new innovations such as - pasture renewal with new varieties, liming, the use of fertilizers, pasture rotation, etc.

²The artificial breeding program has been operating since 1952 on a cooperative basis. The semen is supplied to the farmers by the Artificial Breeding Center of the State Department of Agriculture.

³Under the pasture improvement program farmers receive compensation for building water supplies for their cattle.

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adequate transportation facilities (buses, public transportation, and automobiles). In addition a highway which connects the capital city with the rest of the Island passes across these regions. The rural areas are easily reached by automobile or other transportation through a very well-developed system of rural roads (usually paved).

The dairy farms are usually located near roads, a situation that facilitates the mobility of the dairy farmers and the interaction with people living beyond their community boundaries. The well-developed network of roads existing in these areas has contributed to the rapid growth of the dairy industry.

Mass communication channels are also widespread among these farmers. Newspapers, farm magazines and other printed matter reaches the farm population. Furthermore, radio and television sets are very common in the homes. Availability of these channels of mass communication has been facilitated by the high standard of living and low rate of illiteracy. The data available show that the average gross income per year, per farmer, for both areas is \$49,993; that 98% of the dairy farmers know how to read and write; that 99% of the dairy farmers' homes have electricity and running water.

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Picture No. 3
Standards of living of Puerto Rican dairy farmers.



The photo shows the house of Don Jesus Deraza Toledo, one of the farmers interviewed. His farm has 60 acres and is located in the municipality of Hatillo.

Difference Among Regions

While the previous sections suggest the two populations are basically similar, they do have noticeable differences.

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One important difference is the scale of their operations. The Northeastern region is characterized by big farms, a large number of acres devoted specifically to the dairy business, large numbers of dairy cattle and a large volume of milk production. The Northern region, on the contrary, is characterized by small farms, small dairy herds and a lower volume of milk production. Number of acres per dairy farm is much smaller in the Northern region than in the Northeast. The average in the Northeastern region is 3 1/2 times bigger, devotes 4 times more land to the dairy business, possesses 2 1/2 times more cattle and produces twice as much milk as the average farm of the Northern region. The figures in Table 1 clearly show the big difference in the scale of operations of the two populations studied. (34)

TABLE 1.--Mean differences, in scale operations
among regions.

	Region I (Northern)	Region II (Northeastern)	Difference
Mean total number of acres per farm	72.67	253.19	180.52
Mean total number of acres devoted to dairy farming per farm	61.10	235.19	174.09
Mean size of the dairy herds per farm	90.96	232.86	141.90
Mean production of milk per farm per day (in thousands of quarts)	4.13	8.79	4.66

Picture No. 4
Region II - Dairy Farm



Typical dairy farm in the Northeastern region of Puerto Rico.
The photo shows the high degree of mechanization due to the
scale of the operations.

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Picture No. 5
Region I - Dairy Farm



Typical farm in the Northern region of Puerto Rico. Although well mechanized, their small scale of operations puts limits to the degree of mechanization in the farm operations.

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The data show that, in proportion to the number of farm operators, the Northeastern region produces much more milk than the Northern. Table 2 clearly shows the economic importance of the two regions as milk producing areas and how they compare with each other with respect to milk production.

TABLE 2.--Economic importance of the two regions as milk producing areas.

	Region I (Northern)	Region II (Northeastern)	Difference
Total number of farmers operating dairy farms	183	76	107
Million quarts of milk delivered annually to the processing plants	43.7	30.1	13.6
Proportion of milk produced by regions to the total milk production in Puerto Rico	21.82%	19.53%	2.40%

On the average, the dairy farmers of the Northeastern region have very high standards of living, with an average gross income of \$68,230 per farm per year. The dominant type of farmer operating in the area is a gentleman farmer (i.e., someone who lives off of the farm, usually at the outskirts of the urban centers). Such farms are operated on a large-scale basis under the direct control of an administrator. The use of hired labor for the normal operations of the business is high. Because

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the majority of the farmers live outside of their farms, their participation in local agricultural activities is low. However, at the state level, they are usually active and influential in agricultural activities.

Normally they are up to date in knowledge about new technology, getting their information directly from the research centers. They have the largest experience, among the Puerto Rican dairy farmers, in the operation of first-class dairy farms.

The situation in the Northern region is quite different. Dairy-men here are generally former sugar cane farmers who shifted to dairying quite recently. The shift from sugar cane to dairying really began in 1950. On the average, these operate on a smaller scale. Their average annual gross income per farm is \$31,757, compared to \$68,230 in the Northeastern region. Unlike the Northeastern farmers, they usually live on their farms and operate their businesses personally. The use of hired labor is very low and most of the farm operation is carried on by family members.

Unlike the Northeastern farmers, the Northern farmers are very active in local agricultural activities and local organizations, but not in state activities. Their contacts with agents of technological change are frequent. They are generally considered excellent co-operators by the extension people.

Another difference between the two populations studied is in their educational levels. Average number of years in school is 10.44 for the Northeastern region, 7.8 for the North (a difference of 2 1/2 years). In the Northeastern region, one frequently finds dairy

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farmers with professional degrees, but not in the Northern area.

Another difference between these two populations is in their ethnic origin. Although both populations have a Spanish origin, the dairy farmers from the Northeastern region descend from Spaniards coming from the mainland, while the dairy farmers of the Northern region are descendants from Spaniards coming from the Canary Islands. Canary Island descendants are all concentrated in the Northern region of Puerto Rico. They represent a sub-culture within the Puerto Rican society and are known by the nickname of "Islenos."

In summary, the two populations studied differ from each other with respect to their scales of operations, experience in dairy farming, educational levels and ethnic origin.

This chapter has discussed the general situation in which the present investigation was conducted. Emphasis was given to the economic development of the dairy industry in the Island, especially in the two areas studied; special attention was given to their existing communications systems and to the availability of two adjacent areas similar in many respects, but exhibiting noticeable differences in other respects relevant to our study.

The next chapter will be concerned with the methodology used by the investigator in testing his hypotheses.

CHAPTER V

METHODOLOGY

The Procedure

The study was divided into five major parts to facilitate the collection of data, its processing and its analysis.

Part I was concerned with the investigation of intra-cultural variations in value orientations among Puerto Rican dairy farmers. Here, the researcher faced his first methodological problem--how one can investigate intra-cultural variations in value orientations accurately and fruitfully. Q-analysis appeared best fitted for that purpose.

What is Q-analysis? What is its use for studying intra-cultural variations in value orientations?

Q-Technique

The Q-technique, as developed by Stephenson, provides a researcher with a systematic way for examining a person's ideas, beliefs, notions, values or wishes. (40) The investigator is concerned with the ways a person sorts "a sample of self referent statements, art objects, descriptions of behavior, personality traits and the like".¹

¹M. S. MacLean & A. L. Kao, "Picture Selection: An Editorial Game," *Journalism Quarterly*, 39:2, Spring, 1963

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In the application of these techniques a respondent is asked to sort a deck of cards, which have items printed on them, into a specific number of rank piles in a modified normal distribution. The sorting is done on the basis of some criterion, (for example, agree-disagree, like-dislike). The basic idea is that the respondent sort the statements in a flattened normal distribution according to his rank order of preference for them. The card statement is weighted for each sort according to the scale score of placement.¹

A matrix of intercorrelations is formed by correlating every person's sort of items with every other person's sort of items. This matrix of intercorrelations is submitted to factor analysis. Here, the persons are the variables and the items the observations. The first factor analysis produces a principal axis solution. Such a solution is not always easy to interpret. To facilitate interpretation, these principal axis factors are submitted to varimax rotation. The varimax rotation produces orthogonal factors as close as possible to simple structure. That is, each variable loads maximally on one factor but not on others. On this basis, a factor represents a grouping of persons around a common pattern of sorting the items. Hence, a factor represents a type of person.²

¹S. Marsh, Q-Technique: An Advance in Idiodynamics, East Lansing, Michigan: Communications Research Center, Michigan State University, Dec., 1963.

²M. S. MacLean, T. Danbury & A. Talbott, Civil Defense Belief Patterns: Technical Summary, East Lansing, Michigan: Communications Research Center, MSU, 1964.

After the rotated factors are obtained, each pattern of sorting the items associated with each factor or type of person is estimated. This is done by weighting each item response for each of the persons most highly associated with a given factor by the degree to which that person is loaded on that factor. The higher a person's loading on a factor, the greater the weight. These weighted responses are summed across each item separately which produces an item array of averaged weighted responses for each factor. (41) The weighted scores are then converted into Z-scores. The items are ordered from highest positive Z-scores to highest negative Z-score - from most accepted to most rejected for each factor. This provides a hierarchy of item acceptance for each factor or type of person. Finally, the item Z-scores are compared by subtraction for each pair of factors. This provides the basis for differentiating one factor or type of person from another.¹ After the factor analysis is completed, analysis of variance of the factor arrays is performed in order to provide a systematic examination of the differences among various clusters of items in each of the factor arrays.

In summary, the Q-technique was considered best fitted for this investigation because it provided the bases for segmenting people into types according to common characteristics as demonstrated by their Q-sorts. The factors represented the types of dairy farmers who provided similar Q-sorts and gave similar descriptions of themselves, in terms of their reactions to the Q-sample of value statements to which they

¹M. S. MacLean, op. cit., p. 73

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were exposed. This technique allowed segmenting of the dairy farmers into types according to intra-cultural variations in value orientations. It was also possible to look at how these different typologies varied with respect to their communication channel orientations, their predispositions toward technological change, and their social behavior.

Construction of the Instrument

Four value orientation areas and three alternatives or value directions for each area were defined as the universe of statements from which the Q-sample was selected. These areas were: (1) Man-nature orientation - subjugated to, harmony with, master over nature; (2) Time orientation - past, present, future; (3) Activity orientation - being, being in becoming, doing; (4) Relational orientation - lineal, collateral, individual.

To find out the clusters or types of farmers operating in Puerto Rico, a Q-sample of 48 value statements was finally constructed - 12 for each value area and four for each value direction.¹ The instrument was quite similar to the one used by Kluckhohn and Strodtbeck (1961) (2) in 5 New Mexican communities. However, after pre-testing with 22 eastern Puerto Rican dairy farmers, many value items were modified to improve validity and reliability within the Puerto Rican context.

¹A value area is defined for the purpose of the study as the orientation of the farmer, let's say, Time, Relational, Activity, Man-Nature; value direction is defined as the rank order of preference for one of the alternatives presented, i.e., in the case of Time - present, past or future.

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The final instrument posed different problem situations and three alternative solutions for each one of them. By sorting the statements according to his own view as to best solution for the problem posed, the dairy farmer classified himself in terms of dominant value orientations. One example is the following:

Time Orientation

A. Problem situation - child training

Q-statements constructed:

- (Past) 1. Children should be taught the traditions of the past (the ways of old people). I believe that the old ways are the best, and that it is when children do not follow them that things go wrong.
- (Pres.) 2. Children should be taught some of the old traditions (ways of the old people), but it is wrong to insist that they stick to these ways. I believe that it is necessary for children always to learn about and take on whatever of the new ways will best help them get along in the world today.
- (Fut.) 3. In raising children I do not believe they should be taught much about past traditions. I believe that the world goes along best when children are taught the things that will make them want to find out for themselves new and better ways of doing things to replace the past.

The same pattern of items' construction was followed across the four value value areas studied.

The Sorting Distribution

After the completion of the value instrument, the next task was to construct the scale of the Q-value statements distribution and to prepare the instructions for the Q-sort of statements. An 11-point

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scale ranging from "agree least" to "agree most" was constructed.

Q-sort Scale

Agree least 1 2 3 4 5 6 7 8 9 10 11 Agree most

The sample size (N=48) of the value statements to be sorted by the respondents called for the following flattened normal distribution of the Q-scores:

Q-distribution¹

Frequency	2	3	4	6	6	6	6	6	4	3	2
Pile	1	2	3	4	5	6	7	8	9	10	11
	Agree least								Agree most		

Instructions called for evaluating the 48 value statements by sorting them into 11 piles ranging from those with which the farmer agrees least to those with which he agrees most.²

Data Processing and Analysis

As was stated previously, the total dairy-farmer population of two major dairy areas from Puerto Rico was studied. Region I (Northern) posed one problem - it was too big (165 dairy farmers) for the capacity of the present factor analysis computer program. The problem was solved by dividing the total population into two samples randomly selected - Sample I with N=83 dairy farmers, Sample II with N=82 dairy farmers.

¹This distribution of the Q-statements along the scale was suggested by Thomas Danbury of the Communications Research Center, Michigan State University.

²The instructions for the Q-sort of value statements are included in Appendix A (Spanish and English versions).

Region II, with only 68 dairy farmers, was used as a whole unit of analysis.

The analytic model called for the following statistical operations:

1. Q-sort factor analysis of Sample - I, Region - I.
2. Q-sort factor analysis of Sample - II, Region - I.
3. Q-sort factor analysis of Region - II.
4. Q-sort factor analysis of the factor arrays of Samples I and II. The purpose of this analysis was to summarize the typologies for Region I.
5. Q-sort factor analysis of factor arrays of Samples I and II (Region - I) and factor arrays of Region II. The purpose was to summarize the typologies for the total population studied.
6. Analysis of variance of factor arrays of Sample I. (Factorial design - 4 x 3 x 4 levels.)
7. Analysis of variance of factor arrays of Sample II. (Factorial design - 4 x 3 x 4 levels.)
8. Analysis of variance of overall factor arrays for Region I (Factorial design - 4 x 3 x 4 levels.)
9. Analysis of variance of factor arrays for Region II. (Factorial design - 4 x 3 x 4 levels.)
10. Analysis of variance for the two combined regions. (Factorial design - 4 x 3 x 4 levels.)

These analyses provided the bases for segmenting the dairy-farmer populations studied into clusters or typologies according to the rank order of preference for the four value orientations. The analyses provided information about consensual value orientations of the dairy farmers within and among regions; about the value orientations directions most accepted and most rejected by the different clusters of farmers within and among regions; about the value orientations directions on which

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some typologies agreed more than others within and among regions. In other words, through these analyses the researcher was able to separate the dairy farmers into clusters according to their value orientations and to relate values to diffusion and adoption of dairy farm innovations.

To study the relationship between value systems, diffusion and adoption of dairy innovations, scores were produced for each value area and each value direction. The scoring procedure was based on weights assigned to value directions ranging from -1 for those favoring traditional orientations to +1 for those favoring progressive orientations. By multiplying the sort distribution scores by the assigned weight to each direction, one was able to produce the scores on the total value orientations for each dairy farmer.

For example, let us present one of the different problems posed to the farmers in the Q-statements - how they perceive the changes occurring in the world of today. Here the dairy farmers were presented with three different ways of perceiving these changes; one favoring the old ways of living and against the changes occurring in the world; the other favoring the status-quo, that is, favoring the old ways of living but accepting the changes occurring in the world as something inevitable that have to be accepted; the other taking a stand highly favoring these changes as something which will be for the benefit of the society. To produce the value scores the following operation was followed:

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<u>Time</u>	<u>Weight</u>	<u>x Q-sort distri- bution scores</u>	<u>= total value orientation score</u>
A. Past - t_3	-1	_____	_____
B. Present - t_2	0	_____	_____
C. Future - t_1	+1	_____	_____
Total time orientation score (TiO)			<u>C - A</u>

Through this procedure it was possible to produce a set of scores for each value area, for each value level, and for the total value orientation of the respondents.

As the reader will notice, the value scores were a combination of a weighting scheme, ranging from -1 to +1, and the Q-sort distribution scale. In this scale, as was stated previously, the score for each respondent is the location of the Q-value statements on the scale. By this combination, a reliable score on value orientations was produced for each farmer participating in the study.

To facilitate the interpretation of the scoring procedure, let us use a hypothetical case, e.g., two dairy farmers, one with predominant orientations toward the future, the other predominantly oriented toward the past. They are asked to sort the value statements used in this study. The instrument provides 12 statements for each value area and 4 for each value direction. The scale asked for the following distribution:

Q-distribution scale

<u>Pile</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>	<u>10</u>	<u>11</u>
<u>Frequency</u>	2	3	4	6	6	6	6	6	4	3	2

Let us suppose that the future oriented farmer places all the 4 value

statements denoting a forward view at the extreme right of the Q-scale. He also places all the items with a traditional view of the world at the extreme left. He will get a maximum score of 42.

Example -	<u>Agree most</u>	<u>Agree least</u>
	$2 \times 11 = 22$	$2 \times 1 = 2$
	$2 \times 10 = 20$	$2 \times 2 = 4$
	Score = $\overline{42}$	Score = $\overline{6}$

The other farmer who is traditional oriented places the traditional items at the extreme right and the future items at the extreme left. He will also get a score of 42, but indicating a completely different direction in his orientation to time.

The weighting scheme allows the scoring of each value area. In the hypothetical case the maximum score for the future minded will be +36 and for the traditional -36.

Example - Traditional oriented

<u>Agree most</u>		<u>Agree least</u>		<u>Score</u>
-42	+	+6	=	-36

Future oriented

<u>Agree most</u>		<u>Agree least</u>		<u>Score</u>
+42	+	-6	=	+36

By the same procedure, scores on value levels and total value orientations were produced for each respondent, and the means and standard deviations were calculated. The value orientation indices constructed were the following:

Value

Time

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t_2 --

t_1 --

TiO --

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r_1 --

TRO --

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n_2 -- H

n_1 -- M

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Activity

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a_1 -- Do

TAO --

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Part II of this study was concerned with the investigation of the communication channel orientations of the Puerto Rican dairy farmers and their relationship with value orientations. Here the concern is with two phases of the communication channels approach:

- (1) The communication channel orientations from the point of view of whether the dairy farmers were egocentric, intra-community, extra-community or impersonal-channel oriented;
- (2) How near or far the dairy farmers were in their channel orientations. The two phases were studied in both the awareness and the interest stages of the adoption process.

Channel Orientations - Awareness Stage

Phase I, called from now on "The Deutschmann Channel Orientations Index (DCOI)", was constructed by taking into consideration the number of times a particular channel was used as a source of first knowledge about a new dairy practice and by whether or not the recipient of the information saw a demonstration. The weighting scheme assigned to each one of the categories under the "Deutschmann Channel Orientations Index" was as follows:

- 0 = Egocentric Channel Oriented
- 1 = Intra-community Channel Oriented
- 2 = Extra-community Channel Oriented
- 3 = Impersonal Channel Oriented

By using this weighting scheme as frame of reference, the Deutschmann Channel Orientation Index was constructed:

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- 0 = if the source of first knowledge was through a demonstration in his own barrio.
- 1 = if the first source was in his own barrio but not through a demonstration.
- 2 = either first source was from a contiguous barrio without a demonstration, or the first source was from another place whether or not a demonstration was presented.
- 3 = first source was a mass media channel.

Phase II, called from now on "Near-Far Channel Orientations Index," (N-FCOI) took into consideration the number of times a particular channel was used as a source of first knowledge of a dairy farm practice. But here, no attention was given to whether or not the source presented a demonstration. The dairy farmers were classified along a scale ranging from 1 to 4 according to the source of first knowledge mentioned. The assigned weighting scheme and the index constructed was as follows:

- 1 = Intra-community (nearest) - first source mentioned was from own barrio.
- 2 = Extra-community near - first source mentioned was from a contiguous barrio.
- 3 = Extra-community far - first source mentioned was from another place.
- 4 = Impersonal (farthest) - first source mentioned was from one of the media channels.

To study Deutschmann's Channel Orientations and the Near-Far Channel Orientations of the Puerto Rican dairy farmers, 10 dairy farm practices were used as a frame of reference: 1) pasture rotation, 2) pasture renewal, 3) use of fertilizers, 4) use of weed killers, 5) insecticides, 6) salt stations or mineral supplements, 7) artificial breeding, 8) prevention and control of internal parasites, 9) silage, and 10) farm records.

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Scores were produced across the ten practices for each respondent (dairy farmer) interviewed. For the collection of the data the following instrument was constructed:

Instrument

1. Have you ever heard about _____? () Yes () No
2. How did you know or how did you obtain for first time information about _____?
 - a. () from a person () from an impersonal source

For those farmers who answered that their source of first knowledge was a personal source, questions similar to the following ones were constructed.

1. The source from whom you heard about the practice was from....
 - a. () Your barrio? () Contiguous barrio? () Other Place?
2. Did he make a demonstration?
 - a. () Yes () No

For those farmers who said that they heard first about the practice in the mass media, the following question was used:

1. From which one of the following mass media channels did you hear about the practice the first time?
 - a. () Radio, () TV, () Newspaper, () Tech. Bulletin,
() Farm Magazine, () Other

Through these questions, the researcher expected to obtain scores on dairy-farmer channel orientations during the awareness stage. These scores were needed for correlational purposes with the other variables being investigated.

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Communication Channel Orientations - Interest Stage

At this stage of the adoption process, again, the two phases of channel orientation were studied. Phase I (Deutschmann Channel Orientation) was indexed by taking into consideration the number of times a farmer mentioned a particular channel as a source of information during the interest stage and whether or not he saw a demonstration. The same 10 dairy practices were used as frame of reference. Departing from this premise, the criteria for indexing the dairy farmers channel orientation during the interest stage were established. The weighting scheme and index finally constructed were the following:

Deutschmann Channel Orientation Index - Weighting Scheme

- 0 = Egocentric = If a person saw a demonstration in his own barrio and obtained no information from other places or the mass media.
- 1 = Intra-community = If during the information seeking stage of the adoption process, he got the information from a personal source in his home or in his own barrio. The farmer was not presented with a demonstration.
- 2 = Extra-community = If during the information seeking stage, the farmer mentioned a personal source from a contiguous barrio or other places and no demonstration was presented to him.
- 3 = Impersonal = If during the information seeking stage the farmer mentioned mass media as the channel of information used.

If a subject was not egocentric he was placed in one of the other categories on the basis of the source with the highest frequency of use.

The Near-Far channel orientations of the Puerto Rican dairy farmers were indexed, during the interest stage, by taking into consideration the number of times a dairy farmer mentioned a particular channel.

Here, the criterion of whether or not a farmer saw a demonstration was not applicable. Again, the same 10 farm practices were used as frame of reference. The Near-Far channel orientations were indexed as follows:

Near-Far Index - Weighting Scheme

- | | |
|---------------------------------|--|
| 1 = Intra-community (nearest) = | If additional information about the practice was obtained from his home or his own barrio. |
| 2 = Extra-community near = | If additional information about the practice was obtained from a contiguous barrio. |
| 3 = Extra-community far = | If additional information was obtained from a source at other place. |
| 4 = Impersonal (farthest) = | If additional information was obtained from one of the mass media channels. |

The Instrument - English Version

To collect the data about the channel orientations of the dairy farmers during the interest stage, the following questions were constructed:

1. After the first contact, did you hear, read or see some additional information about _____?

a. () Yes () No

For the farmers who answered yes to the preceding question the next question asked them was:

2. How much information did you get from the following sources...
(check mark in columns)

A. Personal Sources	Much	Some	A Little	Nothing
Your home				
Your community				
A contiguous barrio				
Other place				

B. Impersonal Sources
1. Radio
2. TV
3. Newspapers
4. Farm magazines
5. Technical publications
6. Others

3. After the first contact, did you see a farmer doing _____
on his farm?

4. Is he a resident of ...

a. () Your barrio, () Contiguous barrio, () Other place

Through these questions the data on the communication channel orientations of the Puerto Rican dairy farmers was obtained and scores produced.

Statistical Analysis

The analytical tool used in this investigation was simple correlation. Simple correlations were used to find out the relationship between value orientations of the dairy farmers and their communication channel orientations.

Part III - Here the researcher was interested in the study of the concept of innovativeness and its relationship with value and communication channel orientations. The same 10 practices mentioned previously were used. These dairy practices were selected because they covered a wide range of time availability and because they all seemed to differentiate the dairy farmers as far as acceptance was concerned.

For comparative purposes, seven phases related to the adoption process of dairy farmers, both within and among regions, were studied. These were: (1) time of awareness, (2) time of adoption, (3) rate of adoption, (4) degree of adoption, (5) total adoption scores (total number of practices adopted), (6) disadoption, and (7) the five stages concept of the adoption process. By studying these variables, one could predict the dairy farmers' tendencies toward adoption. And by relating them with value and communication channel orientations, one could explain not adoption per se, but the reasons for adoption.

Time of Awareness

Time of awareness was the first variable studied. It showed how the 10 practices studied were spread among the two dairy populations investigated. The variable reflected time of awareness for individual practices and averaged across the 10 practices. To measure time of awareness, two indices were constructed.

The Indices:

Scores

1. Time of awareness for individual practice (raw scores)	= Number of years ago the farmer heard about the practice	00 + actual No. of years ago
2. Average time of awareness across 10 practices (raw scores)	= $\frac{\text{Number of years ago the farmer heard about } X \text{ practices}}{\text{No. of practices he heard about}}$	00.0 + average No. of years

This phase of the study was covered by the following questions:

English Version

1. Have you seen, read or heard about _____? () Yes () No
2. When did you see, read or hear about _____?
(_____)
year, month or data recalled

Time of Adoption

The second phase was concerned with the time of adoption. Here the researcher was interested in getting information about how long it takes a person to adopt an innovation from the time he first heard about it to the time he finally adopted it. To measure time of adoption two indices were constructed.

The Indices:

Scores

- | | | |
|--|--|--------------------------------|
| 1. Time of adoption for individual practice (raw scores) | = No. of years ago he adopted a practice | 00 + - actual No. of years ago |
| 2. Average time of adoption across 10 practices (raw scores) | = No. of years ago he adopted X number of practices
<u>No. of practices adopted</u> | 00.0 + |

To collect the data needed to measure time of adoption the following questions were constructed:

1. Have you ever used _____? () Yes () No
2. When did you use _____ for the first time?

The same questions were used across the 10 practices studied.

Rate of Adoption

One important aspect of diffusion and adoption is the readiness to adopt. As has been demonstrated by diffusion researchers, some

farmers are more prone than others to adopt farm innovations. For agents of technological change it is very important to know who are the early adopters and who are the late adopters in any community. The Puerto Rican study investigated rate of dairy-practice adoption plus the reasons for observed differences in adoption rate. We attempted to investigate the relationships between value and communication channel orientations on the one hand and rate of adoption on the other. To measure the rate of adoption, the first step was to construct indices for individual practices and then to construct average indices across the 10 practices. The rate of adoption indices were derived from the time of awareness and time of adoption scores.

The Indices:

			<u>Score</u>
1. Rate of adoption for individual practice	$= \frac{\text{Adoption time of a practice}}{\text{Awareness time of a practice}} \times 100$	000 - 100	
2. Average rate of adoption across 10 practices (raw scores)	$= \frac{\text{Average adoption time}}{\text{Average awareness time}} \times 100$	000.0 - 100	

Degree of Adoption and Total Number of Practices Adopted

To measure the degree of adoption and the number of practices adopted by the Puerto Rican dairy farmers the following scales were constructed:

1. 0 _____ 1 0 = no adoption; 1 = full adoption (100%)
2. No adoption 0 .1 .2 .3 .4 .5 .6 .7 .8 .9 1.0

Full
Adoption

The indices for each individual practice were the following:

1. Pasture Rotation Index

Ratio -
$$\frac{\text{Total number of acres where rotation is currently practiced}}{\text{Total number of acres of pasture lands in use}} \times 100$$

2. Fertilizers Index

Ratio -
$$\frac{\text{Total number of acres fertilized or being fertilized}}{\text{Total number of acres of pasture land or forage crops currently in use}} \times 100$$

3. Pasture Renewal Index

Ratio -
$$\frac{\text{Total number of acres of pastures renewed or currently under renewal}}{\text{Total number of acres of pasture lands or forage crops in use}}$$

4. Weed Control Index

Use = 100%; Not used = 0 adoption

5. Insect Control Index

Use = 100%; Not used = 0 adoption

6. Salt Stations or Mineral Supplements Index

Use = 100%; Not used = 0 adoption

7. Artificial Breeding Index

Ratio -
$$\frac{\text{Total cow population inseminated by artificial methods}}{\text{Total cow population inseminated during the year}} \times 100$$

8. Internal Parasites Control Index

0 = no treatment at all; .5 (50%) treatment of infested animals - no preventive measures; 1.00 (100%) treatment of infested animals + preventive measures. The product used as frame of reference was fenotiacine.

9. Use of Silage Index

0 = not use it; 1.00 = 100% adoption

10. Keeping Records Index

Keeping either one of the following dairy farm records - WDAM - Weigh-A-Day-A-Month or DHIA - Dairy Herd Improvement Association.

Average adoption and degree of adoption scores were produced through

indices derived from individual practices. The average adoption and degree of adoption indices constructed were the following:

1. Average Adoption Index Raw Scores
$$\frac{\text{Ratio - Total No. of practices adopted}}{10} \times 100 \quad 000.0 - 100.0$$
2. Total Degree of Adoption
$$\frac{\text{Ratio - Total degree of adoption score}}{\text{Total No. of practices adopted}} \times 100 \quad 000.0 - 100.0$$

To collect the data from which the scores were going to be produced the following questions were constructed; For the 10 Practices -

English Version

1. If you have used _____, have you continued using _____ in your farm?
2. How many (e.g. acres of pasture land or forage crops) have you (e.g. fertilized)?

Participation in Adoption Stages

The last phase of the adoption process studied was the participation of the Puerto Rican dairy farmers in the different stages of the adoption process. The main object here was to study the relationship between value orientations and communication channel orientations on the one hand and the tendency to follow all adoption stages or skip some of them on the other. To produce the scores necessary for

analytical purposes the following indices were constructed:

1. Participation in Adoption Stages
for Individual Practices - Index

The number of stages in which the dairy farmers participated for each individual practice.

2. Participation Profile Across
10 Practices - Index

The mean number of stages in which the farmer participated across 10 practices.

To collect the data about the farmers' participation in the different stages of the adoption process the following questions were constructed:

1. After the first knowledge about the practice...did you adopt without seeking for additional information about _____? () Yes () No
2. Did you continue seeking information about _____? () Yes () No
3. After reaching your final decision to adopt _____, did you try it first on a small basis or did you adopt it on a full-scale basis?

() Try it first () Adopt on full-scale basis

Analytical Procedure

Simple correlation was used to analyze the relationship between communication channel orientations, value orientations and the different phases of the adoption process. The statements constructed for collecting data on this phase of the present study were submitted to Guttman Scale analysis to test homogeneity of the instrument.

Part IV was concerned with the frequency of exposure of Puerto Rican dairy farmers to mass media.

Mass Media

Degree of exposure during a given time period was obtained for the following channels: 1) radio, 2) television, 3) newspapers, 4) farm magazines, and 5) technical bulletins. Media exposure was measured in two ways -- 1) overall exposure to a particular channel, 2) overall exposure to all channels.

Radio - Three sources were used for investigating radio listening habits - 1) Actualidad Agricola, number of days listened to it during a week, 2) other radio farm programs, number of days listened to any of them during a week, 3) radio farm releases, number of days listening to radio farm releases during a week.

General Exposure Index to Radio = Number of days listened to
the three (3) radio sources
past week.

Television - Two sources were used as frame of reference to test dairy farmers' frequency of exposure to television - Panorama Agricola, a TV farm news program produced by the Agricultural Extension Service and telecasted once a week; exposure to any kind of information related to agriculture presented during a week on TV.

General Exposure Index to Television = Number of times the dairy
farmer used two (2) tele-
vision sources.

Newspapers - Three newspaper sources were used to measure frequency of exposure to this medium - La Pagina Agricola - a page dealing with farm matters and published once a week by El Imparcial, one of the papers with largest circulation in Puerto Rico; any kind of farm information read in El Imparcial during a week; any kind of information read in El Mundo and dealing with farm matters during a week.

General Press Exposure Index = Number of issues read of three
(3) newspaper sources.

Farm Magazines - Exposure to farm magazines was measured by the number of times a dairy farmer read one of the following monthly farm magazines during a period of three (3) months - Cafeteros de Puerto Rico, Soagrico, Impex, El Boletin Ganadero. Three of these magazines are published by private enterprise, the other one, El Boletin Ganadero, is published by the Agricultural Extension Service.

General Farm Magazines Exposure Index = Number of issues read
of four (4) magazines
in last three months.

Technical Publications - Here the following technical bulletins were used as a frame of reference - Nuevos Conceptos Para La Explotacion Ganadera En Puerto Rico, La Brucelosis o Aborto Contagioso, Orientando Sobre Inseminacion Artificial, Mayor Produccion Con Mejores Practicas de Ordeno, Administracion y Cuido de los Pastos and La Crianza de Novillas Para Reemplazo. These bulletins were selected because they are concerned with the practices under study and have been available to the farmers for some time. Each bulletin received a score of one (1) and frequency of exposure to technical bulletins was measured as follows:

General Technical Bulletin Exposure Index = Frequency of non-zero codes in each of the columns indicating a bulletin - number of bulletins exposed to.

To collect the data, questions like the following were constructed:

1. Did you listen to _____ during the last week? () Yes () No

2. Would you tell me which of the _____ you listened?

- a. () Monday, () Tuesday, () Wednesday, () Thursday,
() Friday.

3. Did you read during _____?

Questions like these were used to find out the frequency of exposure to each one of the media channels investigated.

To measure the overall exposure to mass media the scores for each one of the channels studied were added. By this procedure, the researcher was in a position to get information about overall exposure.

General Media Exposure Index = Scores on radio + TV + newspaper +
farm magazines + technical bulletins.

Statistical Analysis

The analytical tool used here was simple correlation. This measure of correlation was used to predict the relationship of exposure to mass media with value and communication channel orientations.

Part V was concerned with dairy farmers' social relationships. Data dealt with advice givers, advice seekers, community cliques and interaction among the dairy farmers of both regions. A dairy farmer's social behavior was measured so as to reflect his own perception on such matters as advice seeking and advice giving.

Also, membership in farm organizations was studied. Indices constructed to measure the dairy farmer's social behavior were the following:

- Belonging to Organizations = Total number of farm organizations in which the subject is an active member.
- Own Perception - Advice Seeking = Total number of farmers the subject mentioned asking for information about his farm problems.
- Own Perception - Advice Giving = Number of times the subject mentioned giving advice to other fellow farmers.

To collect data on such matters, subjects were asked to mention the farmers to whom they gave advice or from whom they received advice on some problem or problems related to dairying. Contacts during the last six months were used as frame of reference.

Data on belonging to organizations were collected by asking the respondents the number of organizations they belong to.

Statistical Analysis

As in the other parts of this investigation, the major analytical tool used was simple correlation.

One more aspect of the dairy farmers' social behavior was studied - the concept of opinion leadership. Dairy farmers were asked to mention farmers from whom they first heard about each of the 10 practices and the farmers who most influenced their decisions to adopt a given practice. Scores were produced across the 10 practices, and sociograms indicated the location of the gatekeepers and influentials.

Field Work

Pre-testing

The pre-testing to improve the instrument was carried out in Puerto Rico with a sample of 22 dairy farmers of the Eastern region. Six

Extension workers did the interviewing at this stage and recorded problems related to length of the questionnaire, clarity of the questions, reactions of the farmers, etc. Three weeks later, the questionnaires were back at the Communications Research Center of Michigan State University, with suggestions about needed changes. As a result of pre-testing, the value instrument was reduced from 60 to 48 items. All the items perceived by the farmers and interviewers as ambiguous were eliminated. The rest of the questionnaire was used as initially constructed. Apparently the questions were clear and meaningful for dairy farmers.

The Final Field Work

On June 15, 1963, the researcher flew back to his native land to plan and organize the field work. Two days after his arrival, a meeting with the Extension Director and his aids was held. The problem was discussed and its value for the Extension Service was explained. As a result of this meeting, county Extension agents were assigned to do the field work. However, there was one problem -- to avoid contamination of the data, the agents from the two regions could not interview. Agents from other places were assigned to the two regions during the interviewing period. Because many farmers, especially those of the Northeastern region, live outside their farms, the interviewers were authorized to move out of the areas to locate cases living outside of the farms. The 12 members of the interviewing team were trained for five consecutive days.

The first training session was devoted to explaining the purpose

of the study and discussing the questionnaire. The discussion dealt with the best ways to approach the farmers and our expectations of the job to be done.

The second and third training sessions were devoted to training specifically for the job. Each member of the team conducted a practice interview in front of the group. In one case he acted as interviewer and the researcher as the farmer; in the next case the roles were reversed. Then each one member of the team was asked to do an interview in a real situation with a real farmer under the supervision of the researcher. The last training session was devoted to preparing the



The researcher explaining the purpose of the study and discussing the questionnaire.

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After training, the field work was conducted. To accelerate the data collection and to detect any problem before it was too late, the researcher was constantly traveling with the interviewers. Each questionnaire was checked and when errors were detected, the interviewers were requested to visit the farmer again to collect the missing data. On September 5, the data collection task was completed.

Coding and Processing

The data were taken back to the Communications Research Center of Michigan State University where it was coded by people hired especially for that purpose. All the analysis was done at the Computer Center of Michigan State University.

This was the methodology used in this study. Our next chapter will report the findings.

CHAPTER VI

THE RESULTS

VALUE PATTERNS AMONG THE PUERTO RICAN DAIRY FARMERS

Value structuring of 233 dairy farmers from two major dairy areas of Puerto Rico was investigated. We expected to find three types of farmers: 1) a modern, progressive-oriented type, 2) a backward or traditional type, and 3) a transitional type sharing both the traditional and modern views of the world.

The dairy farmers were asked to rank 48 value statements into 11 piles ranging from those with which they agreed least to those with which they agreed most. The statements posed different alternatives for the solution of human problems. The resulting data were submitted to factor analysis.

Identifying the Types

Due to limitations of the computer program, the dairy farmers of Region I (Northern) were divided randomly into two samples - Sample I with 83 farmers, and Sample II with 82. The 68 farmers of Region II were within the computing capabilities of the program and were used as our third group. Each one of these groups was submitted to the following analyses:

1. After the sorting operation, a matrix of intercorrelations was formed for each group by correlating every person's sorting with every other person's sorting.

2. The correlation matrix for each individual group was submitted to factor analysis with persons as variables and statements as observations. For each group a principal axis solution was obtained. Each solution was submitted to varimax rotation and the following rotated factor solutions were obtained:

A. Region I - Sample I with N = 83, a 6-factor solution
Sample II with N = 82, a 6-factor solution

B. Region II - with an N = 68, a 4-factor solution

An item pattern associated with each one of the factors or types of persons in the three observed groups was estimated by weighting the individuals most highly associated with a given factor to the degree with which they loaded on that factor. These weights were applied to each item response and the weighted scores were then summed across all persons on each factor within each of the observed groups. This operation produced an item array of weighted statements of scores for each one of the 16 factors (types of persons) in each group. These 16 value-item arrays were converted into Z-scores and described the types of persons sharing common value systems in each observed group.

However, further analysis was needed to relate the types from the three groups and find out the characteristics of dairy farmers sharing common value patterns (considering the two regions together).

To do this, the 12 factor arrays from Region I and the 4 factor arrays from Region II again were submitted to factor analysis. By the same procedure discussed above an intercorrelation matrix of the factor arrays was formed, factor solutions were obtained, and a new set of factor arrays was produced and converted into Z-scores. Factor analysis of the factor arrays of the two combined regions yielded an adequate two-factor solution. It accounted for 42% of the variance. A more

complex solution accounted for little of the remaining variance.¹

This solution produced one pure factor (Factor I) and a bipolar factor (Factor II). Factor II indicated two types of dairy farmers with value patterns in opposite directions.

To compare and contrast the three types of dairy farmers present, the first step was to look at the consensus item array - items which provided the views shared by all three types. By observing respects in which these three types were alike, the researcher expected to get a cue as to dominant value patterns for the dairy farmer population as a whole.

The Consensus Item Array²

Consensus was present on 12 of the 48 value statements sorted. The Z-scores on the array were very low, ranging from a highest positive score of .28 to a highest negative score of -.23. Observation of the array suggested that consensus existed only on those items on which the three types of farmers seemed to have a neutral or indifferent attitude. This can be attributed to the condition of bipolarity present on Factor II.³ With a bipolar condition on one of the factors, consensus has to

¹See Appendix B - Factor Matrix for the Two-Factor Solution.

²See Consensus Item Array on Appendix B.

³A bipolar factor is one in which two types of persons are present on a factor - one with a value system opposite to the other.

be on those items less salient (less important) for the farmers.³

Of the four value areas studied, man-nature relationships accounted for more than its share of the consensual items. Seven out of 12 man-nature items were consensual with low Z-scores.

Observation of the array suggests that all the three types of farmers agree fairly well on the opinion that man is responsible for his own failures, but that natural forces also play important roles in human life. There is substantial agreement that the right way to live is to maintain harmony with natural processes that affect life. All the three types of farmers demonstrate some uncertainty as to whether their children will be better off, worse off or as well off as they (the parents) are at the present.

Also, the subjects seem to reject, although very slightly, the idea that it is best to divide capital from a family property inheritance so every member of the family gets his share.

The next step was a systematic examination of the differences among clusters of items on each of the arrays. This was done through the observation of the results of the analysis of variance to which the factor analytic data were submitted.

Type I - Progressive - Broad Value Emphases

No differences were detected among the four value areas on this type of person. However, strong differences were observed in the

⁴Consensus was defined as existing where the Z-scores for an item did not differ by more than a standard unit (1.000). When the Z-scores on each array differed by less than a standard unit, these scores for each item are summed across the three arrays and averaged. This produces the Z-score for each item in the consensus array.

three levels studied - traditional, transitional, progressive. Results suggest that this type of person is strongly oriented towards a progressive view of the world. However, when the individual levels within each area were observed, the data suggest that in the activity orientation he tends to deviate from his general pattern and to assume a middle range position -- he accepts hard work and achievement as something worth looking for, but he does not see any contradiction between accomplishing things and enjoying life occasionally.

As indicated by the data, Type I is a future-minded man. He believes in science. He prefers hard work and accomplishment as a way of life, but he likes to enjoy life occasionally. In this "enjoyment" orientation he tends to deviate, although only slightly, from the ideal type constructed in the value model.

Here are the most accepted and most rejected value items in the Type I Array:

TABLE 3*--Value items most accepted by Type I - progressive

Z-score	Item
1.93	In deciding how to vote in an election, I prefer to make my own decision independently and without regard for the opinion of other family members.
1.80	I prefer to work on my own, to be my own boss.
1.40	It seems to me that modern scientific discoveries such as antibiotics or preventive vaccines (e.g., Polio) constitute an effective way of increasing life span of man. By using modern scientific discoveries the average life span of human beings can be lengthened.

TABLE 3* - continued

Z-score	Item
1.31	Children should be taught some of the old traditions, but it is wrong to insist that they stick to these old ways. I believe that it is necessary for children always to learn about and take on whatever of the new ways will best help them get along in the world today.
1.20	What I care most about is accomplishing things. Getting things done just as well as or better than other people do them. I like to see results and think they are worth working for.
.92	I really expect my children to have more than I have had if they work hard and plan right. There are always good chances for people who try.

*The complete array included in Appendix B.

Relational Orientation - As is indicated by the above table, the Type I farmer likes above all to make his own decisions independently and without regard of the opinions of others. He prefers to work on his own and be his own boss. From his strong acceptance of these items, he seems to strongly resemble the individually-oriented man of our model.

Time Orientation - Here, Type I appears to be future-minded. He believes that those who plan ahead will have the best chance of being successful. While he seems happy with the present, he likes above all else to see the things moving forward. He also believes it's necessary for children to learn about and make the best of new approaches that will help them get along in the world of today. However, he does not seem to be against teaching children about the old ways of living.

Man-Nature Orientation - He is a man who accepts science as a means of achieving progress. He strongly believes that the average life span of human beings can be lengthened by using modern scientific discoveries. In this respect he seems to believe that man can control his environment.

Activity Orientation - He seems to prefer to accomplish things, to work hard and plan right.

From his acceptance of those opinions favorable to a progressive view, one can conclude that Type I seems very similar to the ideal type of progressive dairy farmer.

His orientation towards a modern view of the world is again suggested by his strong rejection of those value opinions favorable to the traditional ways of looking at the world.

TABLE 4*--Value items most rejected by Type I -
progressive

Z-score	Item
-2.10	In deciding how to vote in an election, the way my family votes is decided by the oldest member of the family.
-2.08	I think that the ways of the past (traditional ways) are right and best, and as changes come things usually get worse.
-1.72	I am very unhappy because of the changes that are occurring here and everywhere. I think that our ways of living should be kept exactly the same in every way - as they were in the past.
-1.63	Children should be taught the traditions of the past (the ways of the old people). I believe that the old ways are best, and that it is when children do not follow them that things go wrong.

TABLE 4* - continued

Z-score	Item
-1.51	I expect my children to have things just about the same as I had or bring things back as they once were. It is their job to work hard and find ways to keep things going as they have in the past.
-1.49	I prefer to work in groups in which a leader or boss makes the important decisions.
-1.27	I think that today human beings have the means and power to master the natural and supernatural forces that affect life. Men will be the masters of nature.
-1.25	In deciding how to vote in an election, my family discusses the matter until almost everyone agrees on the party or candidate that the family prefers.
-1.11	When we need a solution for a problem in our community it is best to depend on our community leaders to decide what is to be done.
-1.04	If my brothers and sisters and I inherit a property, it is best for the oldest brother to take charge or manage the property.
-1.03	What I care about most is to be left alone to think and act in ways that best suit the way I really am. If I don't always get much done but can enjoy life as I go along - that is the best way.
-1.02	In my leisure time what I like most is to talk with my friends or have some kind of fun. Life is so short that we have to enjoy it.

*The complete array is included in Appendix B.

It is noticeable how this type of person tends to strongly reject all those value items favoring the traditional ways of looking at the world.

Relational Orientation - His orientation towards individuality and his rejection of submission to authority is indicated by rejection of the following items:

Authority has to be given to a person because he is older.

Working in groups in which a leader or boss makes all decisions is best.

In the decision making process all solutions have to be decided on unanimously.

Time Orientation - His progressive way of looking at the world is again indicated by his rejection of the notion that the ways of the past are right and best and that change usually brings trouble; by his strong rejection of the notion that ways of living should be kept exactly the same as in the past; by his rejection of the notion that the best way to bring up children is by teaching them the ways of the past and convincing them to stick to these ways of living. On the contrary, he tends to be very happy with changes and accepts them as worthwhile.

Man-Nature Orientation - This type of person seems ambivalent. In his most accepted value items, he indicates a favorable attitude towards science and towards man's power to control his environment. However, he strongly disagrees with the notion that today human beings have the means and power to master the natural and supernatural forces that affect life; that men will be the masters of nature. This apparent ambivalence toward man-nature relationships can be explained as follows:

He is a strong supporter of science and thinks that man can control some aspects of environment - for example, to control illness by

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medical treatment, or to prevent soil erosion by contour farming.

But he places a religious interpretation on some value items and tends to believe God has the power to control all men's activities.

It seems this type of person feels science can be put to the service of humanity, but at the same time he rejects any defiance of God's power.

Activity Orientation - He rejects easygoing ways of life and tends to prefer hard work and achievement. This is indicated by:

1. Strong disagreement with the view that man alone can think and act in ways that best suit his personality.
2. Strong disagreement with the idea of spending all his leisure time having fun and enjoying life.

Summary

Type I seems quite similar to the ideal type of progressive dairy farmer in the value model. In general he can be described as a man who believes in the future (future oriented), in science as means of achieving progress (mastery over nature), in man's independence in making his own decisions (individuality), and in hard work and achievement as a way of life (doing). He was not as pure as expected on "doing", but he seems to be more oriented toward hard work and achievement than the other types studied.

Type I and the Spanish Americans of New Mexico (Kluckhohn and Strodtbeck, 1961) seem quite similar in only one respect - both are individually oriented. They differ greatly in the value areas of time,

relational and activity. The Spanish American seems to prefer the present over the future and past, has a fatalistic view of the world, and likes to be easygoing. Type I rejects such orientations and prefers modern styles of living.

It is predicted that Type I dairy farmers will be the highest adopters of farm innovations, the most exposed to mass media and agents of change, and the most influential among the dairy farmers.

Types II and III - Broad Value Emphases

Results of the analysis of variance for the factor array of these two types of dairy farmers suggest a strong discrimination on some value areas over others. There is a clear indication that man-nature orientation is the most discriminated value area, followed by relational orientation. Time and activity orientations seemed less discriminatory for the two types.

The analyses of variance do not detect any significant difference among the subjects' discrimination for the three general levels - traditional, transitional, and progressive.

Furthermore, the analysis of variance does not detect any strong discrimination among the value directions on each one of the value areas studied.

However, a look at the means suggested that Type II tends to be inclined slightly towards the traditional way of looking at the world, while Type III seems to move in the opposite direction.

Departing from the preceding results, the next step was to observe the item array for each individual type of dairy farmer in order to get specific information which will allow the researcher to present a clear

picture of the dominant value patterns for each type.

Type II - Traditional - Dominant Value Patterns

To describe more specifically the dominant value patterns of this type of dairy farmer, the first step was to observe the most accepted value items in the array.

TABLE 5*--Value items most accepted by Type II -
traditional

Z-score	Items
1.47	I think that the ways of the past (traditional ways) are right and best, and as changes come things usually get worse.
1.40	When we need a solution for a problem in our community, it is best to call a meeting of the people affected and discuss the problem until almost everyone agrees on what is to be done. We prefer to reach our decision unanimously.
1.38	I prefer to work in groups in which a leader or boss makes the important decisions.
1.28	The past is gone and the future is too uncertain to count on. So I believe it is best to give most attention to what is happening now in the present.
1.21	I believe that it is always the ways of the future - the ways that are still to come - which will be best, and even though there are sometimes small setbacks, changes bring improvements.
1.09	When we need a solution for a problem in our community, the best way is for the problem to be discussed in a community meeting and to decide the matter by vote. We accept the majority decision even though there are still a great many people who disagree and object to the action.
1.05	I prefer to work in groups in which everyone works together and has the same rights and obligations.
1.04	I really do not believe that there is much human beings themselves can do to make the lives of men and women longer. It is my belief that every person has a set time to live, and when that time comes, it just comes.

TABLE 5* - continued

Z-score	Items
.95	What I care about most is to be left alone to think and act in ways that best suit the way I really am. If I don't always get much done but can enjoy life as I go along, that is the best way.

*Complete items array in Appendix B.

Relational Orientation - Observation of the array suggests that Type II strongly believes in authority and tends to accept it without question. However, his relational orientations seem bounded by his perception of the situation confronted. For example, when he perceives himself dealing with a certain problem, he prefers to work in a group where a leader or boss makes the crucial decisions. He prefers that others assume responsibilities. When he perceives himself as an integral part of a group, he seems to prefer group decisions based on unanimity, or as an alternative, on a group majority.

Time Orientation - Here again this type of person does not appear to be as traditionally oriented as was expected. But the array shows a slight preference for the traditional view of the world. For example, his most accepted item suggests that the ways of the past are right and best, and changes usually make things worse. He considers it best to give attention to the present rather than the past or future. Also, he feels the ways of the future will be best. This suggests that, while he does not discriminate strongly between the three time levels, he is slightly inclined towards a preference for the old ways of living.

Man-Nature Orientation - Here, one finds a strong preference for subjugation to the natural processes that affect life. Type II does not believe human beings themselves can do much to lengthen the lives of men and women. He feels every person has a set time to live and die -- a rather fatalistic way of looking at the world.

Activity Orientation - In this orientation, Type II seems to be ambivalent once again. He has a strong desire to be left alone so he can think and act in ways best suited to his personality. He appears to be easy-going, not caring much about accomplishment if he can enjoy life. However, in his most rejected items, he seems to disagree with this way of looking at the world under other kinds of situations.

A clear picture of his dominant value patterns must also include his most rejected items. Comparing most accepted and most rejected items should give a meaningful view of his dominant value patterns.

TABLE 6*--Value items most rejected by Type II -
traditional

Z-score	Item
-2.65	In my leisure time what I like best is to read about new things and do some kind of productive work.
-2.42	In my leisure time what I like best is to use some of my time learning or trying out new things and part of it having fun with my friends.
-2.24	In raising children, what I care most about is to provide them all the happiness that I can. Children are children and while they are young they have to play and enjoy life, because later life will be hard for them.
-1.94	In my leisure time what I like most is to talk with my friends or to have some kind of fun. Life is so short that we have to enjoy it.

TABLE 6* - continued

Z-score	Item
-1.69	In deciding how to vote in an election, my family discusses the matter until almost everyone agrees on the party or candidate that the family prefers.
-1.43	In raising children I do not believe that they should be taught much about past traditions. I believe that the world goes along best when children are taught the things that will make them want to find for themselves new and better ways of doing things to replace the old.
-1.04	I like best of all to use my leisure time doing extra things in my house, business or farm. I am very happy when I am busy and getting a lot of things done. Time is money and to waste time is to waste money.

*Array in Appendix B.

Relational Orientation - Here he tends to reject the view that, in deciding how to vote in an election, the family must discuss the matter and arrive at a unanimous decision.

Time Orientation - This type of person strongly rejects the notion that past traditions have to be replaced by new things, especially in bringing up children. He disagrees with the opinion that children should be taught to find for themselves new and better ways of doing things to replace the old ways. He believes that in bringing up children one should stress tradition.

Man-Nature Orientation - No items were strongly rejected in this area. Most of them seemed to be irrelevant for this type of farmer, except that he strongly accepts the power of natural forces to control man's destiny.

Activity Orientation - He strongly rejects most of the items

favorable to hard work and achievement. Also he rejects, although not so strongly, some aspects of the easygoing ways of life. For example, he rejects the notion of giving his children all kinds of pleasure and fun. He also rejects strongly the idea of using his leisure time talking with friends and having fun. And he strongly rejects the intermediate position of learning and trying new things while keeping work and leisure time in balance.

Summary

After observing the value items most accepted and most rejected by Type II, one sees that he has a tendency to prefer lineality (acceptance of authority emanated from a leader or older person); over collaterally (no leadership accepted, each member of the group has the same rights and obligation) and collaterally over individuality (independence in his decisions). While he seems ambivalent in his attitudes towards individuality and collective types of relationships, accepting some of them and rejecting others, he consistently favors lineality as a way of looking at the world.

The same tendency is noticeable in his time orientation. He seems to favor present and future orientations in some instances, but he tends to reject them for the most part. However, he is consistent in favoring the traditional ways of living.

In his man-nature orientation, he clearly favors the fatalistic view of natural processes affecting life.

In his activity orientation, he rejects strongly the items favoring hard work and accomplishment as the best way of life. He is ambivalent in the other two value directions in this value area, but he

seems to prefer the easygoing way of life over other styles of living.

Although mixed in his value patterns, this farmer is the most traditional oriented of the three types. He is closest to the ideal traditional dairy farmer in the theoretical model. He is similar to the Spanish Americans of the Kluckhohn and Strodtbeck study in only one respect - a fatalistic view of natural processes.

It is predicted that this type of farmer will be the latest to adopt, the low adopter, the lowest in his exposure to mass media and agents of change, and the least influential in his community. Furthermore, it is predicted that he will be the most egocentric among the dairy farmers present in the population investigated.

Type III - Transitional or Intermediate. - Dominant Value Patterns

This person also seems to be in transition, but he's moving in a direction opposite to that of Type II. He is inclined more towards the progressive view of the world, although he still possesses some values commonly shared by tradition-oriented people. The dominant value patterns of Type III become clear when we look at his most accepted and most rejected value items.

TABLE 7*--Value items most accepted by Type III -
transitional

Z-score	Item
2.65	In my leisure time, what I like best is to read about new things and to do some kind of productive work.
2.42	In my leisure time what I like best is to use some of my time learning or trying out new things and part of it having fun with my friends.

TABLE 7* - continued

Z-score	Item
2.24	In raising my children, what I care most about is to provide them all the happiness that I can. Children are children and while they are young they have to play and enjoy life, because later, life will be hard for them.
1.94	In my leisure time what I like most is to talk with my friends or to have some kind of fun. Life is so short that we have to enjoy it.
1.69	In deciding how to vote in an election, my family discusses the matter until almost everyone agrees on the party or candidate the family prefers.
1.43	In raising my children I do not believe that they should be taught much about past traditions. I believe that the world goes along best when children are taught the things that will make them want to find out for themselves new and better ways to replace the old.
1.04	I like best of all to use my leisure time doing extra things in my house, business or farm. I am very happy when I am busy and getting things done. Time is money and to waste time is to waste money.

*Array on Appendix B.

Relational Orientation - He likes to see unanimity in family decisions. For example, he strongly believes in calling in a family meeting to discuss politics until almost everyone agrees on what party or candidate the family members should vote for. This is a collateral view.

Time Orientation - He seems to be somewhat opposed to teaching the old ways of living to his children in such a way as to pressure them to live by these ways. He strongly believes children should be encouraged to find out for themselves new and better ways of doing things.

Man-Nature Orientation - In his most accepted items, he does not seem to give much attention to this orientation as an important factor

influencing his ways of living. But a closer observation of the whole array indicates that he slightly prefers the notion that men can be better if they live in harmony with the natural processes rather than being subjugated to them. This is also suggested by his rejection of the value items favoring the subjugation of men to the natural processes that control life.

Activity Orientation - Apparently this is the value area most relevant for Type III. A large number of value items in this area are strongly accepted. It seems that this is the kind of person who likes to work hard and accomplish things, but also to enjoy life occasionally. He likes to read about new things and to do some kind of productive work. He likes to use part of his leisure time learning and trying new things, and part of it enjoying life. He also likes to use his leisure time doing extra things and feels wasting time is wasting money. But he also prefers to spend his leisure time having fun with friends. He likes to provide his children all the happiness he can, and he believes children must play and enjoy life.

His position seems to be ambivalent in many respects, and to get a more meaningful understanding of his dominant value patterns one has to look at the most rejected items in the array.

TABLE 8*--Value items most rejected by Type III - transitional

Z-score	Item
-1.47	I think that the ways of the past (traditional ways) are right and best, and as changes come things usually get worse.
-1.40	When we need a solution for a problem in our community, it is best to call a meeting of the people affected and discuss the problems until almost everyone agrees what is to be done. We prefer to reach our decision unanimously.

TABLE 8* - continued

Z-score	Item
-1.38	I prefer to work in groups in which a leader or boss makes the important decisions.
-1.28	The past is gone and the future is much too uncertain to count on. So, I believe it is best to give most attention to what is happening now in the present.
-1.21	I believe that it is almost always the ways of the future - the ways which are still to come - which will be best, and even though there are small setbacks, changes bring improvements.
-1.09	When we need a solution for a problem in our community, the best way is for the problem to be discussed in a community meeting and to decide the matter by vote. We accept the majority decision even though there are still a great many people who disagree and object the action.
-1.05	I prefer to work in groups in which everyone works together and has the same rights and obligations.
-1.04	I really do not believe that there is much human beings themselves can do to make the lives of men and women longer. It is my belief that every person has a set time to live, and when the time comes, it just comes.
- .95	What I care about most is to be left alone to think and act in the ways that best suit the way I really am. If I don't always get much done but can enjoy life as I go along, that is the best way.
- .91	When we need a solution for a problem in our community it is best to depend on our community leaders to decide what is to be done.

*See array on Appendix B.

Relational Orientation - The opinions most rejected by Type III include the one favoring working in a group in which a leader or boss makes all crucial decisions. He also rejects strongly the idea that in tackling community problems the best approach is to call a meeting of

the people affected and discuss the problem until almost everyone agrees on what is to be done. In rejecting this item he seems to contradict himself, because in his most accepted items he showed a strong preference for arriving at family decisions by unanimity. Apparently he makes a distinction between family problems and community problems. Moreover, he tends to reject the idea that community decisions can be made by majority vote. In other words, he tends to reject items involving all three value directions in this value area and to accept only value items favoring the collateral direction (decisions on family needs to be made by unanimity).

Time Orientation - Here Type III tends to reject the three value directions of present, past and future. He rejects the notion that the past is gone, the ^{future?} present is too uncertain to count on, and the present should get most of man's attention. He also rejects the notion that the ways of the future will almost always prove best. And his most rejected item is the one favoring the ways of the past (traditional ways). He rejects strongly the idea that the ways of the past are right and best, and that as changes come things usually get worse. However, when the situation involves his children, he accepts the future orientation over the present and the past. .

Man-Nature Orientation - Type III rejects the fatalistic idea that all of man's activities are governed by the natural processes that affect life. He rejects the idea that every person has a set time to live and to die.

Activity Orientation - Here he tends to reject the notion of an easy-going way of life. He rejects the opinion that what is best for a person is to be left alone to think and act in ways best suited to his

personality.

Summary

The most accepted and most rejected value items suggest Type III is mixed, sharing both the traditional and progressive orientations. However, a closer look at the array suggest that this person leans more towards the progressive than the traditional. For example, in his relational orientation he seems to give top rank to the collateral view (all decisions have to be taken by unanimity), but he favor individuality (independence of man in determining his own behavior) over lineality (submission to the authority of a leader).

In his time orientation he seems to prefer the ways of the future over the traditional ways of looking at the world. He also rejects the notion of living in the present and forgetting about the past and the future.

In his man-nature orientation, he rejects the subjugation to the natural forces as a way of living. He tends to prefer to be in harmony with natural processes that affect life rather than to attempt to control them.

In his activity orientation he seems to prefer the middle position of hard work and accomplishment but also enjoying life. He likes to maintain a balance between hard work and leisure time.

This type of person, then, is the more transitional of the three types investigated. He seems to resemble the ideal transitional dairy farmer of the theoretical model in three out of four value areas - relational, man-nature and activity. He seems to deviate from the transitional type in time orientation, being more future minded.

He seems to differ markedly from the Spanish Americans of New Mexico (Kluckhohn and Strodtbeck, 1961) in the four value areas studied.

Up to now the writer has described the dominant value patterns for each individual type of dairy farmer in the population studied. Principal bases for this analysis have been the most accepted and rejected items in each type array. In addition, each type accepts or rejects some items to a greater extent than do the other types. One can consider opinion on such an item a unique characteristic of the type in question.

Type I - can be identified by strong acceptance of the following value directions:

1. In deciding how to vote in an election, he prefers to make his own decisions independently and without regard for the opinions of others.
2. Working on his own and being his own boss.
3. Science as a means of achieving progress and better ways of living for human beings.
4. Hard work and achievement as a way of life.
5. Natural forces (when he perceives the items as related to religious beliefs) as something to live in harmony with rather than to be subjugated to or defy. He accepts much more strongly than the other types that the best thing to do is to live in harmony with the natural forces that control rain, winds and other natural conditions.

He can be considered unique by his strong rejection, stronger than the other two types, of the following opinions supporting some directions opposed to his value system:

1. He rejects more than the other two types the idea that in deciding how to vote in an election, the way his family would vote has to be decided by the older member of the family.

2. He rejects much more than the others the notion that the past is better than the present and the future; that changes always bring troubles. He does not feel that the old ways of living have to be kept exactly as they usually were.
3. He rejects the idea of teaching his children the old traditions and influencing them to stick to traditional ways. He does not feel that when the old ways of living are forgotten, things go wrong.
4. Today, men have the means and power to control or master the natural and supernatural forces that affect life. He does not feel that men will be the masters of nature.
5. If a property is inherited by his family (brothers, sisters and himself) the best solution is for the oldest brother to manage the property, or for each family member to take his own share and do what he wants with it.

It is obvious that Type I has a dominant value orientation favorable to a progressive view of the world. He accepts more than do Types I and II items considered typical of an orientation towards progress.

Type II - is characterized by his relatively very strong acceptance of the following opinions supporting specific value directions:

1. The ways of the past are right and best. As changes come things usually get worse.
2. In the solution of community problems, the best thing to do is to call a meeting of the people affected, discuss the problem, and arrive at a unanimous decision on what to do.
3. It is desirable to work in groups in which a leader or boss makes all the crucial decisions.
4. The past is gone, the future is too uncertain to count on, and the present should get most of man's attention.
5. It's good to be left alone to think and act in ways best suited to one's personality. It's not too important to accomplish things if one can enjoy life doing what he really wants.
6. It is the job of his children to work hard and find ways to keep things going as they have been in the past.
7. All the activities in which human beings engage are subjugated to the natural and supernatural forces that affect life. Man is always subjugated to nature.

8. If his family inherits a property, it is best for the oldest member to take charge.

Also he is distinguished from the other two types by his greater rejection of the following items:

1. One should use leisure time reading about new things and doing some kind of productive work.
2. One should use part of his leisure time learning and trying new things, and part of it having fun.
3. The world goes along better when children are taught things that will make them want to find out for themselves new and better ways of doing things to replace the old.
4. The best way to use leisure time is by doing extra things in the house or business. Time is money and to waste time is to waste money.
5. In bringing up children, the best way is to teach them to work hard for what they want and at the same time enjoy life. That is, one should maintain a balance between hard work and achievement and play.
6. His children will be better if they work hard and plan right, and there are always good chances for people who try.
7. Children should be taught some old traditions, but it is wrong to insist that they stick to these old ways. It is always necessary for children to learn about and take on new ways that will help them get along in the world of today.
8. Working a little more than the average person while occasionally enjoying life is the best thing to do.
9. Although men were created by God, their own effort determines their destiny.
10. The best thing to do is to work on one's own, to be one's own boss.
11. Human beings need to be subjected to natural and supernatural forces that affect life. However, man should not ignore such forces. It is better to live in harmony with nature than to be subjugated to it.

From those items which the Type II farmer accepts or rejects much

more than the other two types, it is obvious that he is the most traditional of the three types studied. He does share some progressive values. This analysis supports our previous classification of this type as the most traditional of the three types.

Type III - This seems to be a typical case of a person in transition. He likes many of the changes that are occurring in the island. He likes progress, but he is still rooted to many of the traditional ways of looking at the world. His ambivalence or confusion about living in two different worlds becomes clear when we consider the value items he accepts or rejects with greater strength than do Type I and II farmers.

His most distinguishing value patterns are indicated by the following value items about which he feels particularly certain:

1. He accepts more than the other two types the notion that the best way to live is to maintain a balance between learning and trying new things and having fun with friends or enjoying life.
2. He places relatively great value on having children enjoy life and play a lot while they are young because later life will be hard.
3. He likes to use his leisure time talking with friends or to have some kind of fun.
4. He values the idea of unanimity on decisions taken by the family on many problems, i.e., voting in an election for a given party or candidate.
5. He seems very unhappy because of the changes occurring in the island and likes to see the maintenance of old ways of living.
6. He likes to work a little harder than the average in doing some extra kind of work at his home or farm, but to enjoy life while visiting friends and going on trips occasionally.
7. He prefers to teach his children the ways of the past, and he holds that things go wrong when children do not follow the ways of the past.

8. He believes human beings have the means and power to control the natural and supernatural forces that affect life, that men will be the masters of their environment.

His ambivalence is indicated by strong rejection of items supporting both the traditional and the modern ways of living. He rejects more strongly than do Types I and II the view that:

1. Solution of community problems requires unanimous approval by all people that a decision affects.
2. The past is gone and the present is too uncertain to count on. Hence it is best to give most attention to what is happening at present.
3. The best way to decide what to do on some specific problem affecting the community is to vote.
4. Through modern scientific discoveries the average life span of human beings can be lengthened.
5. One might justifiably walk around just for fun without doing anything.

In conclusion, Type III seems to be a man in a stage of transition, leaning toward the modern view on some issues and the traditional view on others.

How do dominant value patterns relate to observed behavior with respect to communication patterns, adoption of farm innovations and social relations?

The answer to this question will be discussed in the following chapter.

CHAPTER VII

RESULTS

VALUES, COMMUNICATION ORIENTATIONS AND THE DIFFUSION AND ADOPTION PROCESSES

The previous chapter described the three types of dairy farmers studied. Type I had dominant value patterns favoring a modern way of looking at the world. The values of Type II tended to favor traditionalism. Type III appeared to be in a state of transition - moving from a traditional to a modern orientation.

This chapter will deal with the relationships between dominant value patterns and communication orientations; between values, communication orientations and the diffusion and adoption of dairy farm practices; and between values, communication orientations and dairy farmers' social behavior.

The last part of this report will include findings on the location of information and opinion leaders and the apparent relationship between value patterns and leadership. Sociograms will indicate the location of leaders for both geographical areas.

Values and Communication Orientations

The predicted relationship between value system and communication orientation was studied during two of the stages of the adoption process - the awareness and the interest stages. Scores for correlational purposes were derived with two indices - Deutschmann Channel Orientation and Near-Far.

The Deutschmann Channel index classified a dairy farmer as

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egocentric if he reported a demonstration in his own barrio as a source of first knowledge; as intra-community if the source of first knowledge was in his own barrio but not through demonstrations; extra-community if the first source was in a contiguous barrio without a demonstration or was in another place whether a demonstration was seen or not; and as impersonal if the first source was mass media.

In the Near-Far index, the egocentric classification was deleted. A dairy farmer was classified as intra-community when his source of first knowledge about dairy practices was from his own barrio; as extra-community near when the source was from a contiguous barrio; as extra-community far if the source was from another place; and as impersonal when the source was one of the mass media.

Communication scores and value orientations scores were produced for correlational purposes.

The Awareness Stage

The relationship between value orientations and communication channel orientations was investigated under the following hypotheses:

1. During the awareness stage, there is a positive relationship between being progressive oriented and being impersonal and extra-community channel oriented. Not supported.
2. During the awareness stage there is a positive relationship between being tradition-oriented and being egocentric and intra-community channel oriented. Not supported.
3. During the awareness stage there is a negative relationship between being progressive and being egocentric, intra-community or extra-community near channel oriented. Partially supported. A significant negative relationship was observed between being progressive and being extra-community near channel oriented.
4. During the awareness stage there is a negative relationship between being traditional and being impersonal and extra-community channel oriented. Not supported.

One unexpected but interesting relationship was that between being tradition-oriented and being extra-community near channel oriented. This relationship was positive and significant. Apparently the traditional oriented dairy farmer passes across his community boundaries and interacts with fellow dairy farmers in contiguous communities. This can be explained by the fact that, although Type II was considered the most traditional among the dairy farmers, he was by no means purely traditional. He shares some characteristics with the progressive-oriented dairy farmer.

The apparent lack of relationship between value and channel orientations during the awareness stage is not surprising when we consider that becoming aware of an innovation isn't necessarily a purposive act. Awareness can be accidental. In this writer's opinion, the value-channel relationship would be more likely to hold at a stage of the diffusion process in which information seeking is mainly purposive. The interest stage was selected.

The Interest Stage

Further testing of the predicted relationship between value and communication channel orientations among Puerto Rican dairy farmers was conducted during the interest stage of the diffusion process. The same hypotheses were investigated during this stage of the diffusion process.

First, the Deutschmann channel and value orientation scores during the interest stage were correlated. The results were as follows:

Hypothesis one was supported. A significant positive relationship was observed between being progressive oriented and being impersonal-channel oriented.

Hypothesis two was not supported. The predicted relationship between traditional and egocentric or intra-community channel orientations was not significant.

Hypothesis three was not supported. The predicted negative relationship between being progressive and being egocentric or intra-community near channel oriented was not significant.

Hypothesis four was not supported. A negative but not significant relationship was observed between being traditional and being impersonal or extra-community oriented.

Hypothesis five was not tested in this phase of our study because the Deutschmann Channel Orientation index does not provide scores for the extra-community-near category.

The results in both the awareness and interest stages of the diffusion process were quite similar when the Deutschmann Channel Orientation scores were correlated with value orientation scores. In the interest stage, the progressive-oriented dairy farmer appeared to be impersonal oriented. In the awareness stage this relationship was not observed.

When the same hypotheses were investigated by correlating Near-Far channel orientation scores with value scores, the results were as follows:

Hypothesis one was supported. As was predicted, a positive significant relationship was observed between being progressive and being impersonal-channel oriented.

Hypothesis two was not supported. The observed positive relationship between being traditional and egocentric or intra-community channel oriented was not significant.

Hypothesis three was supported. A significant negative relationship was observed between being progressive-oriented and being intra-community or extra-community-near channel oriented.

Hypothesis four was supported. A significant negative relationship was observed between being tradition-oriented and extra-community far channel oriented.

Hypothesis five was not supported. No significant positive relationship was observed between being transition-oriented and being extra-community near channel oriented.

The findings are not conclusive. Different findings resulted when different measures of channel orientation were used. The Near-Far index appeared to detect more of the predicted relationships than did the Deutschmann Channel index. Apparently further research with more refined indices to conclusively test the predicted relationships between value and communication channel orientations is needed.

The data do suggest that progressiveness and impersonal-channel orientations are positively related, especially during the interest stage of the diffusion process. That is, progressive-oriented dairy farmers tended to look to mass media for additional information about dairy farm practices. The data also suggest that progressive farmers tend to disregard fellow dairy farmers as sources of additional information about dairy practices.

The opposite occurred with the tradition-oriented dairy farmer. He seemed to pay little attention to mass media channels during the interest stage.

In conclusion, while the dairy farmers oriented toward a modern view of the world rely on mass media and outside sources for information about dairy practices, the tradition-oriented men seem to disregard these channels.

This finding has practical significance. If change agents know the dominant value orientations among their clients, they can use communication channels more effectively. Thus further research with more refined indices and varied populations seems justified.

Value Orientations and Exposure to Mass Media

What are some relationships between value orientations and the frequency of exposure to mass communication channels? This phase of our study, was not restricted to any specific phase of the diffusion and adoption process. Our aim was to study the relationship between value orientation and mass media use in a broader sense.

Hypothesis: a positive relationship between being progressive oriented and having a high degree of exposure to mass communication channels. Further hypothesis: tradition-oriented dairy farmers would have low exposure to mass communication channels. To test the predicted relationships, the following research hypothesis was tested:

Progressive-oriented dairy farmers will be the highest consumers of mass media, while the traditional oriented dairy farmers will be lowest.

One expected the transitional man to be average in media consumption. The data support only certain aspects of the hypothesis. The results were as follows:

When over-all use of mass media was measured, a positive but not significant relationship was found between being progressive and high degree of exposure to mass media.

When over-all use of mass media was considered, a negative but not significant relationship was observed between being traditional and frequency of exposure to mass media.

However, the situation changed when mass communication channels were considered individually. The results were as follows:

A positive significant relationship between being progressive-oriented and frequency of exposure to the press (newspapers).

A positive significant relationship between being progressive-oriented and frequency of exposure to farm magazines.

A negative and significant relationship between being tradition-oriented and the frequency of exposure to farm magazines.

Radio and television showed no significant relationship with being traditional, while the progressive dairy farmer tended to disregard, although not significantly, these channels as sources of information.

The transitional dairy farmer, as expected, was less exposed to mass communication channels than the progressive and more exposed than the tradition-oriented dairy farmers.

Apparently the progressive-oriented dairy farmer is quite selective in media use. He does not have unusually high exposure to all the channels lumped together. But he is a fairly avid reader of newspapers and farm magazines. It would seem that change agents should make great use of these two channels to reach progressive individuals.

The data imply that mass media do not reach tradition-oriented dairy farmers effectively. However, further research is needed with other kinds of farmers. The population studied had relatively high standards of living and education. Also, scales of operations were large, and opportunities for exposure to mass media were better than with other populations.

In conclusion, frequency of exposure to farm magazines and press were positively related to being progressive oriented. Traditional orientation was negatively related to the frequency of exposure to these channels. Further research on other populations could study general use of mass media channels for both farm and non-farm information.

Channel Orientation and Frequency of Exposure to Mass Media

As postulated in Deutschmann theory of communication channel orientations, egocentric-channel-oriented dairy farmers should have the lowest exposure to mass media. Impersonal-channel oriented dairy farmers should be the heaviest media consumers. We also expected extra-community oriented dairy farmers would have high frequency of media exposure, while

intra-community channel oriented would be low. The following hypotheses were stated and investigated:

1. Impersonal-channel oriented dairy farmers will have high frequency of exposure to mass media channels, followed by the extra-community oriented dairy farmers and by the intra-community oriented dairy farmers. Supported.
2. Egocentric-oriented dairy farmers will have the most infrequent exposure to mass media. Supported.

As predicted, the impersonal-channel oriented dairy farmers were the highest in their degree of exposure to mass media followed by extra-community oriented dairy farmers and intra-community oriented dairy farmers.

Also as expected, the egocentric channel oriented dairy farmers disregard mass media as sources of information about farm practices.

Stated more specifically, the results were as follows:

A highly significant relationship between being impersonal-oriented and the overall use of mass media as sources of information.

A significant relationship between being extra-community channel oriented and the overall frequency of exposure to mass media.

No significant relationship between being intra-community channel oriented and frequency of exposure to mass media.

A negative significant relationship between being egocentric channel oriented and the use of mass media (frequency of exposure).

Other interesting findings were the following:

Farm magazines and press were the mass communication channels most frequently used by the impersonal channel oriented type of dairy farmer.

Radio and technical bulletins appeared to be less frequently used than farm magazines and press.

The impersonal channel oriented dairy farmer did not seem to use television as a source for getting farm information.

The extra-community channel oriented dairy farmer seemed to be highly exposed to farm magazines. But he seemed to prefer television over the press as a source of information. He did not appear to use radio, press and technical bulletins for getting information about farm practices.

The intra-community oriented dairy farmer showed a marked preference for radio and technical bulletins and a tendency to disregard farm magazines, press and television as sources of information.

The egocentric channel oriented dairy farmer disregarded all media channels as sources of information, but the most rejected media channels were farm magazines and press.

Channel orientation and progressiveness each correlated with media exposure. Impersonal and extra-community channel orientations, along with a progressive outlook, tended to characterize people who paid great attention to the media. Those with egocentric or intra-community channel orientations tended to pay little attention to the media. These observed similarities provide additional support to our predicted relationships between value and communication orientations.

When the two theories are fused, one can state that the tradition-oriented man seems to share many characteristics of the egocentric and intra-community channel oriented dairy farmers. The impersonal channel oriented dairy farmer seems to share many of the characteristics of the progressive oriented dairy farmer. The transitional oriented dairy farmer seems to basically resemble the Deutschmann extra-community-near oriented dairy farmer.

Value Orientations and the Diffusion and Adoption Processes

What is the relationship between value orientations and the diffusion and adoption processes? We expected progressive-oriented farmers would be the first to know about dairy practices, the first to adopt, and the leading adopters of dairy farming innovations. Also, we expected

the traditional type would be the latest to know, the latest to adopt and the lowest in degree of adoption. Stated more formally, the relationship between value orientation and adoption was tested under the following hypotheses:

1. Dairy farmers with an orientation towards a progressive way of looking at the world will be the first to know about dairy innovations.
2. Dairy farmers with a progressive orientation will be the earliest adopters of dairy farm practices.
3. Dairy farmers with an orientation towards being progressive will be the highest in degree of adoption of dairy farm innovations.
4. Traditional oriented dairy farmers will be the latest to know about dairy practices.
5. Traditional oriented dairy practices will be the latest to adopt dairy farm practices.
6. Traditional oriented dairy farmers will be the lowest in degree of adoption of dairy farm practices.

We expected the transitional oriented man to be average with respect to time of awareness, time of adoption and degree of adoption.

Hypothesis one was not supported by the data. There was no significant relationship between time of awareness and being progressive-oriented.

Hypothesis two was supported by the data. As predicted, there was a positive significant relationship between being progressive and time of adoption of dairy farm practices.

Hypothesis three was supported by the data. We found significant positive relationship between being progressive and degree of adoption of dairy farm practices.

Hypothesis four was not supported by the data. There was no significant relationship between being tradition-oriented and time of awareness about dairy innovations.

Hypothesis five was not supported by the data. A negative but non-significant relationship was observed between being tradition-oriented and time of adoption of dairy farm practices.

Hypothesis six was supported by the data. A significant negative relationship was observed between being tradition-oriented and degree of adoption of dairy farm innovations.

The data suggest the important role played by value orientations in the diffusion and adoption of dairy farm innovations. However, more research is needed on different populations and under different kinds of situations. From the results obtained in this study one can conclude that under the Puerto Rican situation and among dairy farmers with high standards of living, value orientations have a demonstrated relationship to the diffusion and adoption process.

Communication Orientations and Diffusion Process

Deutschmann, in his Latin American studies, found a close relationship between time of awareness, time of adoption, degree of adoption, and communication channel orientation. The findings supported his predictions that egocentric-channel oriented individuals were the latest to know, the latest to adopt, and the lower in degree of adoption. He also found evidence that impersonal-channel oriented were the first to know, the first to adopt and the highest in degree of adoption.

Here we attempted to test further Deutschmann's hypotheses:

1. Egocentric-channel oriented dairy farmers and intra-community dairy farmers will be the latest to know about dairy practices.
2. Egocentric channel and intra-community channel oriented dairy farmers will be the latest to adopt dairy practices.
3. Egocentric and intra-community channel oriented dairy farmers will be the lowest in degree of adoption of dairy farm practices.
4. Impersonal and extra-community channel oriented dairy farmers will be the first to know about dairy practices.
5. Impersonal and extra-community channel oriented dairy farmers will be the first to adopt dairy practices.

6. Impersonal and extra-community dairy farmers will be the highest in degree of adoption of dairy practices.

Hypothesis one was not supported. We found no significant relationship between being egocentric or intra-community channel oriented and time of awareness about dairy innovations.

This finding seems to be contrary to Deutschmann's findings in Latin America (6) (11).

Hypothesis two was supported. The data showed a significant negative relationship between being egocentric or intra-community channel oriented and time of adoption.

This finding supported Deutschmann's findings in Latin America where time of adoption was found to be negatively related to being egocentric-channel oriented.

Hypothesis three was supported. As predicted, a significant negative relationship was found between being egocentric-channel oriented and degree of adoption of dairy farm innovations.

This finding supported once again Deutschmann's theory of communication channel orientations.

Hypothesis four was not supported. No significant relationship was found between being impersonal or extra-community channel oriented and the time of awareness.

This finding does not reinforce Deutschmann's findings in Latin America.

Hypothesis five was supported by the data. A positive significant relationship was observed between being impersonal or extra-community channel oriented and time of adoption of dairy innovations.

Hypothesis six was again supported by the data. A positive significant relationship was observed between being impersonal or extra-community channel oriented and degree of adoption of dairy farm innovations.

These two hypotheses supported the theory of communication channels orientations outlined by Deutschmann, except in the time of awareness about innovations. Apparently dairy farmers in the context studied don't differ in time of awareness. This situation can be explained as follows: In Puerto Rico there are many sources of dairy-farming information. Also, the good economic condition insured that the people studied had the time

and resources to buy and attend to radios, magazines, etc. Because farm information is diffused through all channels - mass media and personal change agents - time of awareness does not seem to be a relevant factor in the adoption of dairy innovations. Apparently the information reaches the population at the same time but people with some channel orientations seem to be more ready to adopt them early than others.

There are noticeable similarities between our findings under the Deutschmann communication-channel orientation theory and the results under the value orientations theory with respect to diffusion and adoption. Under both theories the time of awareness hypothesis was not supported. In the time of adoption and degree of adoption hypotheses, the data supported the predictions. Once more, Deutschmann's impersonal and extra-community channel oriented dairy farmers seem to show many characteristics with the progressive oriented dairy farmer under the value orientations theory. Agents of technological change should be able to predict communication channel orientations from a knowledge of value patterns. This, in turn, should allow more effective communication. It should also aid prediction of how new technology will "go over" in an area.

Values and Dairy Farmers Social Behavior

In this phase, we investigated three aspects of the dairy farmers' social behavior - advice seeking, advice giving and belonging to organizations. The following hypotheses were tested:

1. Being progressive-oriented is positively related to advice giving with respect to farm matters.
2. Being traditional-oriented is negatively related to advice giving with respect to farm matters.

3. Being transitional oriented is positively related to advice seeking with respect to farm matters.
4. Being traditional oriented is negatively related to advice seeking with respect to farm matters.

None of these hypotheses was supported. Apparently value orientations do not relate to advice seeking and advice giving in the population studied. Two kinds of interpretations can be made from these findings - (a) There is no relationship between value orientation and the dairy farmers' perception of themselves as advice givers or advice seekers; and (b) That the instrument used did not measure what we were attempting to measure.

Belonging to Organizations

The hypotheses tested here were the following:

1. Progressive dairy farmers will be the highest in participation in formal organizations.
2. Tradition-oriented dairy farmers will be the lowest in participation in formal organizations.
3. Transitional oriented dairy farmers will be higher participants in formal organizations than the tradition-oriented dairy farmers, but lower than the progressive-oriented dairy farmer.

The results were as follows:

Hypothesis one was supported. A positive significant relationship was observed between being progressive-oriented and belonging to formal organizations.

Hypothesis two was supported. A negative significant relationship was observed between being tradition-oriented and belonging to formal organizations.

As expected, the transitional-oriented man was intermediate in participation in formal organizations.

The data suggest a close relationship between value orientations and belonging to formal organizations. This indicates the progressive-oriented dairy farmer is prone to be in contact with many sources of information

which in turn may explain his proneness to adopt innovations early.

Channel Orientations and Dairy Farmers' Social Behavior

In this phase of the study, we attempted to investigate the relationship between dairy farmers' communication channel orientations and dairy farmers' social behavior. First we investigated the relationships between channel orientations, advice giving and advice seeking. Then we investigated the relationship between channel orientations and participation in formal organizations.

To test the relationship between dairy farmers' own perception as advice givers and advice seekers with dairy farmers communication channel orientations the following hypotheses were set up:

1. Being impersonal-channel oriented is positively related to dairy farmers' own perceptions as advice givers.
2. Being impersonal-channel oriented is negatively related to dairy farmers' perception as advice seekers.
3. Being extra-community channel oriented is positively related to dairy farmers' self perception as advice givers and negatively related to self perceptions as advice seekers.
4. Being intra-community channel oriented is positively related to dairy farmers' self perception as advice seekers and negatively related to their self perception as advice givers.
5. Being egocentric-channel oriented is negatively related to dairy farmers' self perception as advice seekers and advice givers.

The results were as follows:

Hypothesis one was not supported. Contrary to our predictions no significant relationship was observed between being impersonal-channel oriented and dairy farmers' self perception as advice givers.

Hypothesis two was not supported. A negative but not significant relationship was observed between being impersonal-channel oriented and dairy farmers' self perceptions as advice seekers.

Hypothesis three was partially supported and partially rejected.

Supported was the predicted negative relationship between being extra-community channel oriented and self perceptions as advice seekers. Not supported was the predicted positive relationship between being extra-community channel oriented and self perception as advice givers.

Contrary to expectation, a significant negative relationship was observed between being extra-community channel oriented and dairy farmers' self perceptions as advice givers.

Hypothesis four was partially supported by the data and partially rejected.

Supported was the observed predicted relationship between being intra-community channel oriented and dairy farmers' self perceptions as advice seekers. Not supported was the predicted negative relationship between being intra-community channel oriented and dairy farmers' self perceptions as advice givers.

Contrary to expectation, a significant positive relationship was observed between being intra-community channel oriented and dairy farmers' self perceptions as advice givers.

Hypothesis five was not supported by the data. The findings were in the opposite direction as expected.

Contrary to our expectations, a significant positive relationship was observed between being egocentric channel oriented and dairy farmers' own perceptions as advice seekers and advice givers.

The findings suggest that impersonal and extra-community channel oriented dairy farmers, because their major sources of information are out of their community boundaries, do not seem to perceive themselves either as advice givers or advice seekers. On the contrary the egocentric and the intra-community oriented dairy farmers, whose major interaction is within the community boundaries, seemed to perceive themselves as both advice seekers and advice givers.

In addition to advice seeking and advice giving the dairy farmers' social behavior was investigated by testing the relationship between communication channel orientations and belonging to formal organizations.

Two hypotheses were investigated:

1. Impersonal and extra-community channel oriented dairy farmers will be the most active participants in formal organizations.
2. Egocentric and intra-community channel oriented dairy farmers will be lowest on participation in formal organizations.

The results were as follows:

Hypothesis one was supported by the data. As predicted, a significant positive relationship was observed between being impersonal and extra-community channel oriented and belonging to organizations.

Hypothesis two was also supported. As predicted, a significant negative relationship was observed between being egocentric-channel oriented and belonging to organizations. No relationship was observed between being intra-community channel oriented and belonging to formal organizations.

The findings were once again very similar to the ones obtained with value theory. For example, being progressively oriented was positively related to organization belonging. In the communication channel orientations approach, the impersonal and extra-community channel oriented dairy farmers seemed to be the most active in formal organizations. This points out once again the similarities between the progressive-oriented dairy farmers and the impersonal and extra-community channel oriented dairy farmers.

The tradition-oriented dairy farmer also showed strong similarities with the egocentric-channel oriented dairy farmers and with the intra-community channel oriented dairy farmers. Under both theories, these types of dairy farmer seemed to be very low on formal organizations participation.

The tradition-oriented dairy farmer also showed strong similarities with the egocentric-channel oriented dairy farmers and with the intra-community channel oriented dairy farmers. Under both theories, these types of dairy farmer seemed to be very low on formal organizations participation.

Participation in Diffusion and Adoption Stages

Here we attempted to investigate the relationship between value orientations and the predispositions to participate in the stages of the adoption process. We expected to find a positive relationship between being progressive-oriented and a more active participation in the stages of the adoption process. We also anticipated a negative relationship between being tradition-oriented and participation in the stages of the adoption process.

The hypothesis tested was the following:

Dairy farmers with an orientation towards being progressive will pass through more stages of the adoption process than the tradition-oriented dairy farmer.

The hypothesis was supported by the data. As predicted, the results were as follows:

Awareness Stage - A significant positive relationship was observed between progressive-oriented and the number of dairy practices heard about.

A significant negative relationship was observed between being tradition-oriented and the number of practices heard about.

Interest Stage - A significant positive relationship was observed between being progressive and seeking additional information about dairy practices.

A significant negative relationship was observed between being tradition-oriented and seeking additional information about dairy practices.

Trial Stage - A significant positive relationship was observed between being progressive-oriented and passing through the trial stage.

A significant negative relationship was observed between being tradition-oriented and passing through the trial stage.

Adoption Stage - A significant positive relationship was observed between being progressive and passing through the adoption stage.

The data suggest that those dairy farmers with dominant value patterns toward a progressive way of looking at the world tend to pass through all the stages of the adoption process, while the tradition-oriented dairy farmer tends to skip most of them. The data suggest that the progressive-oriented dairy farmer is predisposed to accept new technology, while the tradition-oriented dairy farmer seems to reject it or just adopt without question.

Channel Orientations and Participation in Adoption Stages

Here we attempted to test the relationship between channel orientation and dairy-farmer predispositions toward passing through the adoption-process stages. We predicted impersonal or extra-community channel oriented persons would pass through more stages of the adoption process. Egocentric or intra-community channel oriented persons, on the other hand, should go through fewer stages.

The hypothesis stated was the following:

Being impersonal and extra-community channel oriented is positively related to one's tendency to pass through more stages in the adoption process, while being egocentric and intra-community channel oriented is negatively related to dairy farmers' proneness to pass through the adoption stages.

The data supported the hypothesis. The results were as follows:

Awareness Stage - A positive significant relationship was observed between being impersonal or extra-community channel oriented and passing through the awareness stage.

A positive and significant relationship was observed between being egocentric channel oriented and passing through the awareness stage. No significant relationship was observed between being intra-community channel oriented and passing through the awareness stage.

In the rest of the stages of the adoption process, the impersonal and extra-community channel oriented dairy farmers showed a positive significant predisposition towards passing through the interest, trial and adoption stages. On the other hand, being egocentric and intra-community channel oriented dairy farmers did not relate to passing through the stages of adoption.

Again, notice the similarities of the findings when this concept was investigated under both the value orientations and communication channel orientations theory.

Other Findings

The relation between value orientations and demographic data was investigated by correlating value scores of the respondents with age, education and scale of operations.

Contrary to our expectations, older farmers were more progressive.

Education did not show any positive or negative relationship with value orientation. Contrary to our expectations, being better educated did not relate significantly to being progressive. The same situation was observed with being tradition-oriented. Contrary to our expectations, no negative relationship was found between being traditional

oriented and being better educated.

Supporting our expectations was a positive relationship between being progressive-oriented and size of operations. A negative significant relationship was observed between being tradition-oriented and size of operations.

The data suggest that scale of operations is an important variable influencing value orientations of the populations studied. The data also suggest that the relationship between value orientations and scale of operations is a two-way relationship.

The finding that older people are progressive-oriented can be explained if we consider that older people have larger scales of operations.

Channel Orientations and Demographic Data

As expected, a significant positive relationship was observed between being impersonal-channel oriented on the one hand and education as well as scale of operations on the other. Being egocentric channel oriented was negatively related to education and scale of operations.

Interaction Patterns in the Regions

This was the last area covered in this study. Here we attempted to investigate the interaction patterns in both geographical areas and through the location of information and opinion leaders. Sociograms were constructed and the general characteristics were described. First, we investigated the characteristics and location of information leaders. The findings will be reported in the following section.

The Information Leaders

The key information leaders in each municipality included in the study were located by asking each respondent to name the dairy farmer who provided him (the respondent) first knowledge on each of 10 dairy practices. The information had to be actually transmitted in the respondent's barrio. However, the person serving as source of first knowledge about a practice could be either (a) a resident of the respondent's barrio or (b) an outsider who told the respondent about the practice while visiting the respondent's barrio.

TABLE 9*--Dairy farmers distribution by municipalities and percentage of dairy farmers using person-channels as sources of first knowledge about practices

Municipality	Dairy farmers population	No. of dairy farmers using person-channels	% Dairy farmers using person-channels as source of first knowledge
<u>Region I</u>			
Hatillo	93	65	70%
Arecibo	37	20	54%
Manati	21	6	28%
Camuy	14	1	7%
<u>Region II</u>			
Toa Baja	14	5	35%
Bayamon	8	2	25%

*The data includes only those municipalities in which personal-channels were mentioned as sources of first knowledge about dairy practices. In 10 out of 12 municipalities in Region II no information leaders were mentioned. In Region I information leaders were named in all municipalities comprising the region.

Our first step was to determine the distribution of dairy farmers among municipalities and the extent to which farmers were using information leaders as a source of first knowledge.

Table 9 shows the largest distribution of dairy farmers using person-channels as sources of first knowledge in the municipalities of Hatillo and Arecibo. In these municipalities, dairy farmer populations are relatively large, dairy farms are close to each other, and where there is a large concentration of dairy farmers in each barrio. The municipalities in Region I with the lowest number of persons named as sources of first knowledge were Manati and Camuy. In both municipalities, the dairy farmer populations are small, the concentration of dairy farmers per barrio is low, and the dairy farms are located some distance from each other. In Region II where the distances between farms are greater, with bigger farms and with a small dairy farmer population per municipality, the use of persons as sources of first knowledge is very low. From the data one can infer that distance is related to the opportunities for interpersonal relations, and that interpersonal relations are closely related to the importance of person-channels as sources of first knowledge about farm innovations.

This finding provides support for previous research findings on diffusion in which distance has been found to determine the degree of interaction among individuals in a given social system. That is to say, the closer people are physically the greater the opportunity for interaction. The greater the opportunity for interaction, the greater the role of interpersonal channels for the spread of farm information, e.g., Deutschmann and Fals Borda (1962) (6), Deutschmann and Mendez

(1962) (11), Emery, et. al. (1958) (4), Lionberger (1960) (10).

Hatillo ranked first, Arecibo second, in total number of information leaders. This seems related to the two variables mentioned above - distance between farms and concentration of dairy farmers in the barrios. Hatillo's 93 dairy farmers named 19 persons as sources of first knowledge, with an average of six dairy farmers naming each of the 19 information leaders. In Arecibo, with similar conditions, five persons were mentioned as sources of first knowledge by an average of five persons per information leader. However, in Manati, only two persons were named as information leaders, and the average number of dairy farmers per leader was three. In Camuy, only one dairy farmer was mentioned as a source of first knowledge.

In Region II - Toa Baja with two dairy farmers mentioned and Bayamon with one were the only two municipalities where person-channels were named as sources of first knowledge. In the other ten municipalities of Region II no dairy farmers were named as first sources.

Mobility

This seems to be an important characteristic of information leaders. A total of 44% of the dairy farmers received first information about a practice from persons residing in other barrios. Fifty-six per cent mentioned information leaders from their own barrio. The data show (see Sociograms I, II, III) that information leaders' mobility is mainly within their municipalities. Leaders seldom cross municipality boundaries to spread information about a dairy practice. Distance between municipalities apparently explains this in large part.

Kinship Channel

As in Deutschmann's Latin American studies (see references six and eleven), the kinship channel, where present, plays a very important role in the diffusion of dairy farm information. In Hatillo, where kinship relations among dairy farmers is very common, 41% of the dairy farmers named a kin as a source of first knowledge about dairy practices. The remaining 59% named non-relatives.

General Characteristics of the Information Leaders

Information leaders are, on the average, slightly younger than the rest of the dairy farmer population. They are also somewhat better educated and of higher socio-economic status.

TABLE 10--Comparison between general characteristics of the dairy farmers population from Region I and information leaders from the area

	Mean for information leaders	Mean for the dairy farmers population	Difference
Age (in years)	44.25	46.07	1.75
Schooling (in years)	8.81	7.81	1.00
Acres	86.69	61.10	25.59
Quarts of milk produced weekly (in thousands)	6.87	4.13	2.74

Table 10 suggests that scale of operations is the most important characteristic of information leaders. They are well above the average in their scale of operation.

In Region II, the only two persons named as information leaders are well above the two-region dairy-farmer average on education, and scale of operations, and substantially below average with respect to age. Leader No. 244 has three years of college education, is 38 years old, possesses 550 acres and produces 12,600 quarts of milk (weekly). The other information leader is 28 years old, with a Bachelor of Science degree in Agriculture, a 400 acre farm and a 10,500 quart (weekly) milk output. Apparently these two persons are seen as technicians whose advice is highly respected.

Sources of First Knowledge for Information Leaders

The sociograms show information leaders tend to share information with each other. It is evident that they tend to look to each other rather than to dairy farmers. Leaders also tend to be more exposed to mass media as well as to agents of technological change. Further, leaders participate more actively in government-sponsored agricultural activities.

Summary

Distance between farms and opportunity for interaction appear to play an important role in the use of person-channels for the spread of dairy farm information. The greater the distance among farms, the less frequently persons are cited as sources of first knowledge.

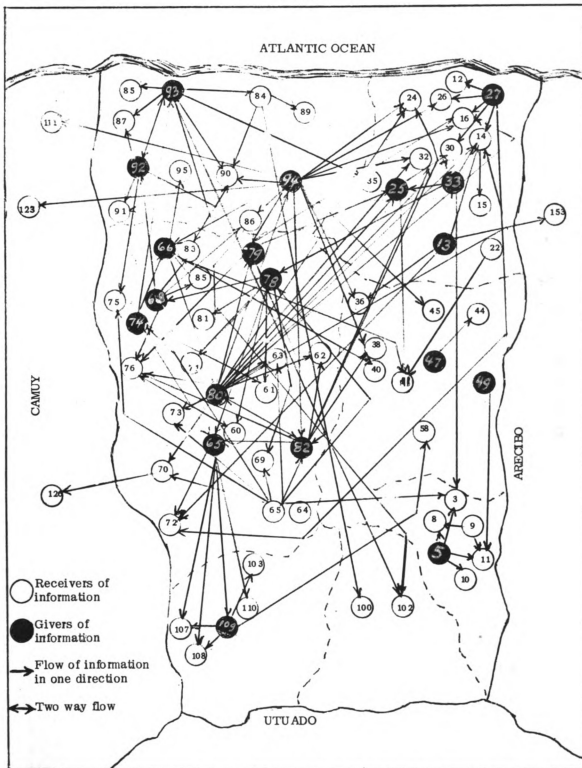
Leaders also tend to be more mobile than the rest of the dairy farmers. However, their mobility seems to be limited mainly within municipality boundaries.

Kinship seems to be important in the spread of dairy farm



* SOCIOGRAM -1

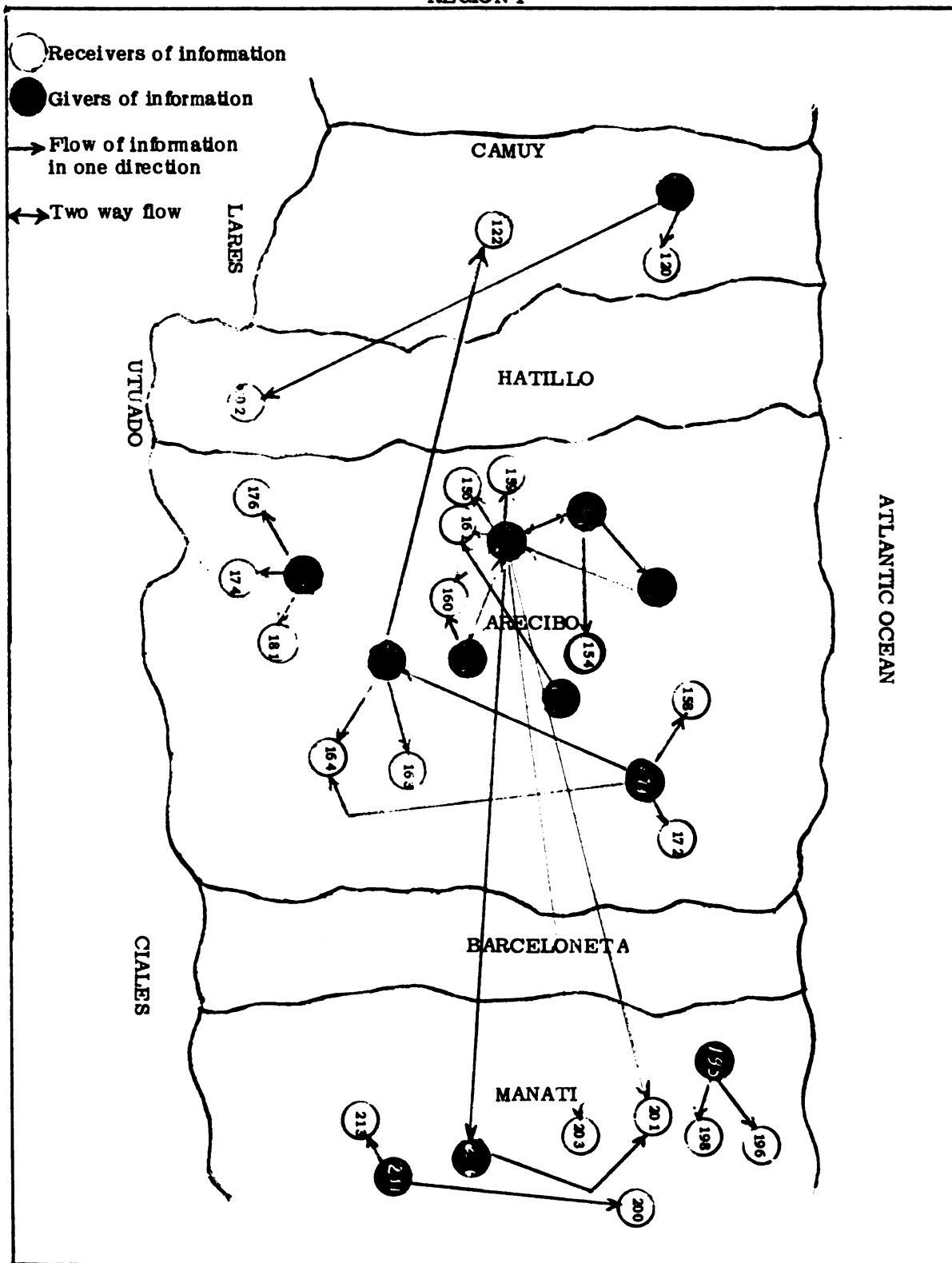
INFORMATION LEADERS AMONG HATILLO DAIRY FARMERS
REGION I



* The location of information leaders was determined by the dairy farmers answer to the following question - From whom did you hear first about _____ (practice)? Ten dairy practices were used a frame of reference.

* SOCIOGRAM - 2

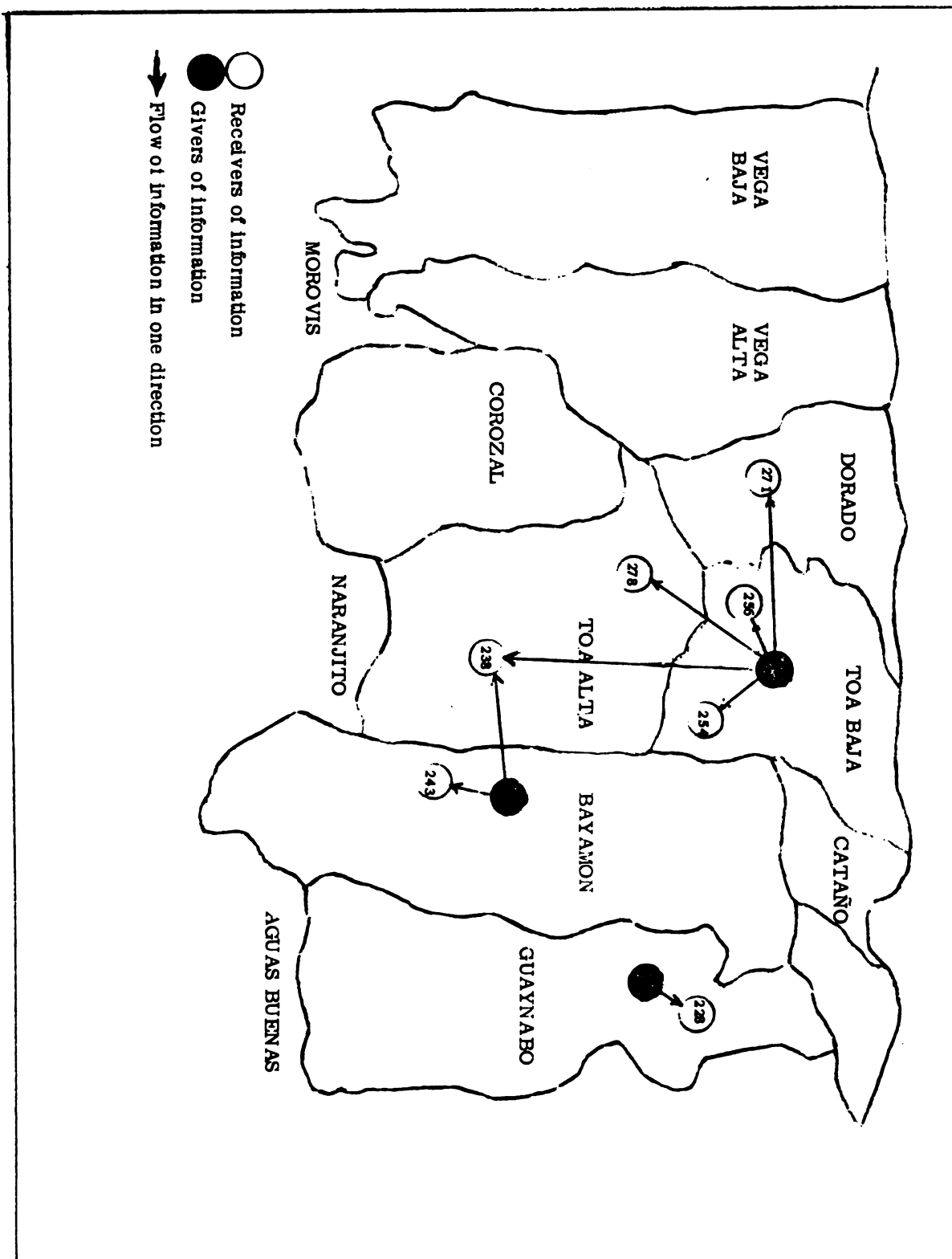
INFORMATION LEADERS AMONG ARECIBO, CAMUY AND MANATI DAIRY FARMERS
REGION I



*The location of information leaders was determined by the dairy farmers answers to the question- From whom did you hear first about the practice? Ten dairy practices were used as frame of reference.

* SOCIOGRAM - 3

INFORMATION LEADERS AMONG DAIRY FARMERS OF REGION II



* The location of leaders (information leaders) was determined by the dairy farmers' answer to the question - From whom did you hear first about _____ (practice)? Ten dairy practices were used as frame of reference.

information.

Information leaders appear younger, better educated, and larger scale operators than the rest of the population.

Information leaders tend to use as first sources other information leaders.

Information leaders also appear to be the ones who get their information from channels such as mass media, agents of change or other leaders.

Opinion Leaders

Who are the opinion leaders and where are they located? To locate them in each municipality of the two regions, respondents were asked to name farmers who most influenced their decision to adopt a given dairy practice of the 10 used as frame of reference in this investigation. Our first step was to observe the distribution of opinion leaders in both regions and the extent of their influence.

Distribution of Opinion Leaders - The largest concentration of opinion leaders was found in Hatillo municipality--27 leaders being named as most influential by three or more dairy farmers each. The Hatillo opinion leaders served as a source of influence for 91% of the dairy farmers from Hatillo, 32% of those in Arecibo municipality, 42% of Camuy dairy farmers, and five per cent of Manati dairy farmers. The two top opinion leaders in Hatillo were leaders No. 94 and No. 80. Leader No. 94 is a very wealthy dairy farmer and a dairy cattle trader. His range of influence is not limited to the community boundaries or even to the municipality boundaries, but is observable in three out of

the four municipalities comprising Region I. He served as a source of influence for 37 dairy farmers - 13 from Hatillo, six from Camuy and four from Arecibo. Leader No. 80, with 24 dairy farmers under his range of influence, ranked second. He is the son of Leader No. 94, a very wealthy farmer and a graduate of Sam Houston University as an agronomist. However, his range of influence is more in his municipality--22 out of 24 dairy farmers whose decisions he influenced were from Hatillo and only two were from Arecibo. Other outstanding opinion leaders in Hatillo were No. 78 with 15 people who named him as the most influential person, No. 74 with 13, No. 65 with 10 and No. 93 with 12 (see Sociogram No. 4).

On the average the number of farmers influenced by each opinion leader in Hatillo municipality was 13. Also, Hatillo opinion leaders served as source of influence to 63% of the dairy farmer population from Region I.

Arecibo ranked second in the number of dairy farmers named as opinion leaders. Fifteen out of 37 dairy farmers in the municipality were mentioned at least once as sources of influence. The opinion leaders in this municipality served as major source of influence for 75% of the Arecibo dairy farmers, 3% of those in Hatillo, 5% of those in Manati, and 7% of the Camuy respondents. These opinion leaders served 20% of all dairy farmers population from the region. The most outstanding opinion leaders in Arecibo were Nos. 166 and 157. Leader No. 166 is a graduate from a college of agriculture and a former county agent. He is a part-time farmer whose major business is the sale of farm implements. He is a person of high socio-economic status, and is

seen by fellow farmers as an authority in dairying matters. Leader No. 157 is also a part-time farmer whose major business is the sale of farm implements. His socio-economic status is high and his schooling (high school graduate) is substantially above average. The influence of both leaders goes beyond the community and municipality boundaries.

The average Arecibo opinion leader served six people, the average Hatillo leader 13.

Manati ranks third behind Hatillo and Arecibo in number of opinion leaders named. Six were mentioned by an average of six persons per leader. Manati opinion leaders served all Manati dairy farmers and 8% of those from Arecibo. The Manati leaders do not seem to interact with dairy farmers from Hatillo and Camuy. However, they served as major sources of influence for 50% of the Vega Baja dairymen interviewed and for 8% of those from Toa Baja. Both of these municipalities are in Region II, but they adjoin Manati. In general, the Manati opinion leaders served as sources of influence for 15% of all Region I dairy farmers and 9% of those from Region II.

The top leaders in Manati municipality were Leaders 205, 211 and 196. All three are very wealthy, large-scale operators. Their farms average 391 acres, their milk production per week is 9,000 quarts. For example, Leader No. 211 has 519 acres, a large farm by Puerto Rican standards; Leader No. 196 had 444 acres, and Leader No. 205, 224 acres. These leaders averaged 8.3 years of schooling, slightly above the region-wide average of seven years. The three men are slightly below the average in age of 45 years.

In Camuy municipality, only one dairy farmer was named as an

opinion leader by six dairy farmers - Leader No. 124. His scale of operations is above average for the region. He operates a dairy farm of 160 acres as compared with the average for the region that is 61. In education he is quite above average, a high school graduate, as compared with seventh grade average for the region. His weekly production of milk is 7,000 quarts, compared with 4,000 quarts for the region. He is older than the average--60 years as compared with 47 for the region.

In Region II, opinion leaders were found only in three of the eight municipalities comprising the area - Vega Baja with three, Toa Baja two, and Guaynabo one (see Sociogram 8). The average number of persons influenced by each opinion leader was three.

The most outstanding leaders in this region were No. 255 and No. 257, both from Toa Baja municipality (see Sociogram 8). Leader No. 255 is a graduate from college in Agriculture, his age is 24 years, and he operates a dairy farm of 400 acres. His range of influence is not limited to his community boundaries or even to his municipality boundaries. He goes beyond this geographical area to influence people from other municipalities. Leader No. 257 is also a college graduate operating a dairy farm of 400 acres, quite above the average for both regions. His weekly milk production is 20,000 quarts. At 63, he is above average for the region. His range of influence goes beyond his municipality boundaries and extends to other municipalities in the region. Leaders No. 223, No. 333 and No. 221 also operate bigger farms and are above average in milk production and schooling.

The preceding description of the leaders found in both regions suggests that there are many characteristics which the opinion leaders share in common.

Mobility

As in the case of information leaders, the opinion leaders seem more mobile than the rest of the population. In total, 48.6% of the people influenced were from other barrios, 13.9 from other municipalities, and 37.5 from their same barrio. (see Sociograms 4 - 8)

Other Characteristics

Region I opinion leaders are somewhat better educated, and their scale of operations is larger than average. Leaders and followers don't differ as to age. Region II leaders are below average in age and well above average in scale of operations and education.

Kinship relations seem related to the use of sources of influence. Fifty-three dairy farmers from Region I named relatives as the persons who most influenced his decision to adopt a given dairy practice. Twelve opinion leaders served as sources of influence for these 53 dairy farmers.

Information and Opinion Leaders

Most of the dairy farmers named as sources of information were also named as influentials. In Hatillo municipality, for example, 19 of the 27 opinion leaders were named as information leaders; in Arecibo, the two information leaders were also named as opinion leaders. The same situation appeared in the ten other municipalities comprising both regions.

Summary

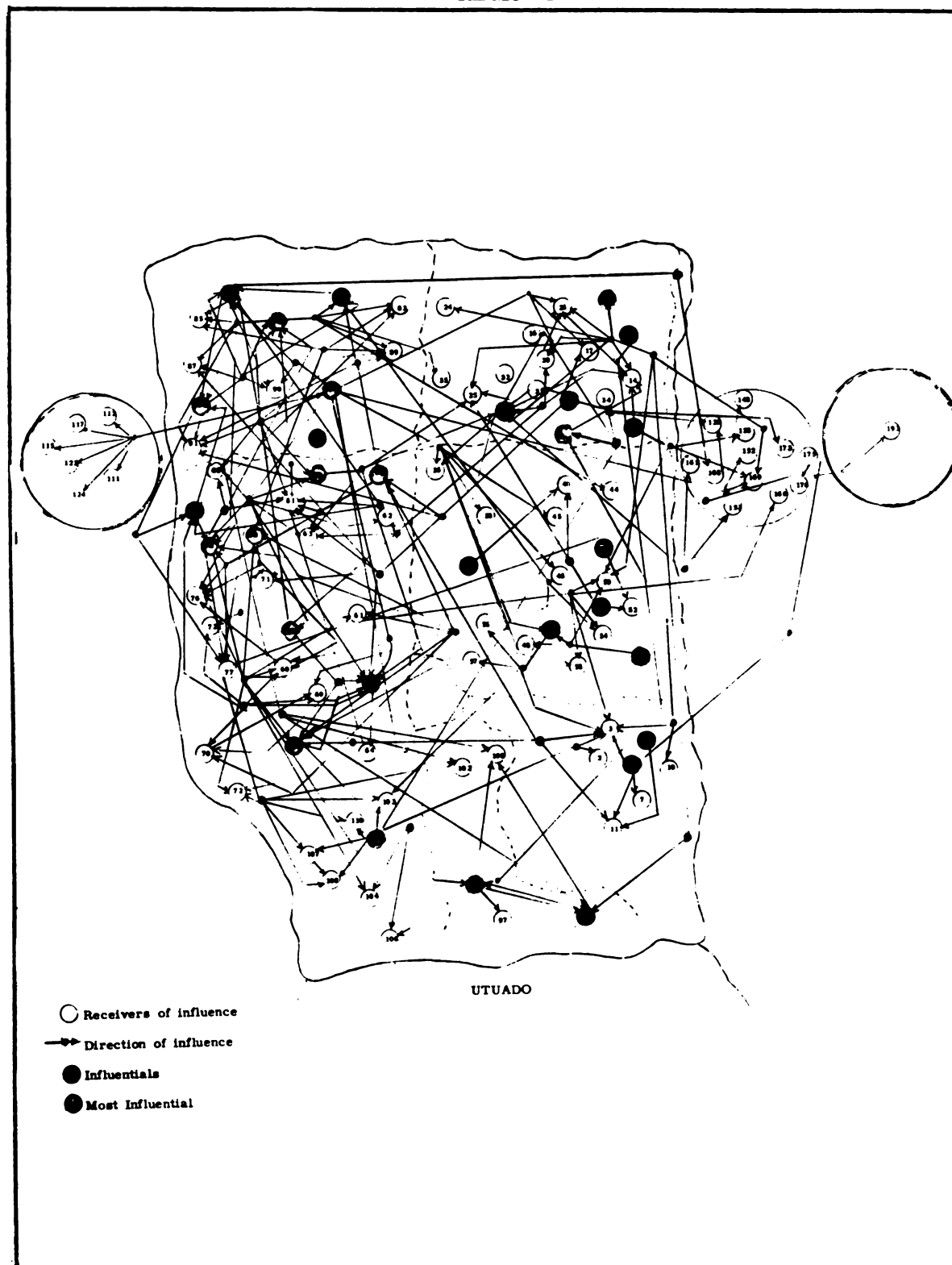
The data show there is a close relationship between distance and incidence of opinion leadership in both regions. The less the distance between farms and the larger the concentration of dairy farmers in barrios and municipalities, the greater the number of dairy farmers named as opinion leaders and the larger their range of influence. Results suggest the tendency of opinion leaders to be more mobile than the rest of the dairy-farmer population. Opinion leaders seem to carry out their influence within municipality boundaries, but their role as influentials often extends further.

Puerto Rican dairy farmers often seem to look to relatives for farm information and advice.

Opinion leaders tended to have more education and larger farm businesses than average. Region II leaders tended to be quite young, but Region I leaders didn't differ from followers with respect to age.

• SOCIOGRAM - 4

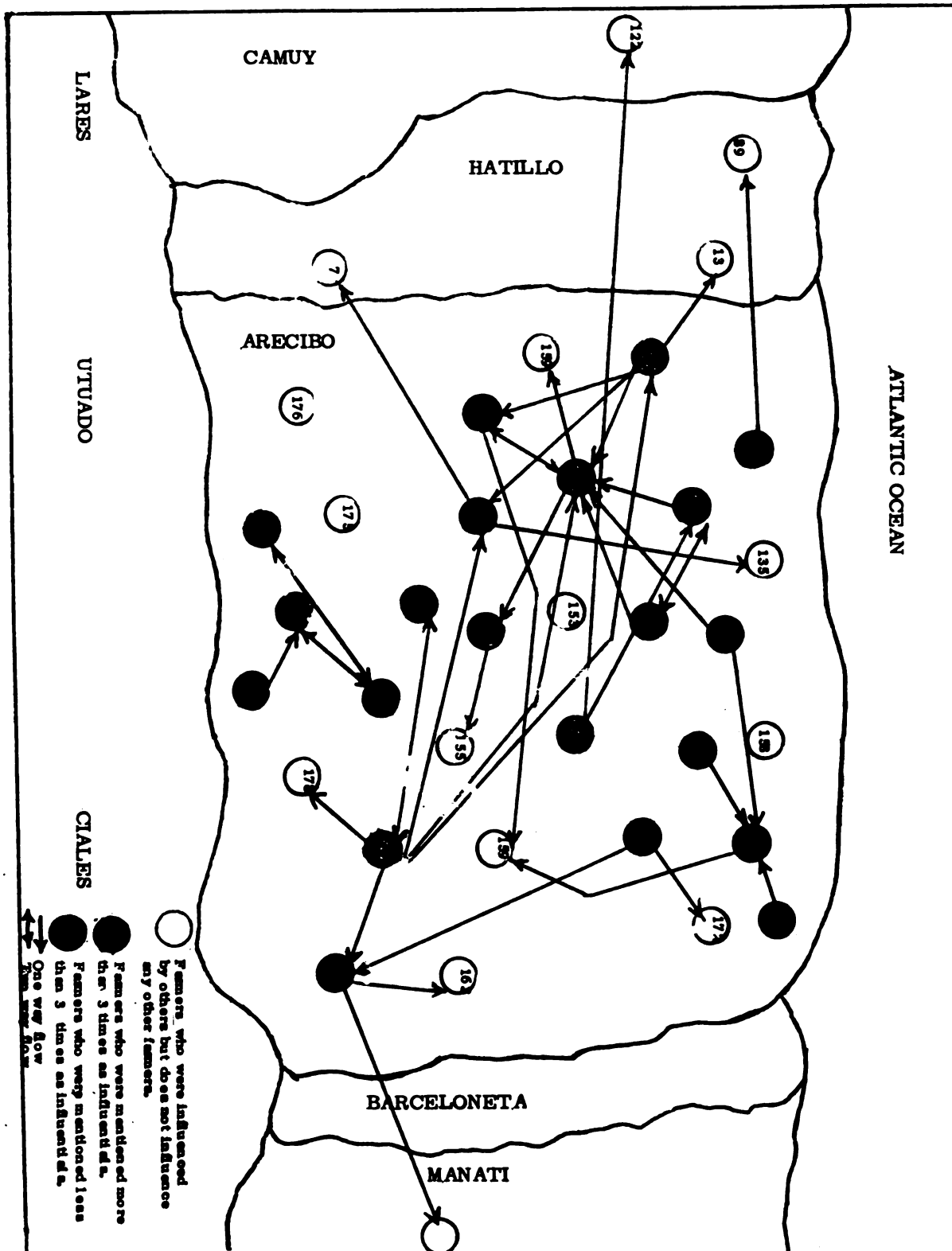
SOURCES OF INFLUENCE IN HATILLO MUNICIPALITY
REGION I



- The location of influentials was determined by the dairy farmers answer to the following question - Who was the person or persons who most influenced your decision to adopt_____? Ten dairy practices were used as frame of reference.

• SOCIOGRAM - 5

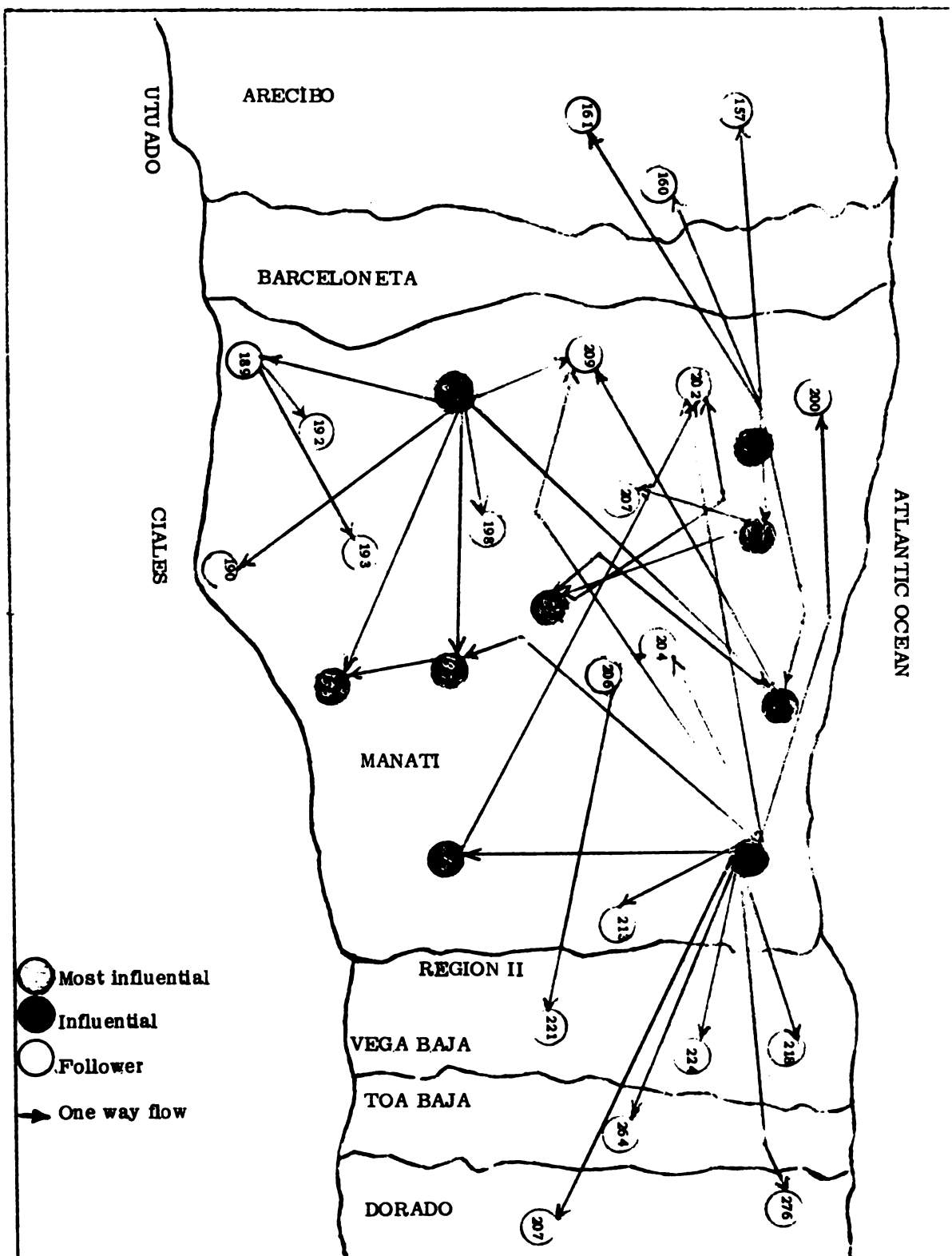
SOURCES OF INFLUENCE AMONG ARECIBO DAIRY FARMERS
REGION I



* The location of influentials was determined by the dairy farmers answer to the question - Who was the person or persons who most influenced your decision to adopt _____ (practice)?

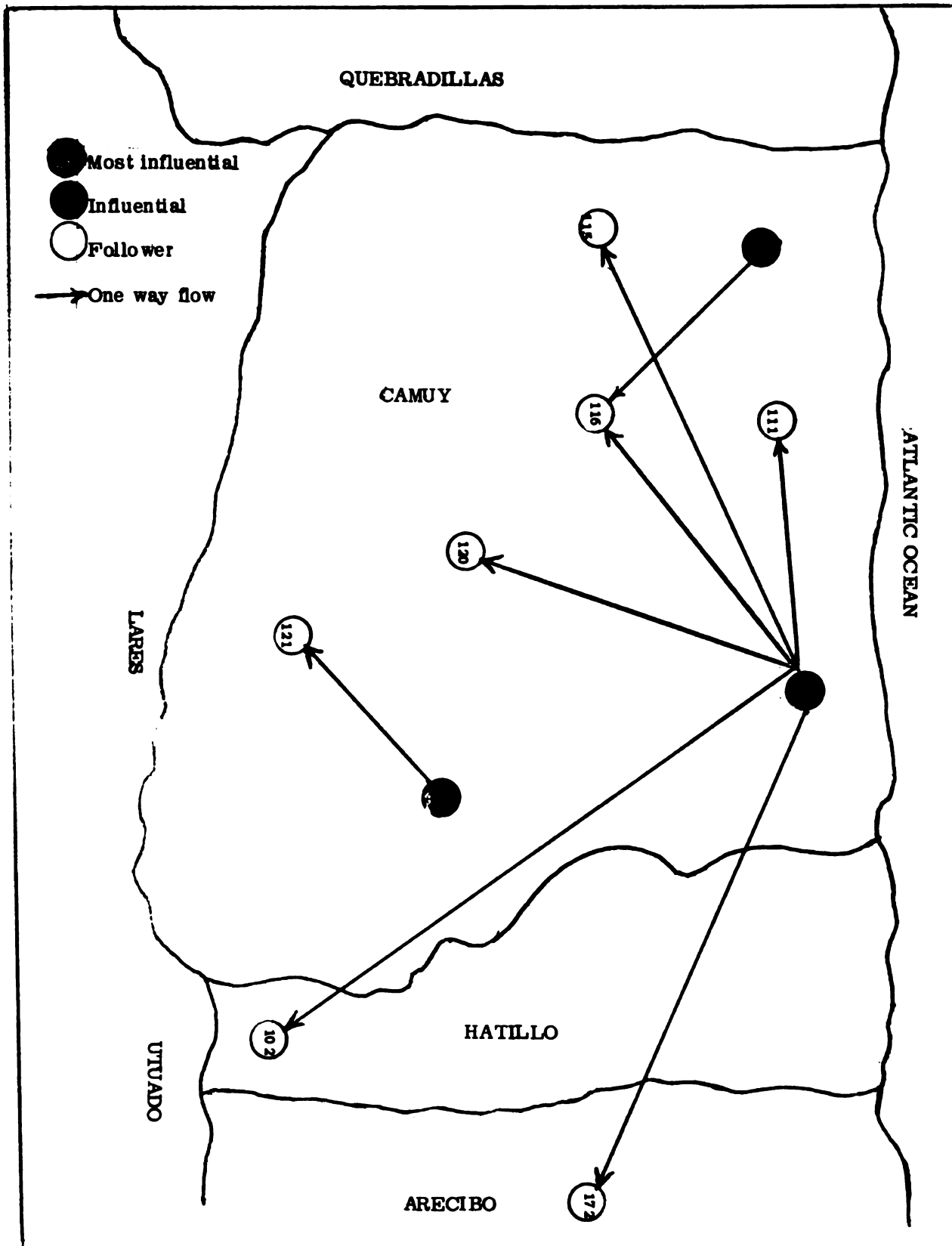
* SOCIOGRAM - 6

SOURCES OF INFLUENCE AMONG MANATI DAIRY FARMERS
REGION I



* The location of influentials was determined by the dairy farmers answer to the following question - Who was the person or persons who most influenced your decision to adopt _____ (practice)?

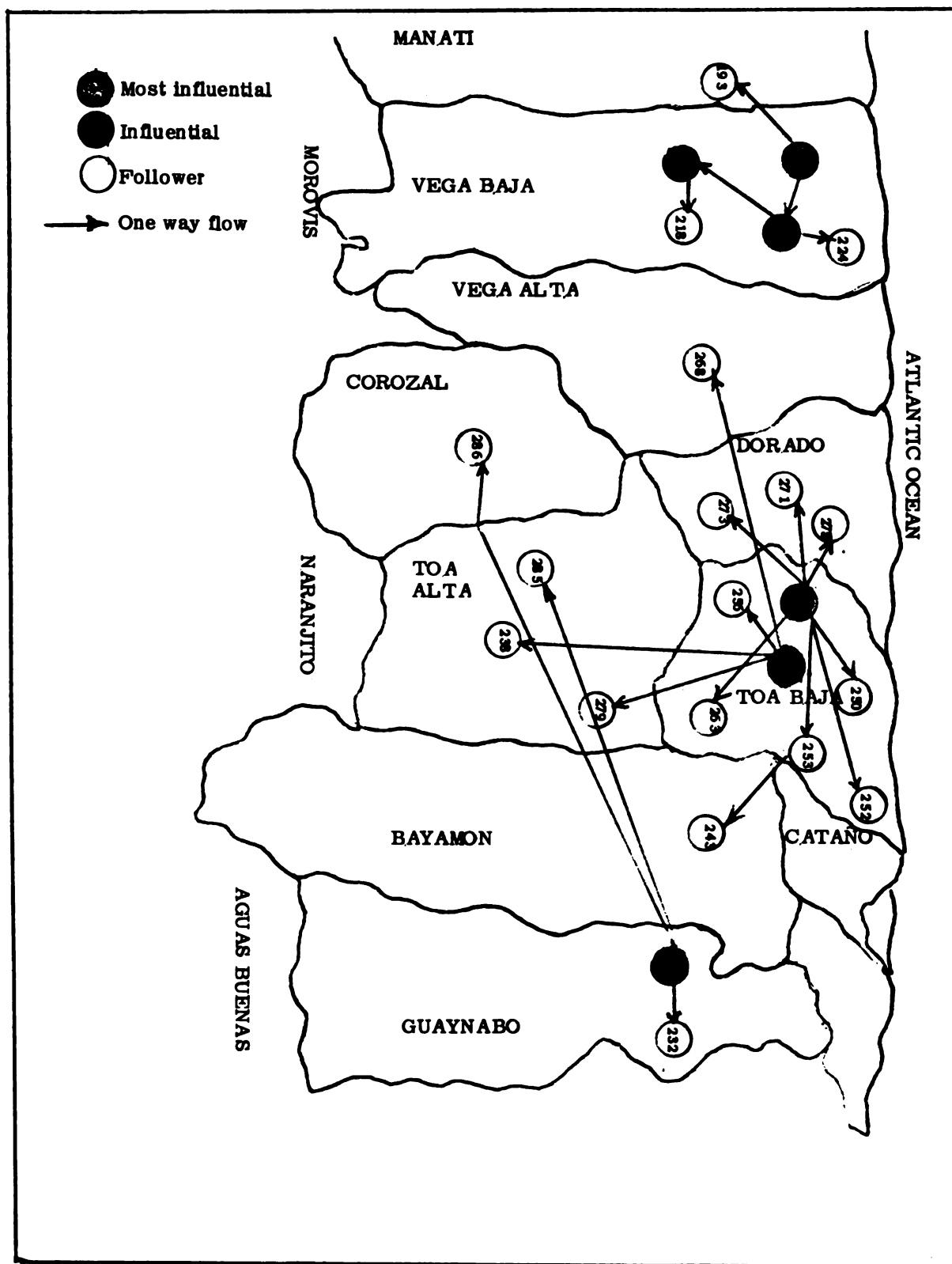
SOURCES OF INFLUENCE AMONG CAMUY DAIRY FARMERS
REGION I



The location of influentials was determined by the dairy farmers answer to the question - Who was the person or persons who most influenced your decision to adopt _____ (practice)?

* SOCIOGRAM - 8

SOURCES OF INFLUENCE ON REGION II



* The location of influentials was determined by the dairy farmers answer to the question - Who was the person or persons who most influenced your decision to adopt _____ (practice)?

TABLE 11--Comparison between general characteristics of the dairy farmers population and opinion leaders from the areas

	Mean for opinion leaders	Mean for the dairy farmers population	Difference
<u>Region I</u>			
Age (in years)	46.80	46.07	.73
Schooling (in years)	8.70	7.81	.99
Acres	109.00	61.10	48.90
Weekly milk production (in thousand quarts)	6.66	4.13	2.53
<u>Region II</u>			
Age (in years)	38.33	47.75	9.42
Schooling (in years)	14.10	10.44	3.66
Acres	302.10	253.19	48.91
Weekly milk production (in thousand quarts)	9.61	8.79	.92

Table 11 suggests that Region I opinion leaders are distinguished primarily by their large scale of operation. In Region II, age, schooling and scale of operations are all important.

Interaction

Region I had 49 leaders, Region II six. The first region's greater opportunities for interaction, small distances between farms, and larger concentration of dairy farmers appear to explain this difference in large part.

Opinion leaders from Region I depended heavily on agricultural officers. Opinion leaders from Region II appeared to get much of their information directly from research centers, from farm magazines, and technical bulletins.

Value Orientations and Leadership

The sociometric data showed the location of information and opinion leaders among the dairy farmers studied. To determine the relationship between value orientations and ability to lead other people, each farmer's correlation with each factor obtained in the two-factor solution was calculated. From a total population of 233 dairy farmers studied, 175 fell within Factor I and 58 within Factor II. Of the 58 dairy farmers in Factor II (bipolar), 35 fell in Type III and 23 in Type II. Of the dairy farmers population falling in Type I (Progressive) 20 were named information leaders by their fellows. Five Type III and two Type II farmers were named as information leaders.

Thirty Type I, five Type II, and two Type III farmers were named opinion leaders.

One-eighth of the Type I dairy farmers, one-seventh of those assigned to Type III, and one-eleventh of the Type II farmers were information leaders. In short, the transitional type led in proportion of persons who were information leaders, followed by the progressive and the traditional types in that order.

The opinion leader situation was different - one out of every five Type I persons was named an opinion leader, while the proportions for Types II and III remained the same as above.

CHAPTER VIII

CONCLUSIONS

The theory of intra-cultural variation in value orientations has been the conceptual scheme underlying this study. This theory postulates that a given society contains variously-oriented subgroups characterized by a rank order of preference given to a set of basic principles which directs behavior in the solution of human problems. The idea of these principles, called basic values or value orientations, has been a core concept in this investigation.

Basic values or value orientations were bases for the construction of a model to fuse the existing diffusion models with value orientations. The study dealt with the relationship between value orientations and observed differences among Puerto Rican dairy farmers in the diffusion and adoption of dairy practices.

The model was tested with 233 dairy farmers from two major dairy areas of the Island. One area - Region I - was characterized by farmers with short experience in the business, small scale of operations, and lower educational levels. This region was also characterized by larger concentration of dairy farmers - 173 distributed among four municipalities. The second region (Region II) had a preponderance of farmers with long experience in the business, larger-scale of operations, and higher educational levels. Only 76 dairy farmers are located in

the area's 12 municipalities.¹

The first part of this study sought to identify dominant value patterns among the dairy farmers of both regions. To do this, we had respondents rank 48 value statements into 11 piles ranging from those with which they agree least to those with which they agree most. The statements posed different alternatives for the solution of human problems.

The data was submitted to factor analysis and a two-factor solution was selected. It accounted for 42 per cent of the variance, and a more complex solution accounted for little of the remaining variance. The solution produced one pure factor (Factor I) and a bipolar factor (Factor II). Factor II suggested two types of dairy farmers with value orientations in opposite directions.

As was predicted, three types of dairy farmers were present with variant patterns of structuring the world. The most progressive type found was Type I. He was future minded, favorable toward hard work and achievement, a strong believer in science and highly independent in his decisions. He seemed to be a religious person. This is indicated by his rejection of those items he interpreted as defiant to God's power. He was very similar to the ideal type constructed in the theoretical model and quite different from the Typical Spanish American from New Mexico who seemed to be quite subjugated to nature.

Time Orientations - Type I persons perceive the future as something to look forward to. For example, some typical comments by Type I

¹A municipality is a geographical area comprising an urban center and rural neighborhoods or barrios.

respondents to explain why they ranked value items of this type as the ones with which they most agree were the following:

I am in favor of everything that bring changes. Life becomes more meaningful when one sees how changes in society bring improvements in all aspects of life.

One would be ignorant to try to stick to the old ways of living. If one wants to live better he has to look forward and accept changes as they come.

I believe the new ways of living are the solution for human problems. Only through careful planning of all activities can we live a better life.

To teach children the ways of the past is unrealistic. I like to see them moving forward, and I think that to teach them the ways of the past is to induce them to live in a world of fantasy.

These statements clearly indicate a progressive view of the world. Apparently Type I farmers had received the benefits of the dynamic program which had been operating on the Island since 1940 and which has helped Puerto Rico to change from a backward region to one of the most advanced areas in Latin America. They are happy with these changes, and they seemed to favor the continuing change. That is why they prefer the future over the present and past.

Activity Orientation - Type I is aware that the future will be best if he works hard and keeps pace with the ever-changing conditions of his society. The saying "leave it for tomorrow" is a thing of the past. The correct theme is "let us do it right now so we can plan more effectively for tomorrow." This direction toward hard work and achievement becomes clear in the reasons given for "agreeing most" with value items favoring this orientation:

I am a poor man in economic resources, but rich in desires and energy to work for what I want. If I want something, I have to work for it. God will reward my efforts.

Man has the power to make his own destiny because God has provided him with the means to get what he wants if he works hard and plans right.

If you want to get something, you have to work for it. You cannot expect to achieve things and to live better if you don't work hard enough.

Man-Nature Orientation - The religious influence plays an important role in all aspects of the Type I dairy farmer's life. He recognizes and respects God's power. He tends to interpret many items from the religious point of view. For example, he believes in science as a way of achieving progress. However, when he gave a religious interpretation to some items and perceived them as contrary to his faith, he rejected them. Some typical comments made by the respondents which support our conclusions are the following:

We are living in a modern world and I believe that we have to keep pace with progress. But I reject the idea that man is the whole master of nature. It is true that man can master many natural forces, but all his power is subdued to God's will.

I believe in progress, but not to the extent of believing that man's power is omnipotent.

I believe that man can control droughts by means of irrigation and river floods by constructing dikes, but because I'm a Roman Catholic, I reject the idea that man is the sole master of nature. Over man is always God.

This type of dairy farmer does not seem to perceive any conflict between believing in progress and his religious faith.

Relational Orientation - The independence of Type I is demonstrated by his desire to work on his own, to be his own boss, to make his own decisions. He seems to believe in the power of vote rather than on authority emanating from a leader or from a collective decision. His value direction is exemplified by the following comments:

I believe in democracy. I believe that in the solution of any problem which will affect many people, any decision has to be taken by the majority. We are not living in Cuba. We are living in a democracy.

I want to be my boss, to work on my own. In this way I will have an incentive to work for.

Statements rejecting the authoritarian and collective ways of looking at the world were highly favored by this type. Those statements favoring the authoritarian or collective types of behavior were usually rejected.

Type II

This was the most traditional type of dairy farmer. He consistently favored the value items suggesting a favorable position toward the old ways of living. In some cases, however, he showed a slight tendency to favor value items referring to modern states of affairs.

Time Orientation - Type II was ambivalent with respect to the time dimension. In some instances, he accepted the future or the present over the past. But despite his ambivalence, his preference for the ways of the past was noticeable from the way he sorted the value items and the comments he made when requested to give the reasons for ranking items favoring the traditional viewpoint first. Some of the comments made by this type of person were the following:

I am using many things that I learned from my father, and I feel they are better. I teach the old traditions to my children because I consider them correct and better.

I strongly reject the idea that changes are always good. There are many instances in which changes bring a lot of problems. For example, in the case of our children - today there is no respect for the parents.

In the past there were many good things, but we can't stick to them. If one likes to be happy, one has to accept changes as something inevitable.

Man-Nature Orientation - Type II highly favored the fatalistic position that man has to be subjugated to the natural processes that affect life. The subjugation is exemplified by some of the following comments made by respondents with this value direction:

God is the master of nature and we have to accept his will. I feel it is impossible to change nature. We have to accept the power of natural forces to control our destiny. The only one who can master the natural processes is God. Man can never be the master of nature.

Activity Orientation - The strong preference for easygoing ways of life and rejection of hard work and achievement were indicated by sorting of the value items. Additional information about the value direction of Type II came from the answers given to the question of why they selected these items as the ones with which they agree most. Some comments were the following:

I work when I have work to do. But my leisure time is my leisure time and I use it visiting friends and enjoying life. We can't stick to work at all times. We need time to relax and enjoy life.

In my free time what I like most is to go to the movies or to watch television. I don't like to think on work while I am resting.

As indicated by value-item sorting, this type of person was more inclined toward an easygoing way of life than the other two types.

Relational Orientation - Type II favored authority emanating from a leader, over the collective or democratic way of arriving at decisions. The authoritarian outlook is exemplified by comments like the following:



It is the boss who has the responsibility to make the crucial decisions on group problems.

I believe that in the solution of community problems the best thing to do is to decide on what to do by unanimity of the people affected. But when the things get tough and a unanimous decision is not possible, the best thing to do is to rely on the decision of the leaders.

Type II, then, was the most traditional dairy farmer studied. He seemed unhappy with changes occurring in the Island, and he preferred to stick to the old ways of living. But he also is aware that progress can not be blocked, and that is the reason for his apparent acceptance of many modern ways of living. This writer believes such persons conform to the ever-changing conditions in Puerto Rican society in order to continue being an integral part of that society.

Type III

This type of person seemed to be in a state of transition. His sorting of value items shows clearly that he shares both the progressive and traditional ways of looking at the world. He apparently is trying to accommodate to a changing situation he was not ready for.

Relational Orientation - Type III was not as independent in his actions as the progressive type nor as dependent on leader authority as the traditional type. He assumed a middle position - the collateral position. That is, he showed preference for groups in which every member has the same rights and duties and in which all members have something to say about decisions affecting the group. For example, he tended to make comments like these:

I don't like to work in groups in which a leader makes all the crucial decisions. The best way to solve a problem is to get unanimity among group members on what to do.

I prefer to work in groups in which all members have the same rights and obligations. I don't believe that we have to rely on the sole decision of a single person. Many people will arrive at a better decision than a single person.

Time Orientation - In his time dimension, Type III also showed confusion with the present state of affairs on the Island. However, he showed an inclination to accept these changes as beneficial to him. Apparently his previous situation was uncomfortable and change has improved matters. But he's still rooted to some of the old traditions. His state of transition is suggested by his sorting of value items and by comments like these:

Each epoch has produced changes, and as change continues more progress can be attained.

I prefer the present, but we can't put the future and past aside. To look at the past is good because it will allow us to make comparisons. To think of the future is also beneficial because it helps us plan our ways of life.

Man-Nature Orientation - Here again Type III seemed to be a man in transition. He rejected the fatalistic view of the traditional man and the mastery-over-nature position of the progressive man. His sorting of value items indicated a desire to live in harmony with these natural processes affecting life. Typical comments included:

Against nature no one can go. If one defies the natural forces, he is looking for trouble. It is better to live in harmony with these natural processes than to defy them.

I am in agreement because I believe that there is a plan to live and that by maintaining a balance between nature and man's life one can live longer.

Activity Orientation - Type III has a middle position on this value orientation. He rejected the easygoing tendencies of the traditional man and the emphasis on hard work and accomplishment by the

progressive man. His value direction was clearly defined by value-item sorting and by comments such as the following:

I like to use my time effectively by doing and accomplishing things. But I also like to use some time just talking with my friends or having a good time.

I am young and I like to have fun after a hard working day. Every person needs some time for leisure. The best thing to do is to keep a balance between hard work and pleasure.

The theory of intra-cultural variations postulated in this study was supported by the data. As predicted, three types of dairy farmers with variant value patterns were found - a progressive type, a transitional type and a traditional type.

Each type found in this investigation differed markedly from the Spanish American of New Mexico in many respects while resembling him in others. For example, in their relational orientations, Type I and the Spanish Americans seemed to favor man's independence in his actions. However, they were quite different with respect to time, activity and man-nature relationships. In the man-nature area, the Spanish American of New Mexico tended to be fatalistic while Type III favored living in harmony with nature. The Spanish American favored the easygoing way of life, while Type III took a middle position on activity - a balance between leisure time on the one hand and hard work and achievement on the other. With respect to time, he and the New Mexico Spanish American were quite similar. In the relational area the Spanish American favored individuality while Type III took a collateral view.

Type II had a similar man-nature activity orientation to the Spanish Americans of New Mexico and quite different in his time and relational orientations.

This study provided some promising leads, but further testing of the value instrument is needed before one can confidently make generalizations. Replication is suggested on other rural and urban populations. Testing in other Latin American countries would allow comparison of these countries. In our opinion, international programs for underdeveloped areas will improve if they take account of dominant value patterns in each society.

This study implies that technological change agents should be familiar with the dominant characteristics of a society as well as with intra-societal variations in value orientation.

Values, Communication Orientations and the Diffusion Process

After finding the farmers' dominant value patterns, we investigated the relationship between value orientations and the diffusion and adoption of dairy farm innovations. We studied Puerto Rican dairy farmers' predispositions towards technological change. We did so in a framework which integrates the value orientations postulated by Kluckhohn and Strodtbeck (1961) (2) with the diffusion models of Beal and Bohlen (1957) (3), Emery, Oeser and Tully (1958) (4), Wilkening, Tully and Presser (1962) (5) and Deutschmann and Fals Borda (1962) (6).

Part I of this study dealt with communication orientations as related to value orientations and adoption of dairy farm practices. Ten dairy practices were used as test situations. The communication hypothesis was tested by measuring the means (channel-source combinations) used by dairy farmers in getting information related to adoption. Using the Deutschmann Channel Orientations Model (1962) (6), dairy

farmers were classified as egocentric, intra-community, extra-community near, extra-community far or impersonally oriented. Indices were constructed to measure values and communication orientations.

The predicted relationships between values and channel orientations during the awareness stage of the diffusion process were not supported by the data. Traditional farmers did not have a significant tendency toward egocentric or intra-community channel orientations. Progressive farmers didn't show predominantly impersonal channel orientations. Finally, people with transitional values had no significant tendency toward extra-community channel orientations. The same results appeared with each of two communication channel indices - the Deutschmann Channel Index and the Near-Far Channel Index. There seem to be three possible explanations for these results.

First, value and channel orientations may really be unrelated.

Second, the indices used weren't really measuring channel and value orientations. If this is true, further research with more refined indices is needed to reject or confirm the predicted relationships.

Third, the relationships between values and communication orientations exist, but not at the awareness stage. Awareness of new ideas or practices may often not require a purposive act. One can learn of an idea through a given channel accidentally without being oriented to the use of that channel.

To further explore the third possibility the same hypotheses were tested during the interest stage. When the Deutschmann Channel scores were correlated with value scores, relationships again failed to appear except in one case. The predicted relationship between being progressive and being impersonal-channel oriented was significant. When the

Near-Far Channel Index was used, the predicted relationships between values and channel orientations were clearly established. For example, the predicted relationship between being progressive and being extra-community channel or impersonal channel oriented was significant; the predicted negative relationship between being progressive and being intra-community channel oriented was significant; the predicted relationship between being traditional and the tendency to disregard extra-community channels or impersonal channels as sources of information was significant.

These findings tend to confirm our theoretical position that the communication channel orientations of a given individual can be explained by value orientations.

These findings suggest that the interest stage of the diffusion process is a better one to detect relationships between values and channel orientations. For example, if a farmer is progressive oriented, it is in this stage that he will seek the information needed in the channels he is oriented to use, like exposure to mass media.

The findings also suggest that the Near-Far Index is stronger than the Deutschmann Channel Index in defining relationships between values and channel orientations. The egocentric type found in our study is probably not the same type of person conceived by Deutschmann as egocentric. To be egocentric, in our study, one had to see a demonstration in his own barrio. The egocentric type of dairy farmer in our study is really an intra-community channel oriented person whose major sources of information are in his own barrio.

In conclusion, the data has suggested but not confirmed a relationship between value and communication channel orientations. More research with more refined indices is needed to conclusively reject or confirm the suggested relationships. The Deutschmann Channel orientations concept does appear useful in predicting diffusion and adoption of new technology and further research would seem in order. If further research shows that values influence channel orientations, change agents can improve their use of communication channels by becoming familiar with the dominant value patterns of their audiences. This study has opened the door to further research which may help develop a stronger, more refined diffusion theory.

Part III of this study was divided into two major areas of concern - 1) frequency of exposure to mass communication channels and how it relates to values and communication orientations and 2) the relationship of values and communication orientations with time, degree and rate of adoption for dairy farm innovations.

Frequency of Exposure to Mass Media

Here we looked for relationships of values and communication orientations to frequency of mass media exposure. We studied exposure to all media as well as individual channels.

Another purpose of this phase was to further test conclusions from other diffusion studies. For example, Rogers (1958) (13), Lionberger (1960) (10), Beal and Bohlen (1957) (3), Emery, Oeser and Tully (1958) (4) and many others cited in Chapter II, found that frequency of exposure was an important determinant of farm adoption. For example, Emery, Oeser and Tully, in their classic study, found that urbanization leads to frequent media exposure, which in turn leads to

adoption. Deutschmann and Fals Borda (1962) (6) and Detuschmann and Mendez (1962) (11) found that impersonal-channel oriented individuals are highly predisposed towards the adoption of innovations.

In this study, we attempted to determine what predisposed the dairy farmers to be exposed to mass media. We predicted a positive relationship between progressiveness and frequency of exposure.

Our findings showed no significant relationship between being progressive and overall media exposure. However, there was a significant positive relationship between being progressive and exposure to newspapers and farm magazines. Apparently the progressive oriented dairy farmer is quite selective in his media consumption, preferring newspapers and farm magazines. Value orientations seem relevant to mass media channel choice.

Similar findings appeared when Deutschmann's Channel Orientation theory was used as a frame of reference.

Apparently, value orientations can be used to help explain predispositions toward channel selection and frequency of use.

However, further research is needed with different populations. The dairy farmers studied here had relatively high education, standards of living, and size of operations. This writer plans to replicate the study with coffee, tobacco and sugar cane farmers whose educational levels, scale of operation and standards of living are not so high.

The Adoption Process - Diffusion students in the United States have found a close relationship between time of awareness, time of adoption, and degree of adoption of farm innovations. American models of agricultural diffusion have categorized farmers as innovators, early adopters, early majority, majority and lated adopters or lagards.

Deutschmann, et. al., in their Latin American studies, found a close relationship between being impersonal and extra-community channel oriented and time of awareness, time of adoption and degree of adoption. Our aim was to find out how the theory of value orientations might explain these phenomena.

We predicted a positive relationship between time of awareness and progressive value orientations. That is, we predicted a significant positive relationship between being progressive and early awareness about dairy innovations; a significant negative relationship between being traditional and late awareness. These predicted relationships were not confirmed.

The same findings were observed when time of awareness was investigated under the communication orientations model. Going further, we investigated the relationship between frequency of exposure to mass media and time of awareness. Again no relationship appeared in the data. In other words, being impersonal-channel oriented was not significantly related to early awareness of dairy innovations. These findings conflict with Deutschmann's in Latin America (1962) (6, 11). There was no significant correlation between frequency of media exposure and time of awareness about dairy practices. The findings confirm a suggestion earlier in this study - that time of awareness can be accidental and does not necessarily indicate predisposition toward use of communication channels. This finding explains the lack of support for our previous hypotheses relating values to communication channel orientations during the awareness stage.

Time of Adoption - We predicted a significant positive relationship between time of adoption and being progressive. We also predicted a positive relationship between being progressive and being impersonal or

extra-community channel oriented. These hypotheses were confirmed by the data. These findings also confirmed Deutschmann's findings in Latin America.

The data showed a significant positive relationship between frequency of exposure to mass communication and time of adoption. These findings tend to confirm our assumption that value orientation is a useful concept by which the diffusion process can be analyzed.

But again one has to be cautious in making generalizations. Up to now the only inference one can make is that in the Puerto Rican situation with high standards of living, educational levels and scales of operations, a theory of value orientations has demonstrated potential in explaining the diffusion process.

Degree of Adoption - What predisposes some farmers to be higher adopters than others? This was another area investigated. Other diffusion students have found that degree of adoption is related to education, scale of operations, channel orientations, and degree of urbanization. We expected to confirm these previous findings. Going further, we attempted to find out a broader explanation. As an extension worker for 14 years, the author found that farmers with larger operations aren't always most likely to adopt innovations. Likewise, the highest adopters aren't always highly educated. These variables doubtless influence adoption, but farmers' value orientations might also be very important. The predicted relationship between value orientations and degree of adoption was confirmed by the data. The same results were obtained when degree of adoption was studied under the communication channel orientation theory, and also when degree of adoption was correlated with frequency of exposure to mass communications.

Again the usefulness of value orientations in predicting adoption was confirmed. This study suggests once again that the diffusion process can be explained under a value orientations model.

Participation in the Stages of Diffusion - American diffusionists constructed a diffusion model with five stages leading to adoption of new ideas and practices. The stages are: awareness; interest (seeking further information about a practice if one is interested in it); evaluation (seeing if the practice seems worth trying in his operation); trial on a tentative or small-scale basis; and finally full-fledged adoption. However, the concept of five stages has been widely disputed among social scientists. Deutschmann et. al. (1962) (6, 11), in the Latin American studies on diffusion, found that some individuals tend to skip stages. Rogers (1962) (1) reported similar findings.

In this study, we did not study the question of whether individuals skip or follow the stages. Instead, we looked at dominant value and communication orientations of those who follow and those who skip stages. Progressive-oriented dairy farmers usually followed the stages, while traditional farmers tended to skip most of them. Also, the progressive dairy farmer apparently is predisposed to accept new technology, while the traditional farmer tends to reject or just adopt without question. Positive significant relationships were found between being progressive and the following variables: number of dairy practices heard about; information seeking; trial of dairy practices; and adoption of dairy practices. Traditional oriented dairy farmers showed a statistically significant tendency to score low on these variables. The transitional farmers were average as expected (i.e., they followed more stages than the traditional-oriented dairy farmer and less than the progressive oriented).

When the same variables were studied in relation to channel orientations, the same relationships were observed. The impersonal and extra-community channel oriented farmers participate most in the stages of adoption, while the intra-community and egocentric channel oriented dairy farmers skip most of the stages (i.e., just adopt without question). Once more the impersonal or extra-community channel oriented person of Deutschmann's model and the early adopter or innovator of the American-Australian diffusion models appear to closely resemble the progressive dairy farmer of our value model. Late adopters of the American-Australian model also resemble the egocentric or intra-community channel oriented of Deutschmann's model and the traditional farmer of the value model.

Values, Communication Orientations and Social Behavior

Three aspects of the dairy farmers' social behavior were investigated in this study - self perception as advice givers; self perception as advice seekers; and belonging to organizations.

No relation was observed between values and either advice giving or advice seeking. Contrary to our predictions, impersonal or extra-community channel oriented persons showed no particular tendency to perceive themselves as advice givers. The predicted negative relationship between being impersonal and self perception as advice seeker also was not found. However, there was an expected negative significant relationship between being extra-community channel oriented and self perception as an advice seeker.

One important unexpected finding was the positive relationship between being egocentric or intra-community channel oriented and perceiving oneself as an advice giver. As predicted, a positive relationship was observed between being intra-community channel oriented and advice seeking.

The data suggest that dairy farmers with impersonal and extra-community channel orientations do not perceive themselves either as advice seekers or advice givers. The egocentric and the intra-community oriented dairy farmers, who interact primarily with people residing in their own communities, seemed to perceive themselves as both advice seekers and givers. Attitudes toward formal organization participation were investigated in relation to value and channel orientations.

The hypotheses derived with the value and channel orientations model were supported by the data. As expected, the progressive dairy farmers belonged to the most organizations, traditional farmers to the fewest. The transitional dairy farmer fell in between. Shifting to communication channel orientation, impersonal channel and extra-community channel oriented dairy farmers were the most active in formal organizations, while egocentric and intra-community channel oriented farmers were less active. A positive significant relationship was observed between being progressive oriented and belonging to formal organizations. A significant negative relationship was observed between being traditional and belonging to organizations. A significant positive relationship was observed between being impersonal or extra-community channel oriented and belonging to organizations, while a negative and significant relationship was observed between this and being egocentric or intra-community channel oriented.

The findings once again suggested value orientations can help explain communication channel orientations and, more generally, the diffusion and adoption processes.

Other Findings - Contrary to our expectations, older farmers were more progressive. Education did not correlate significantly with value

orientations. A predicted positive relationship appeared between being progressive and size of operations. A negative relationship was observed between being traditional and size of operations.

The data suggest that scale of operation is importantly related to value orientations of the population studied.

The finding that older farmers are progressive might be attributable to their larger scale of operations.

Similar findings were observed when these variables were studied within the framework of the communication channel orientations theory.

Interaction Patterns in the Regions - Here we attempted to find out where the leaders in both geographical areas studied were located and their distinguishing characteristics.

First, key information leaders in each municipality were located by asking each respondent to name the dairy farmer who provided him (the respondent) first knowledge on each of 10 dairy practices. The findings showed that distance between farms is related to the opportunities for interpersonal relations, which in turn help determine the importance of person-channels as sources of first knowledge about innovations. This finding ties in with previous studies which show that distance helps determine the degree of interaction. That is, people physically close to each other have the greatest opportunity for interaction. The greater the opportunity for interaction, the greater the role of interpersonal channels for the spread of farm information, i.e. Deutschmann and Fals Borda (1962) (6), Deutschmann and Mendez (1962) (11), Emery, et. al., (1958) (4), Lionberger (1960) (10).

The municipality of Hatillo had the largest concentration of dairy farmers and ranked first in number of information leaders named. The

same condition was observed throughout the two geographical areas studied.

The data also show that information leaders were more mobile than other dairy farmers. Kinship was also important in naming of information leaders. In Hatillo, where kinship relations among dairy farmers are very common, 41% of the dairy farmers named a kin as a source of first knowledge about dairy practices. The most distinguishing characteristic of the information leaders was their larger size of operations.

Also, information leaders tended to use as first sources other information leaders. And they appeared to be the ones who got their information from channels such as mass media, change agents and other leaders.

Opinion Leaders - As with information leaders, distance seems to relate rather closely to incidence of opinion leadership in both regions. The less the distance among farms and the larger the concentration of dairy farmers in barrios and municipalities, the greater the number of dairy farmers named as opinion leaders and the greater their range of influence. Results also suggest opinion leaders tend to be more mobile than other dairymen. Opinion leaders seem to carry out their influence mainly within municipality boundaries, but their role as influentials often extends further.

Puerto Rican dairy farmers often seem to look to relatives for farm information and advice.

Opinion leaders tended to have more education and larger farm business.

The data showed some relationship between leadership patterns and values. One-eighth of the progressive dairy farmers (Type I), one-seventh of the transitional dairy farmers (Type III) and one-eleventh

of the traditional oriented dairy farmers (Type II) were named as information leaders. In short, the transitional and progressive types led in proportion of persons who were information leaders, followed by the traditional types.

The opinion leaders situation was different. One out of every five Type I persons was named an opinion leader, while the proportions for Types II and III remained the same as above.

The study suggested a relationship between value orientations and ability to lead people. Dairy farmers with a modern or progressive view of the world were most often named as information and opinion leaders. On the contrary, few tradition-oriented people were named as leaders.

Implications of the Study - Our theory of value orientations seems to have potential as a frame of reference for the study of the diffusion and adoption processes. The value model used in this study explains the processes and the factors involved in them. In other words, the concept of values can be used to explain what predisposes individuals to adopt new innovations.

If values as viewed in this study play an important role in a person's attitudes towards technological change, change agents can profitably consider value patterns dominant in groups dealt with.

However, this study has only opened the door for further testing of the concept. Further research is needed in different contexts and with different populations in order to make broader generalizations.

Up to now we must restrict inferences to the dairy farmers studied. Further research, if it confirms our findings, will allow diffusion students to look at diffusion from a broader point of view.

In Puerto Rico, plans have been made to replicate the study with different populations - coffee farmers, tobacco farmers, sugar cane farmers and housewives participating in extension home demonstration clubs. An attempt will be made to refine the instrument and indices used in this study.

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APPENDICES

APPENDIX A

The value instrument and instructions for the interviewers.

Q-SORT - INSTRUCTIONS FOR VALUE ITEMS

As you know people react and behave in a different manner to different sorts of situations. Some people have different opinions about the best ways of living, about farm technology, about how to solve many family problems, and so on.

HERE WE HAVE A DECK OF CARDS (HAND RESPONDENT THE VALUE ORIENTATIONS CARD DECK).

In this group of opinion cards, we have tried to represent some of the things people say about such things.

We like you to describe your own feelings by sorting the cards (READY WITH THE BLUE CARDS), (ACT AS YOU TALK). I will spread out these blue cards which show how the opinion cards should be sorted.

We start with NUMBER 1 at the left here. Notice that it calls for the opinions you feel you most disagree with or disbelieve. And here is the rest. Notice that NUMBER 11 calls for the opinions you feel as closest to the way you believe or agree most.

BLUE CARDS

Disagree													Agree
Most	1	2	3	4	5	6	7	8	9	10	11	Most	

Read through each card in the deck. As you read a card and decide how you feel about the statement, you might begin sorting them into three piles: Those you agree most on the extreme right; those you don't feel much about in the middle; those you disagree most with in the extreme left side.

For example:

FIRST SORT

<u>PILE 1</u>	<u>PILE 2</u>	<u>PILE 3</u>
Most Disagree	Don't feel Much	Agree Most

Then, from the DISAGREE pile pick the two opinion cards that have the statements with which you disagree most---and put them on the top of RANK 1 card. Now from the AGREE pile pick the two opinion cards with the statements you agree most with and put them on the top of RANK 11 card.

From the cards that are at the left, pick the three you most disagree with and put them on the top of the RANK 2 card. Select the three opinion cards with which you most agree and put them on the top of RANK 10... card.

Continue in the same way until you have all the cards sorted and distributed the way the blue cards call for. If you change your mind about the position of a card, go ahead and shift it to where you feel it should be. We just have to make sure that each rank card has exactly the number of opinion cards it requires. After he is done, the opinion cards distribution on the top of the blue cards must be as follows:

BLUE CARDS (RANKED)	Most																Most
	Disagree	1	2	3	4	5	6	7	8	9	10	11	Agree				

OPINION CARDS TO BE																	
PUT ON EACH BLUE CARD		2	3	4	6	6	6	6	6	4	3	2					

When the respondent completes sort, ask questions on the three top rank opinions, the three bottom rank opinions. Ideas and opinions about the statements he ranked as most agree with or most disagree with - Why he disagrees or agrees most.

Write his comments on the paper sheet included in the envelope with the Q-Sort statements.

Note: After completion of the sort pack your cards in the order distributed by the respondent and rubber band the whole pack. Be VERY CAREFUL when packing the cards to avoid any misplacing of the cards. The form of packing them will be as follows:

Blue card NUMBER 11 at the bottom - the TWO most agree opinion cards over it...then the next BLUE CARD (No. 10) and the three next opinion cards on it...then the BLUE CARD number 9 and the four opinion cards on it. Follow the same procedure until completing the task. BE VERY CAREFUL IN DOING THIS TASK.

- The first of these is the fact that the system is not a simple one, but a complex one, involving many different factors and many different people. It is a system that is constantly changing and evolving, and it is one that is not easily understood or controlled.

- The second of these is the fact that the system is not a simple one, but a complex one, involving many different factors and many different people. It is a system that is constantly changing and evolving, and it is one that is not easily understood or controlled.

- The third of these is the fact that the system is not a simple one, but a complex one, involving many different factors and many different people. It is a system that is constantly changing and evolving, and it is one that is not easily understood or controlled.

- The fourth of these is the fact that the system is not a simple one, but a complex one, involving many different factors and many different people. It is a system that is constantly changing and evolving, and it is one that is not easily understood or controlled.

- The fifth of these is the fact that the system is not a simple one, but a complex one, involving many different factors and many different people. It is a system that is constantly changing and evolving, and it is one that is not easily understood or controlled.

- The sixth of these is the fact that the system is not a simple one, but a complex one, involving many different factors and many different people. It is a system that is constantly changing and evolving, and it is one that is not easily understood or controlled.

- The seventh of these is the fact that the system is not a simple one, but a complex one, involving many different factors and many different people. It is a system that is constantly changing and evolving, and it is one that is not easily understood or controlled.

- The eighth of these is the fact that the system is not a simple one, but a complex one, involving many different factors and many different people. It is a system that is constantly changing and evolving, and it is one that is not easily understood or controlled.

SUPPLEMENTARY SHEET ACCOMPANYING THE Q-SORT

Name of the Interviewer_____ Number of Interviewer_____

Name of Respondent_____ Barrio_____

Municipality_____

Date of the Interview_____

-
-
1. What are the reasons for choosing these two opinions as the ones with which you most agree?

a. WRITE HERE HIS COMMENTS (PROBE)ANY OTHER REASONS....

2. What are your reasons for choosing these opinions as the ones with which you disagree most with?

a. WRITE HERE HIS COMMENTS (PROBE)ANY OTHER REASONS....

NOTE TO THE INTERVIEWER.....AFTER COMPLETING THIS INFORMATION, PLEASE
PROCEED WITH PART III.

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Q-SORT ON VALUE ORIENTATIONS INSTRUMENT

I. TIME ORIENTATION

- t₃ (Past) 1. Children should be taught the traditions of the past. (The ways of the old people.) I believe that the old ways are best, and that it is when children do not follow them that things go wrong.

Espanol

A los niños se les debe enseñar las costumbres del pasado con mucho cuidado. Las viejas costumbres son siempre mejores y cuando los niños no siguen estas costumbres viejas, vienen dificultades.

- t₂ (Pres.) 2. Children should be taught some of the old traditions (ways of the old people), but it is wrong to insist that they stick to these ways. I believe that it is necessary for children always to learn about and take on whatever of the new ways will best help them get along in the world of today.

Espanol

A los niños se les debe enseñar las costumbres del pasado, pero no se debe insistir en que se sigan estas costumbres al pie de la letra. Los niños necesitan aprender y aceptar muchas cosas nuevas para vivir mejor hoy día.

- t₁ (Fut.) 3. In raising children I do not believe they should be taught much about past traditions. I believe that the world goes along best when children are taught the things that will make them want to find out for themselves new and better ways of doing things to replace the old.

Espanol

En la crianza de niños yo no creo se le deba dar mucha atención a las costumbres viejas. La vida es mejor para todos cuando nuestros hijos aprenden a querer buscar por sí mismos nuevos y mejores modos de hacer las cosas.

- t₁ (Fut.) 4. I really expect my children to have more than I have had if they work hard and plan right. There are always good chances for people who try.

Espanol

Realmente yo creo que mis hijos tendran mas de lo que yo he tenido, eso es, si trabajan duro y hacen sus planes con cuidado. Siempre existen buenas oportunidades para los que trabajan duro.

- t₂ (Pres.) 5. I don't know whether my children will be better off, worse, or just the same. Things always go up and down even if one works hard, so we can't really tell.

Espanol

Yo no se si mis hijos viviran mejor o peor, o lo mismo, que yo he vivido. La vida tiene sus alzas y sus bajas, aun cuando la gente trabaja duro.

- t₃ (Past) 6. I expect my children to have just about the same as I had or bring things back as they once were. It is their job to work hard and find ways to keep things going as they have been in the past.

Espanol

Yo espero que mis hijos vivan mas o menos como yo he vivido, y que hagan volver la vida como era antes. Es la responsabilidad de los hijos mantener la manera de vivir del pasado.

- t₂ (Pres.) 7. The past is gone and the future is much too uncertain to count on. So I believe it is best to give most attention to what is happening now in the present.

Espanol

El pasado ya ha pasado y el futuro es muy incierto para darle mucha atencion. Por eso yo creo lo mas conveniente es poner mi atencion en las cosas del presente.

- t₃ (Past) 8. I think that the ways of the past (traditional ways) are right and best, and as changes come things usually get worse.

Espanol

Yo creo que las cosas del pasado son mucho mejores y que los cambios por lo regular traen problemas.

- t₁ (Fut.) 9. I believe that it is almost always the ways of the future - the ways which are still to come - which will be best, and even though there are sometimes small setbacks, changes bring improvements.

Espanol

Yo creo que lo que venga en el futuro tiene que ser, casi siempre, mejor. Los cambios siempre traen mejoras aunque uno no vea las mejoras inmediatamente.

- t₁ (Fut.) 10. I am very pleased with the changes occurring here and everywhere because the new ways are usually better than the old ones. I like to see everything - even religious ceremonies - moving ahead.

Espanol

Yo me siento muy contento con los cambios que estan ocurriendo aqui y donde quiera, porque las nuevas costumbres y medios de vida son mejores que los viejos y a mi me gusta seguir lo nuevo en todos los aspectos (cosas), aun en las ceremonias religiosas.

- t₃ (Past) 11. I am very unhappy because of the changes that are occurring here and everywhere. I think that our ways of living should be kept exactly the same in every way - as they were in the past.

Espanol

Yo estoy muy disgustado con los cambios que estan ocurriendo aqui y donde quiera. Yo creo que las viejas costumbres y tradiciones se deben conservar tal y como eran en el pasado.

- t₂ (Pres.) 12. I feel that the old ways of living are better but we just can't hang on to them. It makes life easier to accept some changes as they come along.

Espanol

Yo creo que las costumbres y tradiciones del pasado son mejores, pero reconozco que hoy en dia es dificil e imposible guardarlas exactamente a como eran antes. La vida se hace mas facil cuando se aceptan los cambios que vienen con el tiempo.

II. RELATIONAL ORIENTATION

- r_3 (Lineal) 13. When we need a solution for a problem in our community it is best to depend on our community leaders to decide what is to be done.

Espanol

Cuando en nuestra comunidad surge un problema y necesitamos solucionarlo, lo mejor es depender de los lideres de la comunidad para que sean ellos los que decidan lo que debe hacerse.

- r_2 (Coll.) 14. When we need a solution for a problem in our community, it is best to call a meeting of the people affected and discuss the problem until almost everyone agrees what is to be done. We prefer to reach our decision unanimously.

Espanol

Cuando en nuestra comunidad surge un problema y necesitamos buscarle solucion, lo mejor es llamar a una reunion de las personas afectadas por el mismo, discutir el problema y llegar a una decision aceptada por todos sobre lo que debe hacerse.

- r_1 (Ind.) 15. When we need a solution for a problem in our community, the best way is for the problem to be discussed in a community meeting and to decide the matter by vote. We accept the majority decision even though there are still a great many people who disagree and object to the action.

Espanol

Cuando en nuestra comunidad surge un problema y necesitamos buscarle solucion, lo mejor es llamar a una reunion y decidir la accion a tomar mediante votacion. La decision de la mayoria es aceptada aunque algunos se opongan a la accion a tomar.

- r_1 (Ind.) 16. In deciding how to vote in an election, I prefer to make my own decision independently and without regard for the opinion of other family members or relatives.

Espanol

Cuando tengo que decidir como votar en una eleccion, yo prefiero tomar mi propia decision independiente de las opiniones que puedan tener otros miembros de la familia.

- r_2 (Coll.) 17. In deciding how to vote in an election, my family discusses the matter until almost everyone agrees on the party or candidate that the family prefers.

Espanol

Para decidir como votar en las elecciones, lo mejor es reunir la familia y discutir el asunto hasta que todos estemos de acuerdo sobre el partido o candidato por el que debemos votar.

- r_3 (Lineal) 18. In deciding how to vote in an election, the way my family votes is decided by the oldest member of the family.

Espanol

Para decidir como votar en las elecciones, lo mejor es que sea el jefe de nuestra familia quien tome la decision sobre como todos debemos votar.

- r_3 (Lineal) 19. If my brothers and sisters and I inherit a property, it is best for the oldest brother to take charge of, or manage the property.

Espanol

Si mis hermanos y yo heredamos una propiedad lo mas conveniente es que sea el hermano mayor quien se encargue de administrar la misma.

- r_1 (Ind.) 20. If my brothers and sisters and I inherit a property, it is best that each of us take his or her own share and do what he or she wants with it.

Espanol

Si mis hermanos y yo heredamos una propiedad lo mas conveniente es que dividamos y cada uno tome su parte de la herencia.

- r_2 (Coll.) 21. If my brothers and sisters and I inherit a property, it is best to manage the property together or decide among ourselves who is best to take charge of things.

Espanol

Si mis hermanos y yo heredamos una propiedad lo mas conveniente es administrar la misma entre todos o que el mas capacitado sea quien la administre.

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- r_1 (Ind.) 22. I prefer to work on my own, to be my own boss.

Espanol

Yo prefiero trabajar por mi cuenta, ser mi propio jefe.

- r_2 (Coll.) 23. I prefer to work in groups in which everyone works together and has the same rights and obligations.

Espanol

Yo prefiero trabajar en grupos en que cada uno tenga los mismos derechos y los mismos deberes.

- r_3 (Lineal) 24. I prefer to work in groups in which a leader or boss makes the important decisions.

Espanol

Yo prefiero trabajar en grupos donde un lider o jefe haga las decisiones importantes.

III. MAN NATURE ORIENTATION

- n_1 (Over) 25. It seems to me that modern scientific discoveries such as antibiotics or preventive vaccines (i.e. Polio) constitutes an effective way of increasing life span of man. By using modern scientific discoveries the average life span of human beings can be lengthened.

Espanol

Para mí los descubrimientos de la ciencia moderna, tales como antibioticos, vacunas preventivas (ejemplo la del polio) constituyen uno de los medios mas efectivos para alargar la vida del hombre. A traves de la ciencia el promedio de vida del hombre se alargara.

- n_2 (With) 26. I believe that there is a plan to life which works to keep all living things moving together, and if man will learn to live his whole life according to this plan, he will live longer than other men.

Espanol

Yo creo que hay un plan para mantener el equilibrio o balance entre la naturaleza y el hombre. Si el hombre vive en paz con la naturaleza su vida sera mas larga y feliz.

1. The first part of the document is a list of the names of the persons who have been appointed to the various positions of the Board of Directors of the Corporation.

2. The second part of the document is a list of the names of the persons who have been appointed to the various positions of the Board of Directors of the Corporation.

3. The third part of the document is a list of the names of the persons who have been appointed to the various positions of the Board of Directors of the Corporation.

4. The fourth part of the document is a list of the names of the persons who have been appointed to the various positions of the Board of Directors of the Corporation.

5. The fifth part of the document is a list of the names of the persons who have been appointed to the various positions of the Board of Directors of the Corporation.

6. The sixth part of the document is a list of the names of the persons who have been appointed to the various positions of the Board of Directors of the Corporation.

7. The seventh part of the document is a list of the names of the persons who have been appointed to the various positions of the Board of Directors of the Corporation.

8. The eighth part of the document is a list of the names of the persons who have been appointed to the various positions of the Board of Directors of the Corporation.

9. The ninth part of the document is a list of the names of the persons who have been appointed to the various positions of the Board of Directors of the Corporation.

- n₃ (Sub) 27. I really do not believe that there is much human beings themselves can do to make the lives of men and women longer. It is my belief that every person has a set time to live, and when that time comes, it just comes.

Espanol

Yo no creo que hay nada que el hombre pueda hacer para alargar la vida de los seres humanos. Creo que cada persona tiene cierto tiempo para vivir y cuando le llega su turno, le llega y se acaba.

- n₃ (Sub) 28. I think that all the activities in which human beings engage are subjugated to the natural and supernatural forces that affect life. Man is always subjugated to the fate of nature.

Espanol

Yo creo que todas las actividades en las que participa el hombre estan sujetas al poder de la naturaleza. El hombre siempre esta sujeto a las leyes de la naturaleza.

- n₁ (Over) 29. I think that today human beings have the means and power to master the natural and supernatural forces that affect life. Men will be the masters of nature.

Espanol

Yo creo que hoy dia el hombre tiene los medios y el poder para controlar y dominar las fuerzas naturales que afectan la vida. El hombre moderno es el amo de la naturaleza.

- n₂ (With) 30. I think that human beings need not be subjected to natural and supernatural forces that affects their lives, but neither should they ignore them. It is better to live in harmony with nature than to be subjugated to it or to attempt to master it.

Espanol

Yo creo que los seres humanos no deben someterse a las fuerzas naturales, pero tampoco deben desafiarlas. Es mucho mejor vivir en armonia con ellas que someterse a ellas o tratar de dominarlas.

- n₃ (Sub) 31. I believe that man can't be blamed for his failures. There are so many things that can and do happen, and man can do almost nothing to prevent such failures. We have to learn to take the bad with the good.

Espanol

Yo no creo que deba culparse al hombre por sus fracasos. Hay tantas cosas que ocurren o pueden ocurrir y que el hombre no puede evitar. Lo mejor es aprender a aceptar las cosas buenas y las malas.

- n₂ (With) 32. I believe man can be responsible for his own failures, but natural and supernatural forces also play an important role. To live in harmony with nature is the right thing to do.

Espanol

Yo creo que el hombre en parte es responsable por sus fracasos, pero creo tambien que las fuerzas naturales juegan un papel importante. Lo mejor es vivir en paz y armonia con la naturaleza.

- n₁ (Over) 33. Man was created by God, but it is his own effort that determines his own destiny. God helps those who help themselves.

Espanol

Yo creo que Dios creo al hombre, pero es el hombre quien determina su propio destino. Bien dice el refran, "ayudate que Dios te ayudara."

- n₃ (Sub) 34. Man can never control the rain, winds, and other natural conditions and probably never will. There have always been good and bad years and if one is wise, he will take it as it comes and do the best he can.

Espanol

El hombre nunca podra controlar la lluvia, los vientos y otras condiciones o fuerzas de la naturaleza. Siempre hay anos buenos y malos y si uno es listo toma las cosas como vienen y hace lo mas que pueda.

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- n₁ (Over) 35. It is man's job to find ways to overcome weather and other conditions, just as he has overcome so many things. Some day man will succeed in mastering droughts and floods.

Espanol

El hombre debe encontrar los medios de controlar las condiciones del tiempo al igual que se ha impuesto a otras cosas. Algun dia el hombre podra dominar las sequias y las inundaciones.

- n₂ (With) 36. The best thing to do is to live in harmony with the forces that control the rain, winds and other natural conditions. To live in harmony with nature is the best way to avoid problems.

Espanol

Lo mejor es vivir en armonia con las fuerzas que controlan la lluvia, el viento y otras condiciones. Vivir en paz con la naturaleza es lo mejor para evitar problemas.

IV. ACTIVITY ORIENTATION

- a₃ (Being) 37. I work as hard as the average, but I prefer to use my leisure time visiting with people, going on trips, or just talking with whoever is around.

Espanol

Yo trabajo tan fuerte como el hombre promedio, pero prefiero usar mi tiempo libre visitando mis familiares, amigos o paseando.

- a₁ (Doing) 38. I like best of all to use my leisure time doing extra things in my house, business or farm. I am very happy when I am busy and getting a lot of things done. Time is money and to waste my time is to waste my money.

Espanol

Ante todo prefiero usar mi tiempo libre haciendo cosas extra en mi casa, negocio o finca. Me siento feliz cuando estoy ocupado y termino muchas de las cosas que tengo pendientes. El tiempo es dinero, y perder mi tiempo es botar dinero.

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a₂ (Be. in Bec.)

39. I work a little more than the average in doing some extra things in my home, farm or business. However, occasionally I like to enjoy visiting with people, to go on trips, or just to talk with some of my neighbors.

Espanol

Por lo regular yo trabajo un poco mas que el promedio haciendo cosas extra en mi casa, finca o negocio. Sin embargo, de vez en cuando me gusta gozar la vida visitando mis amigos, paseando o conversando con mis amigos.

- a₃ (Being) 40. What I care about most is to be left alone to think and act in ways that best suit the way I really am. If I don't always get much done but can enjoy life as I go along, that is the best way.

Espanol

Lo que mas me importa es que me dejen solo para pensar y actuar en la forma que mas se ajuste a mi manera de ser. La vida es corta y hay que gozarla aunque no se obtengan muchos logros.

- a₁ (Doing) 41. What I care about most is accomplishing things...getting things done just as well or better than other people do them. I like to see results and think they are worth working for.

Espanol

Lo que mas me importa es lograr mis metas y hacer las cosas tan bien o mejor que las otras personas. Me gusta ver los resultados de mis esfuerzos y creo vale la pena luchar por lo que uno quiere.

a₂ (Be. in Bec.)

42. Sometimes I like to be left alone to think and act in the ways that best suit how I really am and sometimes I like to accomplish things as well as other people. What I like best is to do both - do many of the things that I have to do, but have time left to enjoy life.

Espanol

A veces prefiero estar solo para pensar y hacer lo que quiera. Sin embargo a veces prefiero trabajar fuerte para lograr mis propositos. Aunque trabajo fuerte, me gusta tener mis ratos libres para gozar de la vida.

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- a₁ (Doing) 43. What I care most about is to teach my sons, when they are young, to work hard. To learn how to work hard for the accomplishment of their goals is the best insurance for a successful life.

Espanol

Lo que mas me interesa es enseñar a mis hijos, desde pequeños a trabajar fuerte por lo que desean. Trabajar fuerte por lo que se desea es el mejor seguro para el éxito en la vida.

- a₂ (Be. in Bec.)
44. In raising my children what I care most about is to bring them up in a way that they learn to work for what they want, but at the same time to enjoy life. To teach them to balance their play and work time is the best way to raise them.

Espanol

Para mis hijos lo que mas me interesa es enseñarles a trabajar fuerte por lo que desean, pero a la vez que aprendan a disfrutar o gozar la vida. Les enseno a mantener un balance entre el juego y el trabajo.

- a₃ (Being) 45. In raising my children, what I care most is to provide them all the happiness that I can. Children are children and while they are young they have to play and enjoy life, because later life will be hard for them.

Espanol

En la crianza de mis hijos lo que mas me importa es darles toda la felicidad que yo pueda. Los niños son niños y mientras estan en su niñez ellos tienen que gozar la vida porque cuando sean grandes la vida sera muy fuerte para ellos.

- a₁ (Doing) 46. In my leisure time what I like best is to read about new things and to do some kind of productive work.

Espanol

En mi tiempo libre lo que mas me gusta es leer sobre cosas nuevas y hacer alguna clase de trabajo productivo.

- a₃ (Being) 47. In my leisure time what I like most is to talk with my friends or to have some kind of fun. Life is so short that we have to enjoy it.

Espanol

En mi tiempo libre lo que mas me gusta es charlar con mis amigos o pasar un buen rato en cosas que no se relacionen con mi trabajo. La vida es muy corta y tenemos que gozarla.

- a₂ (Be. in Bec.)
48. In my leisure time what I like best is to use some of my time learning or trying out new things and part of it having fun with my friends.

Espanol

En mi tiempo libre lo que mas me gusta es usar parte del mismo haciendo algun trabajo que me beneficie y parte del mismo gozando la vida - por ejemplo, dando chiste con mis amigos o vecinos.

APPENDIX B

Factor analytic data on value orientations.

FACTOR MATRIX - TWO FACTOR SOLUTION

VARIMAX ROTATION ANALYSIS.

PROPORTIONS OF VARIANCE.

1	.2970	2	.1249
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HIGHEST LOADINGS.

1	.8200	2	.6232
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COMMUNALITIES.

1	.6433	2	.3850	3	.2281
4	.2828	5	.6324	6	.3584
7	.6829	8	.3593	9	.4089
10	.4001	11	.0350	12	.3375
13	.5236	14	.4758	15	.5276
16	.4222				

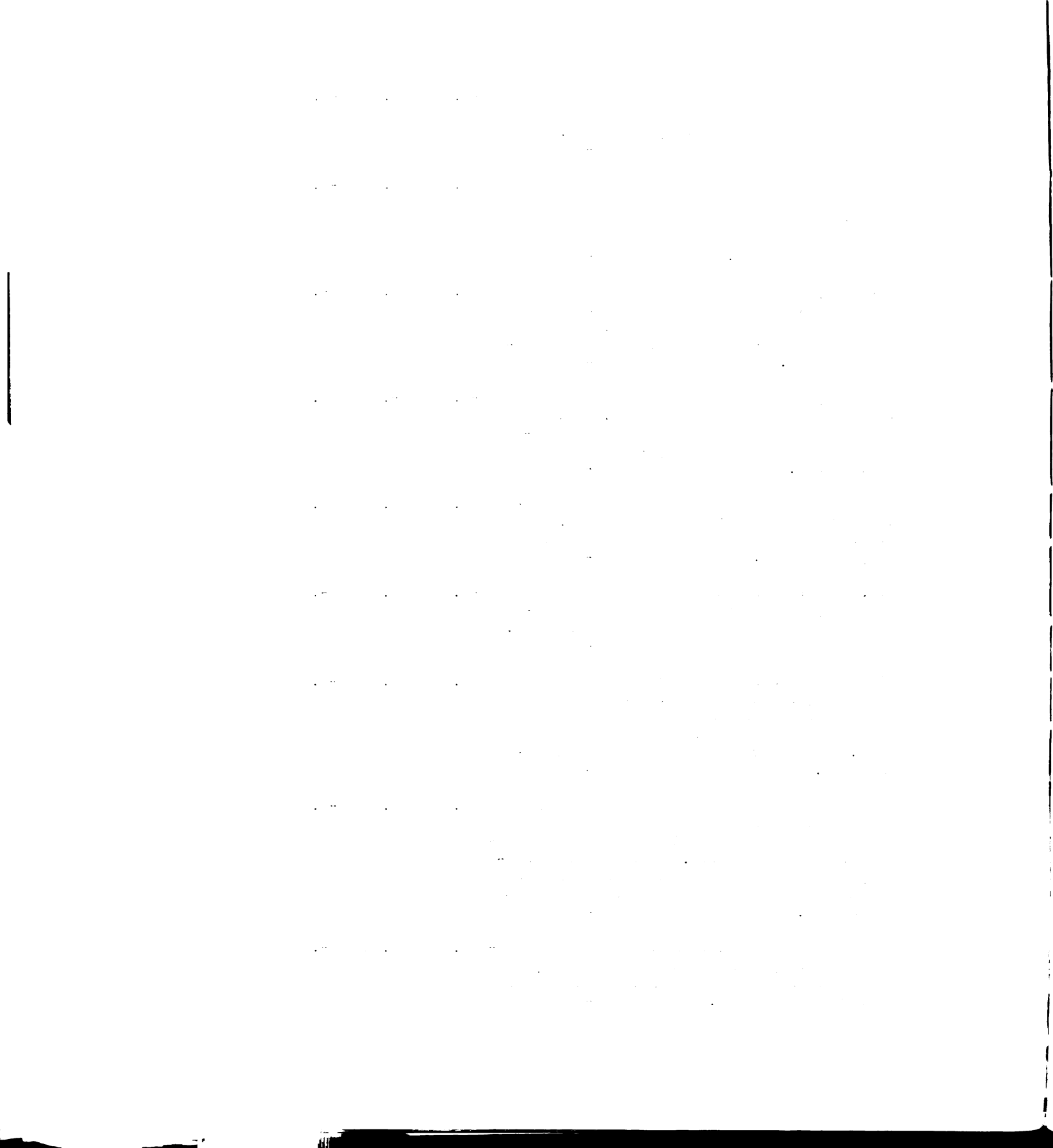
ROTATED FACTOR LOADINGS.

	1	2		1	2
1	.7984	.0763	9	-.1430	.6232
2	.6178	.0578	10	.5603	-.2935
3	-.0570	-.4742	11	.0538	-.1792
4	.4486	-.2857	12	.1393	.5640
5	.7326	-.3092	13	.7188	-.0834
6	-.0443	-.5970	14	.6575	.2085
7	.8200	.1023	15	.4512	-.5692
8	.5820	-.1433	16	.6495	-.0183

FACTOR ARRAYS FOR THREE TYPES

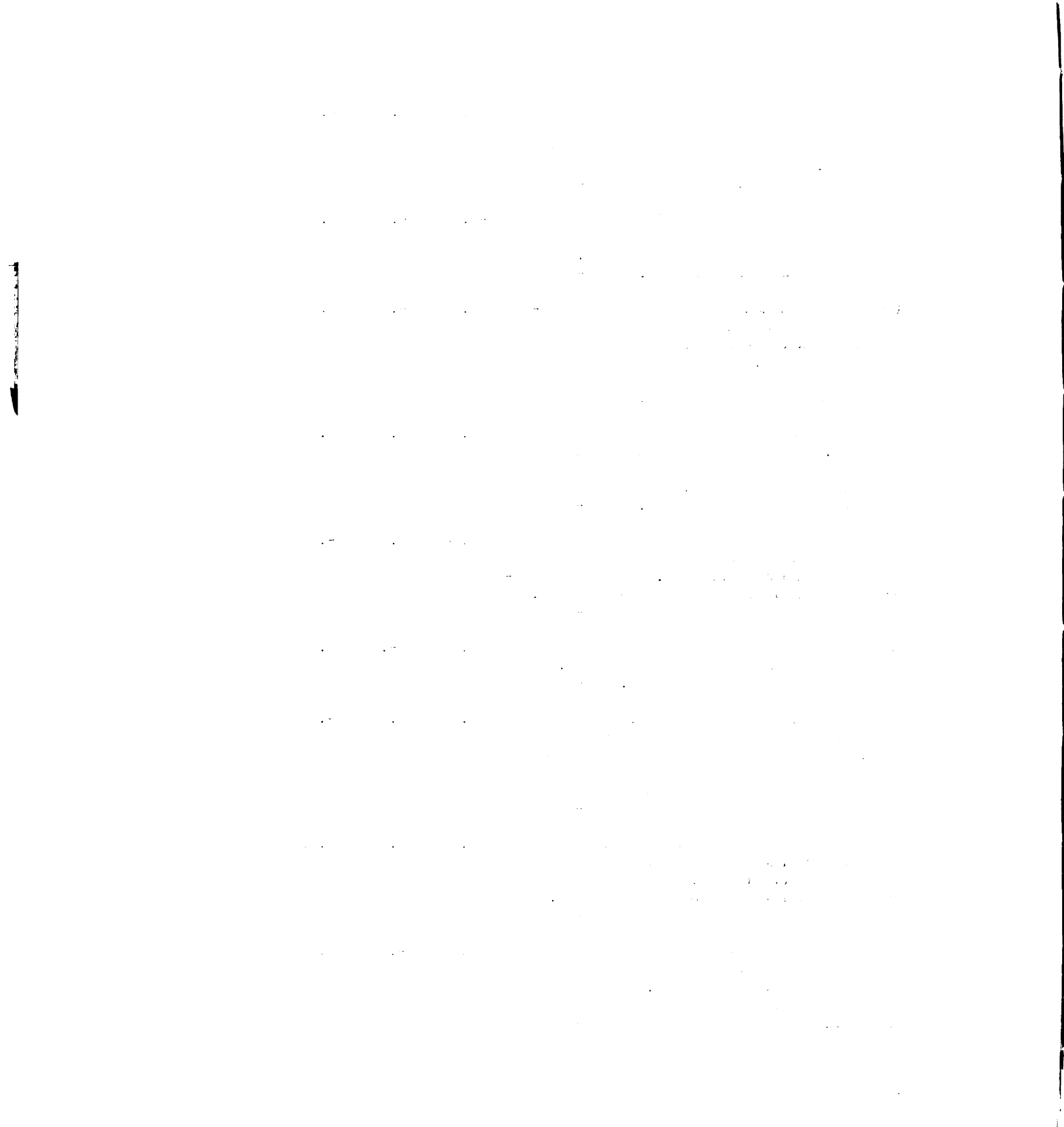
<u>Description</u>	1	2	3
001 Children should be taught the traditions of the past. (The ways of the old people.) I believe that the old ways are best, and that it is when children do not follow them that things go wrong. T3-Past	-1.63	-.38	.38
002 Children should be taught some of the old traditions, but it is wrong to insist that they stick to these old ways. I believe that it is necessary for children always to learn about and take on whatever of the new ways will best help them get along in the world of today. T2-Pres	1.31	-.55	.55
003 In raising children I do not believe that they should be taught much about past traditions. I believe that the world goes along best when children are taught the things that will make them want to find out for themselves new and better ways of doing things to replace the old. T1-Fut	.84	-1.43	1.43
004 I really expect my children to have more than I have had if they work hard and plan right. There are always good chances for people who try. T1-Fut	.92	-.62	.62
005 I don't know whether my children will be better off, worse, or just the same. Things always go up and down even if one works hard, so we can't really tell. T2-Pres	.64	.35	-.35
006 I expect my children to have just about the same as I had or bring things back as they once were. It is their job to work hard and find ways to keep going as they have been in the past. T3-Past	-1.51	.88	-.88
007 The past is gone and the future is much too uncertain to count on. So I believe it is best to give most attention to what is happening now in the present. T2-Pres	.22	1.28	-1.28

008	I think that the ways of the past (traditional ways) are right and best, and as changes come things usually get worse. T3-Past	-2.08	1.47	-1.47
009	I believe that it is almost always the ways of the future - the ways which are still to come - which will be best, and even though there are sometimes small setbacks, changes bring improvements. T1-Fut	.47	1.21	-1.21
010	I am very pleased with the changes occurring here and everywhere because the new ways are usually better than the old ones. I like to see everything - even religious ceremonies - moving ahead. T1-Fut	.20	.43	-.43
011	I am very unhappy because of the changes that are occurring here and everywhere. I think that our ways of living should be kept exactly the same in every way - as they were in the past. T3-Past	-1.72	-.56	.56
012	I feel that the old ways of living are better but we just can't hang on to them. It makes life easier to accept some changes as they come along. T2-Pres	.25	-.08	.08
013	When we need a solution for a problem in our community it is best to depend on our community leaders to decide what is to be done. R3-Lineal	-1.11	.91	-.91
014	When we need a solution for a problem in our community, it is best to call a meeting of the people affected and discuss the problem until almost everyone agrees what is to be done. We prefer to reach our decision unanimously. R2-Coll	.49	1.40	-1.40
015	When we need a solution for a problem in our community, the best way is for the problem to be discussed in a community meeting and to decide the matter by vote. We accept the majority decision even though there are still a great many people who disagree and object to the action. R1-Ind	.40	1.09	-1.09
016	In deciding how to vote in an election, I prefer to make my own decision independently and without regard for the opinion of other family members or relatives. R1-Ind	1.93	.62	-.62



017	In deciding how to vote in an election, my family discusses the matter until almost everyone agrees on the party or candidate that the family prefers. R2-Coll	-1.25	-1.69	1.69
018	In deciding how to vote in an election, the way my family votes is decided by the oldest member of the family. R3-Lineal	-2.10	-.13	.13
019	If my brothers and sisters and I inherit a property, it is best for the oldest brother to take charge of, or manage the property. R3-Lineal	-1.04	.46	-.46
020	If my brothers and sisters and I inherit a property, it is best that each of us take his or her own share and do what he or she wants with it. R1-Ind	-.68	.10	-.10
021	If my brothers and sisters and I inherit a property, it is best to manage the property together or decide among ourselves who is best to take charge of things. R2-Coll	.48	.69	-.69
022	I prefer to work on my own, to be my own boss. R1-Ind	1.80	-.18	.18
023	I prefer to work in groups in which everyone works together and has the same rights and obligations. R2-Coll	.38	1.05	-1.05
024	I prefer to work in groups in which a leader or boss makes the important decisions. R3-Lineal	-1.49	1.38	-1.38
025	It seems to me that modern scientific discoveries such as antibiotics or preventive vaccines (i.e. polio) constitutes an effective way of increasing life span of man. By using modern scientific discoveries the average life span of human beings can be lengthened. N1-Over	1.40	.68	-.68
026	I believe that there is a plan to life which works to keep all living things moving together, and if man will learn to live his whole life according to this plan, he will live longer than other men. N2-With	.34	.38	-.38
027	I really do not believe that there is much human beings themselves can do to make the lives of men and women longer. It is my belief that every person has a set time to live, and when that time comes, it just comes. N3-Sub	-.79	1.04	-1.04

028	I think that all the activities in which human beings engage are subjugated to the natural and supernatural forces that affect life. Man is always subjugated to the fate of nature. N3-Sub	-.06	.57	-.57
029	I think that today human beings have the means and power to master the natural and supernatural forces that affect life. Men will be the masters of nature. N1-Over	-1.27	-.31	.31
030	I think that human beings need not be subjected to natural and supernatural forces that affects their lives, but neither should they ignore them. It is better to live in harmony with nature than to be subjugated to it or to attempt to master it. N2-With	.45	-.15	.15
031	I believe that man can't be blamed for his failures. There are so many things that can and do happen, and man can do almost nothing to prevent such failures. We have to learn to take the bad with the good. N3-Sub	.27	.01	-.01
032	I believe man can be responsible for his own failures, but natural and supernatural forces also play an important role. To live in harmony with nature is the right thing to do. N2-With	.84	.10	-.10
033	Man was created by God, but it is his own effort that determines his own destiny. God helps those who help themselves. N1-Over	.60	-.45	.45
034	Man can never control the rain, winds, and other natural conditions and probably never will. There have always been good and bad years and if one is wise, he will take it as it comes and do the best he can. N3-Sub	.18	.25	-.25
035	It is man's job to find ways to overcome weather and other conditions, just as he has overcome so many things. Some day man will succeed in mastering droughts and floods. N1-Over	-.34	-.07	.07
036	The best thing to do is to live in harmony with the forces that control the rain, winds and other natural conditions. To live in harmony with nature is the best way to avoid problems. N2-With	.60	-.13	.13



037	I work as hard as the average, but I prefer to use my leisure time visiting with people, going on trips, or just talking with whoever is around. A3-Being	.24	.65	-.65
038	I like best of all to use my leisure time doing extra things in my house, business or farm. I am very happy when I am busy and getting a lot of things done. Time is money and to waste my time is to waste my money. A1-Doing	.76	-1.04	1.04
039	I work a little more than the average in doing some extra things in my home, farm or business. However, occasionally I like to enjoy visiting with people, to go on trips, or just to talk with some of my neighbors. A2-Be In Bec	.10	-.53	.53
040	What I care about most is to be left alone to think and act in ways that best suit the way I really am. If I don't always get much done but can enjoy life as I go along, that is the best way. A3-Being	-1.03	.95	-.95
041	What I care about most is accomplishing things...Getting things done just as well or better than other people do them. I like to see results and think they are worth working for. A1-Doing	1.20	.11	-.11
042	Sometimes I like to be left alone to think and act in the ways that best suit how I really am and sometimes I like to accomplish things as well as other people. What I like best is to do both - do many of the things that I have to do, but have time left to enjoy life. A2-Be In Bec	.20	-.05	.05
043	What I care most about is to teach my sons, when they are young, to work hard. To learn how to work hard for the accomplishment of their goals is the best insurance for a successful life. A1-Doing	.79	.31	-.31
044	In raising my children what I care most about is to bring them up in a way that they learn to work for what they want but at the same time to enjoy life. To teach them to balance their play and work time is the best way to raise them. A2-Be In Bec	.80	-.78	.78

045	In raising my children, what I care most about is to provide them all the happiness that I can. Children are children and while they are young they have to play and enjoy life, because later life will be hard for them.	- .86	-2.24	2.24
	A3-Being			
046	In my leisure time what I like best is to read about new things and to do some kind of productive work.	.80	-2.65	2.65
	A1-Doing			
047	In my leisure time what I like most is to talk with my friends or to have some kind of fun. Life is so short that we have to enjoy it.	-1.02	-1.94	1.94
	A3-Being			
048	In my leisure time what I like best is to use some of my time learning or trying out new things and part of it having fun with my friends.	.06	-2.42	2.42
	A2-Be in Bec			

Correlations

	1	2	3
1	1.000		
2	-.054	1.000	
3	.054	-1.000	1.000

CONSENSUS ITEMS

(No diff. more than 1.000)

		Average
005	I don't know whether my children will be better off, worse, or just the same. Things always go up and down even if one works hard, so we can't really tell. T2-Pres	.21
010	I am very pleased with the changes occurring here and everywhere because the new ways are usually better than the old ones. I like to see everything - even religious ceremonies - moving ahead. T1-Fut	.07
012	I feel that the old ways of living are better but we just can't hang on to them. It makes life easier to accept some changes as they come along. T2-Pres	.08
020	If my brothers and sisters and I inherit a property, it is best that each of us take his or her own share and do what he or she wants with it. R1-Ind	-.23
026	I believe that there is a plan to life which works to keep all living things moving together, and if man will learn to live his whole life according to his plan, he will live longer than other men. N2-With	.11
030	I think that human beings need not be subjected to natural and supernatural forces that affects their lives, but neither should they ignore them. It is better to live in harmony with nature than to be subjugated to it or to attempt to master it. N2-With	.15
031	I believe that man can't be blamed for his failures. There are so many things that can and do happen, and man can do almost nothing to prevent such failures. We have to learn to take the bad with the good. N3-Sub	.09
032	I believe man can be responsible for his own failures, but natural and supernatural forces also play an important role. To live in harmony with nature is the right thing to do. N2-With	.28
034	Man can never control the rain, winds, and other natural conditions and probably never will. There have always been good and bad years and if one is wise, he will take it as it comes and do the best he can. N3-Sub	.06

- 035 It is man's job to find ways to overcome weather and other conditions, just as he has overcome so many things. Some day man will succeed in mastering droughts and floods. N1-Over -.11
- 036 The best thing to do is to live in harmony with the forces that control the rain, winds and other natural conditions. To live in harmony with nature is the best way to avoid problems. N2-With .20
- 042 Sometimes I like to be left alone to think and act in the ways that best suit how I really am and sometimes I like to accomplish things as well as other people. What I like best is to do both - do many of the things that I have to do, but have time left to enjoy life. A2-Be in Bec .07

APPENDIX C

Correlational data.

Table 1 -- Value Orientations Correlations Matrix

	Traditional (Type II)	Transitional (Type III)	Progressive (Type I)
<u>Demographic Data</u>			
Age (in years)	-.24*	.16*	.14*
Education	.03	.01	.04
No. of Acres	-.16*	.00	.15*
Dairy Heads	-.16*	.03	.17*
Milk Production	-.13*	.00	.15*
<u>Near-Far Index</u>			
<u>Awareness</u>			
Intra-Community	-.05	.02	.04
Extra-Community Near	.16*	.06	-.13*
Extra-Community Far	-.12	.08	.08
Impersonal	-.02	.08	.07
<u>Deutschmann Channel</u>			
<u>Index-Interest</u>			
Egocentric	-.05	.00	-.01
Intra-Community	.03	.07	-.05
Extra-Community	-.11	.00	.04
Impersonal	-.02	.04	.13*
<u>Near-Far Index</u>			
<u>Interest Stage</u>			
Intra-Community	.02	-.11	-.13*
Extra-Community Near	.07	.09	-.08
Extra-Community Far	-.13*	.03	.13*
Impersonal	-.11	.04	.13*
<u>Mass Media</u>			
Radio	.08	.00	-.07
Press	-.07	-.06	.13*
Farm Magazines	-.24*	.12	.18*
Television	.04	-.03	.02
Technical Bulletins	-.08	.08	.09
All Media	-.12	.05	.11
<u>Use of Personal Sources</u>			
Awareness Stage	-.13*	.03	.13*
Interest Stage	-.13*	.05	.11

Table 1 -- Value Orientations Correlations Matrix

	Traditional (Type II)	Transitional (Type III)	Progressive (Type I)
Formal Organizations	-.15*	.09	.13*
<u>Diffusion Process</u>			
No. of Practices heard about	-.21*	.03	.22*
No. Practices Secondary Sources Used	-.16*	.04	.16*
No. Practices Tried	-.15*	.03	.16*
No. Practices Continued	-.12	.00	.14*
<u>Adoption Indices</u>			
Time of Awareness	-.02	.02	.02
Adoption Time	-.11	.00	.13*
Average Adoption	-.09	.04	.14*
Adoption Category	-.14*	.06	.13*

*Significant - $r = .1276$

Table 2 -- Communication Channel Orientations Correlation Matrix

	Ego- centric	Intra- Community	Extra- Community	Imper- sonal
<u>Demographic Data</u>				
Age (in years)	.00	.06	.09	-.04
Education (in years)	-.20*	-.14*	-.12	.28*
No. of acres	-.16*	-.07	.13*	.24*
Size of Dairy Herd	-.15*	-.06	.14*	.23*
Milk production (in thousands quarts) per week)	-.13*	-.02	.13*	.30*
<u>General Media Exposure</u>				
Radio	-.05	.16*	.10	.13*
Press	-.16*	-.07	.01	.29*
Farm Magazines	-.22*	.02	.30*	.42*
Television	-.03	.02	.15*	.08
Technical Bulletins	-.07	.16*	.04	.42*
<u>Social Behavior</u>				
Advice Seeking	.21*	.23*	-.23*	-.01
Advice Giving	.14*	.17*	-.20*	.01
Belonging to Organizations	-.31*	.09	.19*	.24*
<u>Participation in Diffusion Stages</u>				
Awareness	.20*	.09	.32*	.14*
Interest	-.33*	.01	.21*	.43*
Trial	.09	.08	.29*	.20*
Adoption	-.09	.07	.29*	.20*
<u>Adoption Process</u>				
Time of Awareness	-.09	.10	-.04	.03
Time of Adoption	-.14*	-.14*	.27*	.17*
Average Adoption	.05	.04	.28*	.18*
Adoption Category	-.17*	.08	.23*	.42*

Significant ($r \geq .1276$)

Table 3 -- Mass Media Exposure Correlation Matrix

	Radio	Press	Farm Mag.	Tele- vision	Tech. Bull.	All Media
<u>Social Behavior</u>						
Advice Seeking	.10	.11	.07	.03	.33*	.23*
Advice Giving	.16*	.09	.11	.10	.34*	.27*
Belonging to Organizations	.16*	.22*	.41*	.07	.20*	.42*
<u>Participation in Diffusion Stages</u>						
Awareness	.01	.15*	.40*	.15*	-.02	.26*
Interest	.04	.25*	.36*	-.08	-.06	.36*
Trial	.20*	.15*	.31*	.27*	-.21*	.41*
Adoption	.24*	.25*	.30*	.24*	.23*	.43*
<u>Adoption Process</u>						
Time of Awareness	-.04	.07	.09	.09	.09	.08
Time of Adoption	-.04	.09	.24*	.15*	.10	.20*
Adoption Index-- No Disadoption	.22*	.27*	.21*	.24*	.30*	.42*
Average Adoption-- Disadoption Included	.26*	.26*	.13*	.21*	.29*	.37*
Adoption Category	.17*	.19*	.33*	.16*	.10	.35*
<u>Personal Sources</u>						
Awareness	-.17*	-.10	-.16	-.20	-.15*	-.07
Interest Stage	.14*	-.04	.14*	-.11	.15	.15*
<u>Demographic Data</u>						
Age (years)	.05	-.04	-.01	.02	.08	.02
Education (years)	.10	.19*	.29*	-.05	.01	.18*
No. Acres	-.03	.13*	.32*	-.06	.05	.21*
No. Dairy Heads	.02	.15*	.36*	-.05	.02	.23*
Milk Production	-.05	.13*	.36*	-.04	.06	.24*

APPENDIX D

Sociometric data.

Sociometric Data

*Table 4-- Person-Channels of First Source for Relatives and Non-Relatives in the Barrio and Outside of the Barrio - Hatillo Municipality

Person-Channel Number	Number of Times He Served as First Source in his own Barrio			Number of Times He Served as First Source in Other Barrio		
	Relative	Non-Relative	Total	Relative	Non-Relative	Total
094	01	00	01	06	08	14
080	06	02	08	02	06	08
065	05	03	08	00	01	01
093	02	04	06	01	01	02
082	03	01	04	02	01	03
078	02	04	06	00	00	00
033	00	03	03	02	01	03
027	00	05	05	00	01	01
077	00	01	01	01	03	04
068	01	00	01	01	03	04
092	02	02	04	00	01	01
066	00	00	00	02	02	04
013	00	01	01	01	02	03
074	00	03	03	00	01	01
Total	22	29	51	18	31	49
Mean	1.57	2.07	3.64	1.28	2.21	3.50

*Data are concerned only with cases in which a farmer mentioned he heard about a practice on his own barrio. A person-channel of first source could be from the same barrio or one who just visited the receiver of the information in his farm. All data are based on first source for 10 dairy farm practices.

*Table 5 -- Person-Channels of First Source of Information in
Hatillo Municipality - Region I

Subject Number Person* Channel	Number of Farmers Using Him as First Source	Number of Times He Served as First Source	Relatives He Served as First Source	Non-Relatives He Served as First Source
094	15	30	07	08
080	16	29	08	08
065	09	22	04	05
093	08	14	03	05
082	07	11	04	03
078	06	09	02	04
033	06	09	01	05
027	06	09	00	06
077	05	15	01	04
068	05	09	04	01
092	05	07	03	02
066	04	15	02	02
013	04	11	00	04
074	04	06	00	04
Total Raw Scores	100	196	39	64
Mean	7.14	14	2.79	4.57

*Data are concerned only with cases in which a farmer mentioned he heard about a practice on his own barrio. A person-channel of first source could be from the same barrio or one who just visited the receiver in his farm. All data are based on first source for 10 dairy farm practices.

*Table 6 -- Mean Number of Practices in which Person-Channels Were
Used as First Source of Information by Dairy Farmers
of Hatillo Municipality

Person-Channel	Number of Practices He Served as First Source (Mean Per Person)
<hr/>	
092	3.75
077	3.00
013	2.75
065	2.44
094	2.00
080	1.81
068	1.80
093	1.75
078	1.50
033	1.50
027	1.50
074	1.50

*The data only includes those farmers who were mentioned by more than one fellow farmer as a first source of information.

***Table 7 -- Number of Dairy Farmers Served by Person-Channels with
Respect to Community Boundaries**

Person-Channel	% of Dairy Farmers He Served as First Source in his Commu- nity (His Barrio)	% of Dairy Farmers He Served as First Source Beyond the Community (Outside his Barrio)
094	6%	94%
080	50%	50%
065	88%	12%
093	75%	25%
082	57%	43%
078	100%	00%
033	50%	50%
027	83%	17%
077	20%	80%
068	20%	80%
092	80%	20%
066	00%	100%
013	25%	75%
074	75%	25%

***The data are concerned specifically with the number of persons served
and with how many of them are from the same community or from other
community.**

*Table 8 -- Patterns of Relationships between Person-Channels of First Source and Receivers Within and Outside the Community

Person-Channel	% of Relatives Served by the Person-Channel			% of Non-Relatives Served by the Person-Channel		
	Own Barrio	Other Barrio	Total	Own Barrio	Other Barrio	Total
094	06	40	46	00	54	54
080	37	13	50	13	37	50
065	55	00	55	33	37	50
093	25	12	37	50	13	63
082	43	29	72	14	14	28
078	33	00	33	67	00	67
033	00	33	33	50	17	67
027	00	00	00	83	17	100
077	00	20	20	20	60	80
068	20	20	40	00	60	60
092	40	00	40	40	20	60
066	00	50	50	00	50	50
013	00	25	25	25	50	75
074	00	75	75	00	25	25

*Across 10 dairy farm practices.

*Table 9 -- Comparison Between General Characteristics of the Dairy Farmers Population from Region I and the Person Serving as Channels of Information

	Person-Channels (Mean)	General Population (Mean)	Difference Between Means
Age	46.42	46.07	0.35
Years Attended to School	8.35	7.81	0.54
Milk Production in Thousands of Quarts	6.25	4.13	2.12



*Table 10 -- Person-Channels of First Source of Information in
Arecibo Municipality -- Region I

Subject Number Person- Channel	Number of Farmers Using Him as First Source	Number of Times He Served as First Source	Relatives He Served as First Source	Non-Relatives He Served as First Source
168	8	15	0	8
171	4	4	0	4
175	3	4	0	3
166	3	16	0	3
157	3	3	0	3

*Total dairy farmers population of 37. Of these 20 mentioned at least one practice of which they heard for first time in the barrio; one first source can be mentioned by more than one farmer. Across 10 practices

Contrary to the observations in Hatillo municipality first sources of information were 100% non-relatives to the receivers.

*Table 11 -- Mean Number of Practices in which Person-Channels were
used as First Source of Information by Dairy Farmers of
Arecibo Municipality

Person-Channel	Mean Number of Practices He Served as First Source Per Person
166	5.33
168	1.87
175	1.33
171	1.00
157	1.00

*The data only includes those farmers who were mentioned by more than one farmer as first source of information.

Table 12 -- Number of Dairy Farmers Served by Person-Channels with Respect to Community Boundaries

Person-Channel	No. of Dairy Farmers He Served as First Source in his Community (his barrio)	No. of Dairy Farmers He Served as First Source beyond the Community (Outside of his barrio)
168	5	3
171	2	2
175	3	0
157	3	0
166	2	1

Comparison between General Characteristics of the Dairy Farmers Population from Region I and the Persons serving as Channels of First Source

Arecibo

	Person-Channels (Mean)	General Population (Mean)	Difference
Age (in years)	48.50	46.07	2.43
Years of School Attended	10.50	7.81	2.69
Milk Production in Thousands of Quarts	4.09	4.13	-.04

Table 13 -- Frequency and Percentage of Adopters Influenced at Least Once by Opinion Leaders from Region I

I - Hatillo Municipality Influentials			
Municipality	Dairy Farmers Population	No. of Adopters Influenced at Least Once by Opinion Leaders	% of Adopters Influenced at Least Once by Opinion Leaders
Hatillo	93	85	91%
Arecibo	37	12	32%
Manati	21	01	15%
Camuy	14	06	42%
Total for the Region 165		104	63%
II - Arecibo Municipality Influentials			
Arecibo	37	28	75%
Hatillo	93	03	03%
Manati	21	01	05%
Camuy	14	01	07%
Total for the Region 165		33	20%
III - Manati Influentials			
Manati	21	21	100%
Arecibo	37	03	08%
Camuy	14	00	00%
Hatillo	93	00	00%
Total for Region I 165		24	15%
Vega Baja	06	03	50%
Dorado	06	02	33%
Toa Baja	12	01	08%
Guaynabo	08	00	00%
Bayamon	08	00	00%
Corozal	10	00	00%
Vega Alta	04	00	00%
Toa Alta	14	00	00%

Table 13 -- (Cont.)

Camuy Municipality			
Municipality	Dairy Farmers Population	No. of Adopters Influenced at Least Once by Opinion Leaders	% of Adopters Influenced at Least Once by Opinion Leaders
Camuy	14	8	57%
Arecibo	37	1	03%
Hatillo	93	1	01%
Manati	21	0	0%
Total for the Region	165	10	6%

Table 14 -- Frequency and Percentage of Adopters Influenced at Least Once by Opinion Leaders from Region II

Toa Baja Municipality			
Municipality	Dairy Farmers Population	No. of Adopters Influenced at Least Once by Opinion Leaders	% of Adopters Influenced at Least Once by Opinion Leaders
Toa Baja	12	7	58%
Vega Alta	4	1	25%
Dorado	6	3	50%
Vega Baja	6	0	0%
Corozal	10	0	0%
Guaynabo	8	0	0%
Bayamon	8	0	0%
Toa Alta	14	0	0%
Total for the Region	68	11	16%

Table 15 -- No. of Adopters Influenced by Opinion Leaders

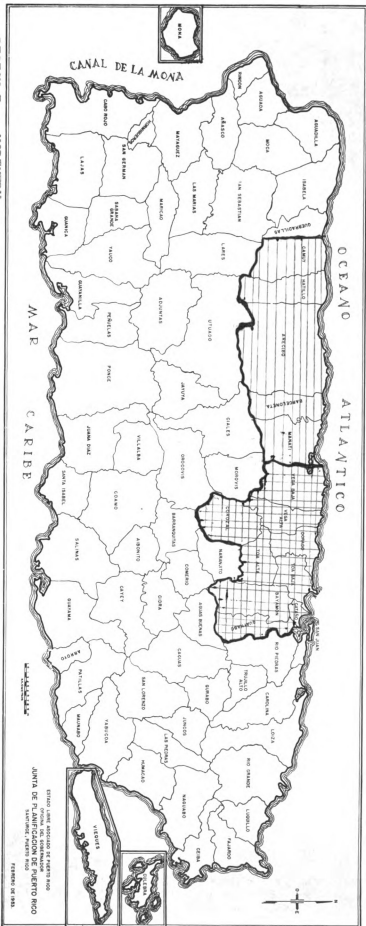
Opinion Leader	In his Barrio	Outside his Barrio Same Municipality	Other Municipality	Total No. He Influenced
<u>Hatillo</u> <u>Region I</u>				
094	2	24	11	37
080	9	13	2	24
078	12	3	0	15
074	10	3	0	13
065	2	8	0	10
093	9	3	0	12
077	2	4	2	8
027	7	1	1	9
033	2	8	1	11
092	6	2	0	8
109	4	5	0	9
068	3	3	0	6
079	3	2	0	5
013	1	2	2	5
066	0	4	1	5
<u>Arecibo</u> <u>Region I</u>				
166	2	4	0	6
157	4	0	1	5
<u>Manati</u> <u>Region I</u>				
211	1	7	4	12
205	2	3	0	5
<u>Camuy</u> <u>Region I</u>				
124	0	4	2	6
<u>Toa Baja</u> <u>Region II</u>				
255	1	2	1	4
257	1	3	3	7

The data only includes those dairy farmers who were mentioned by at least four adopters as the most influential source across 10 dairy farm practices.

APPENDIX E

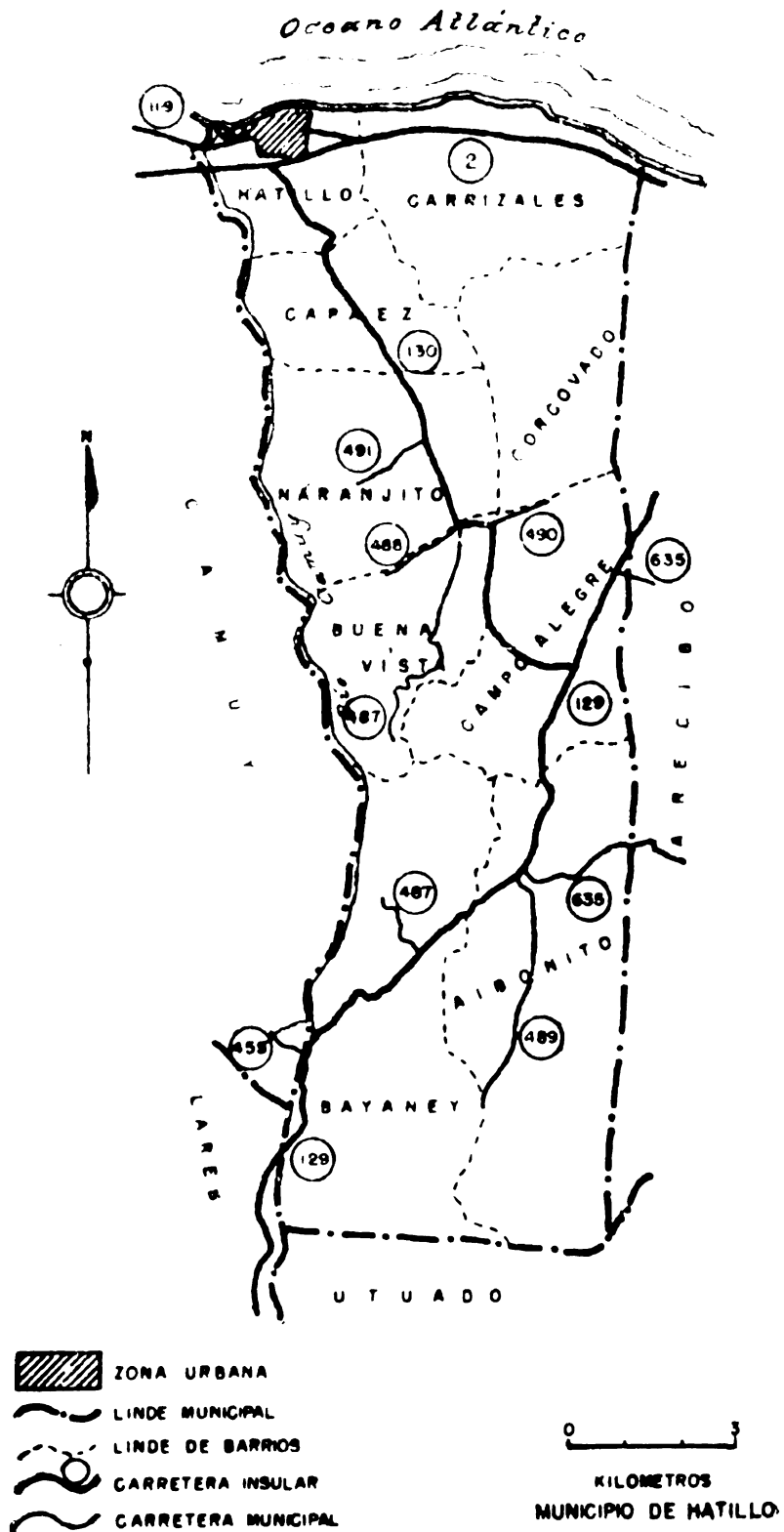
Maps of the regions and municipalities included in the study.

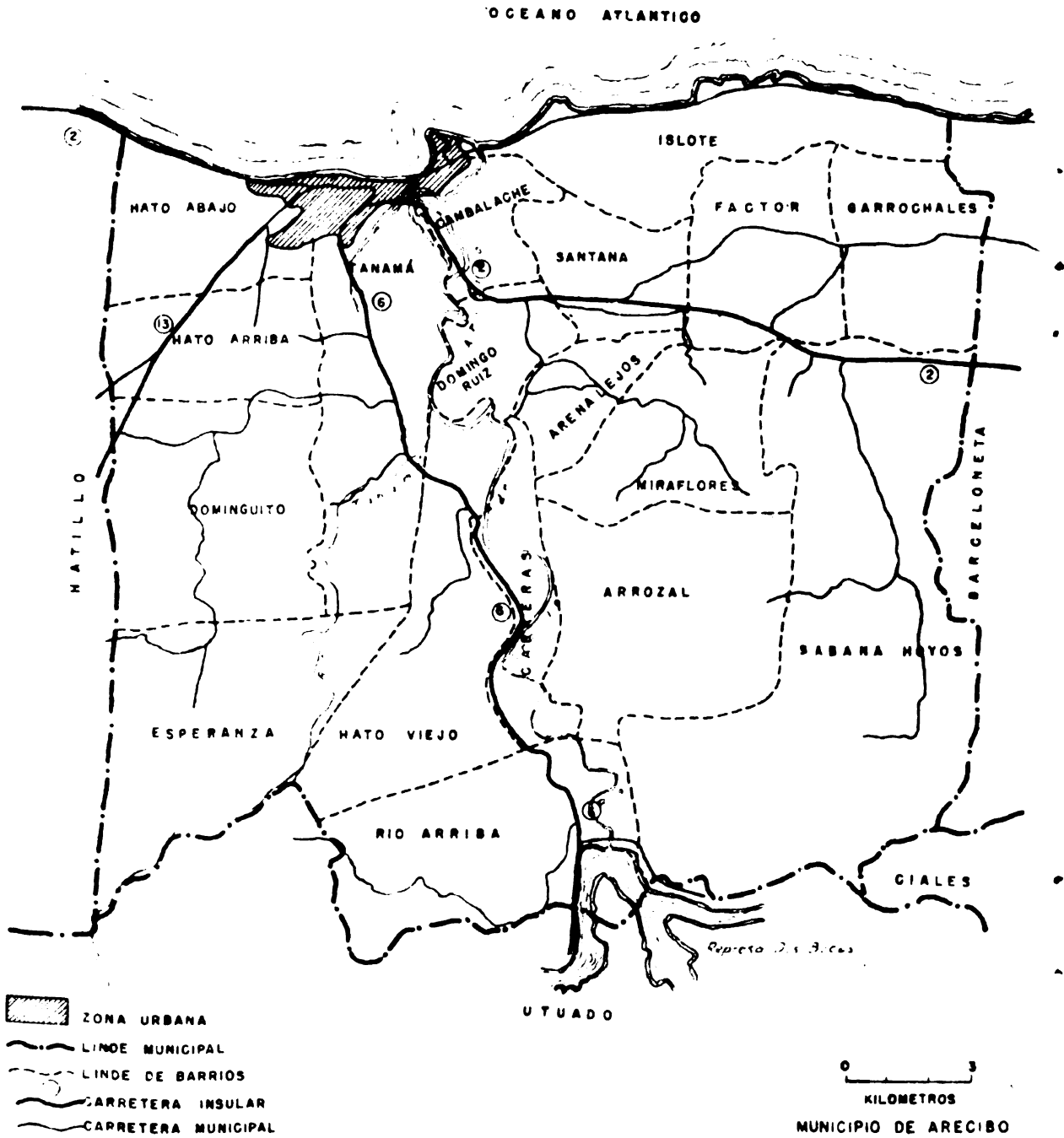
ATLANTICO

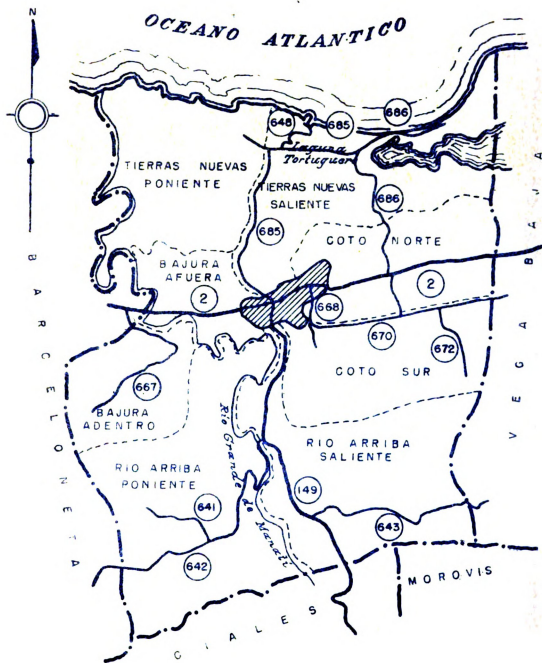


—	REGION I	--	NORTHERN
#	REGION II	--	NORTHEASTERN

LIBRERO LIBRE ASOCIADO DE PUERTO RICO
OFICINA DEL GOBIERNO
JUNTA DE PLANTACION DE PUERTO RICO
SANTUAGO, PUERTO RICO
FEBRERO DE 1953

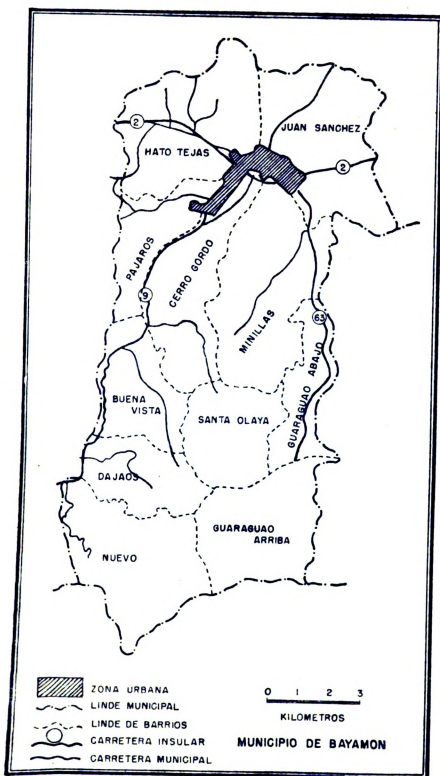


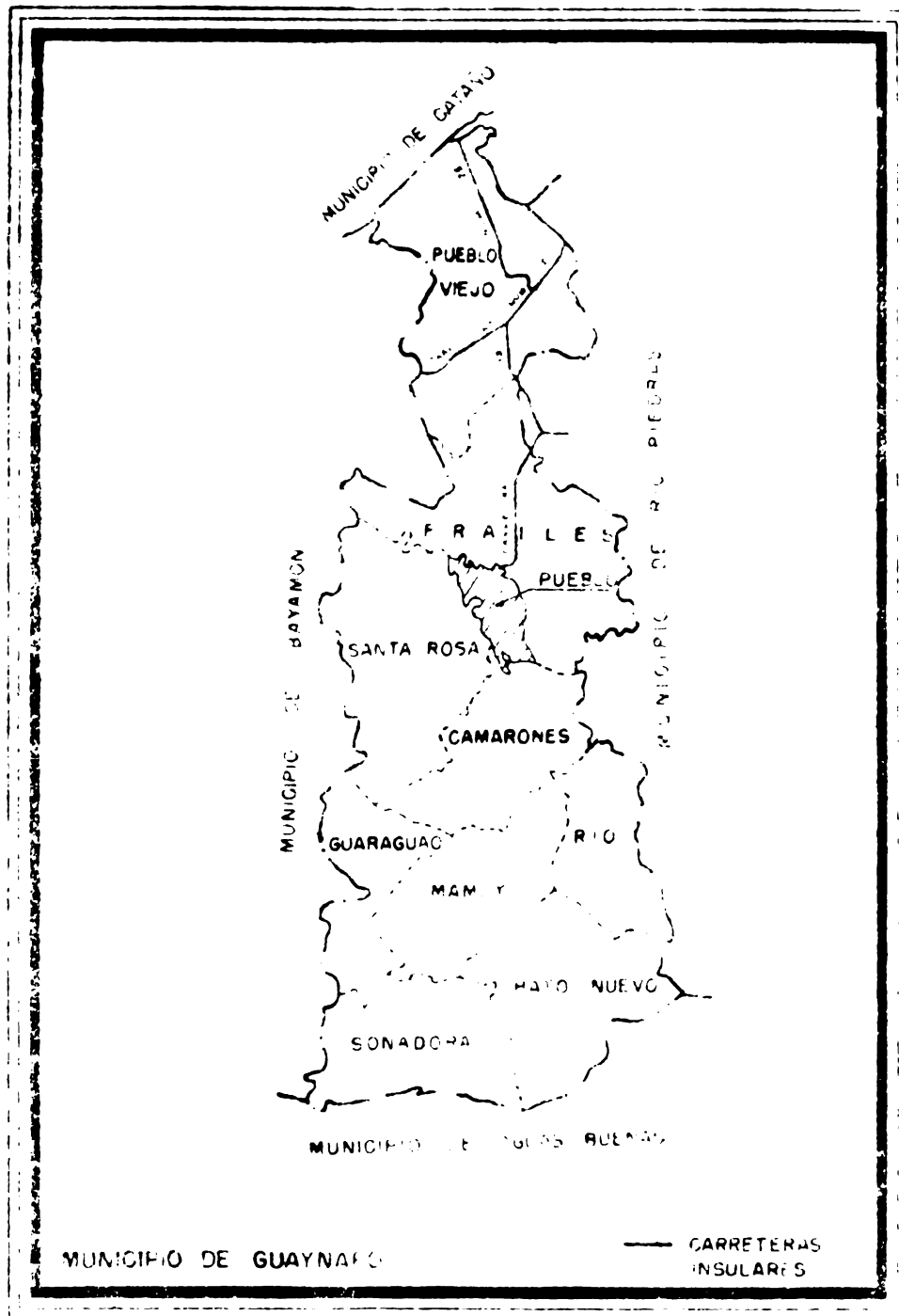


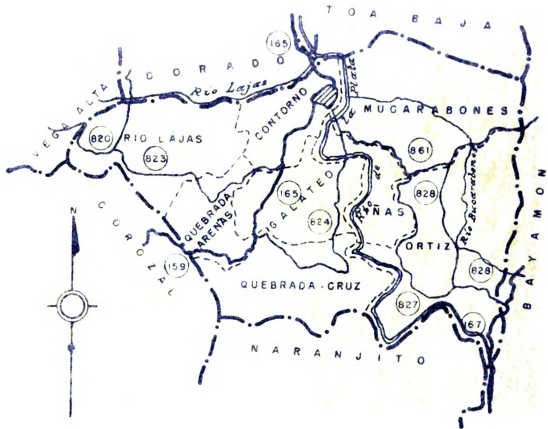


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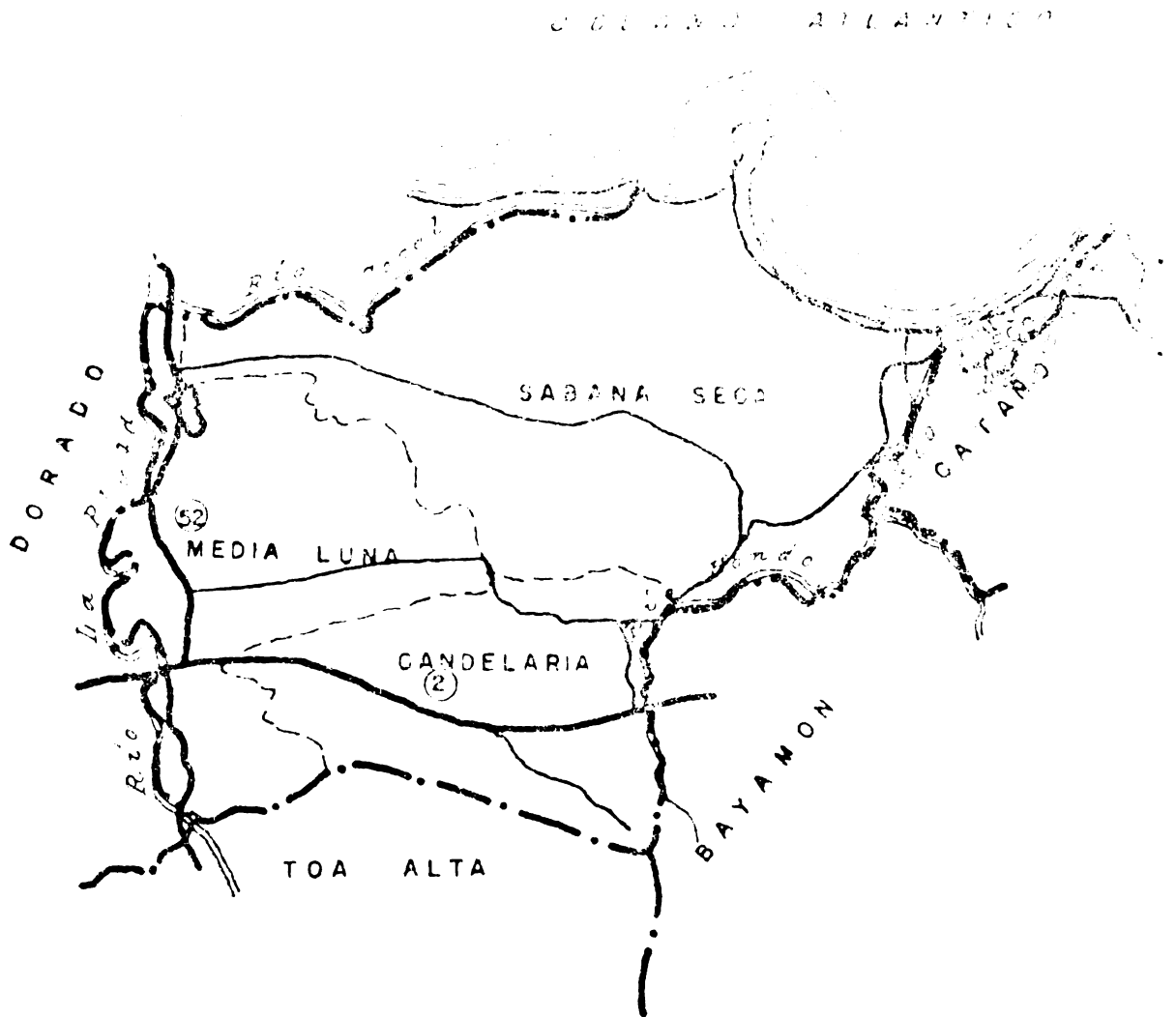











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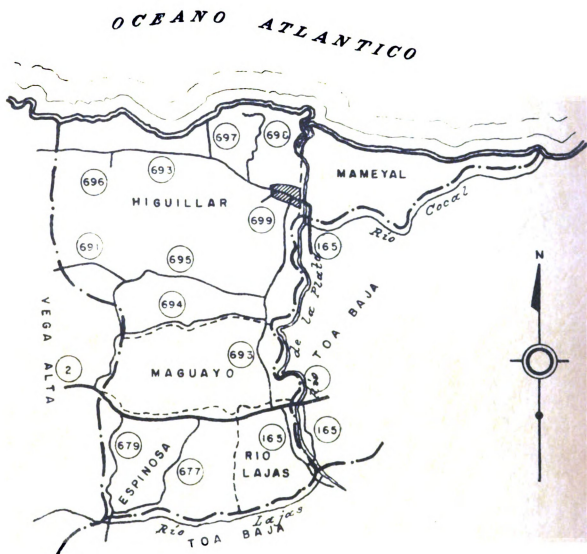
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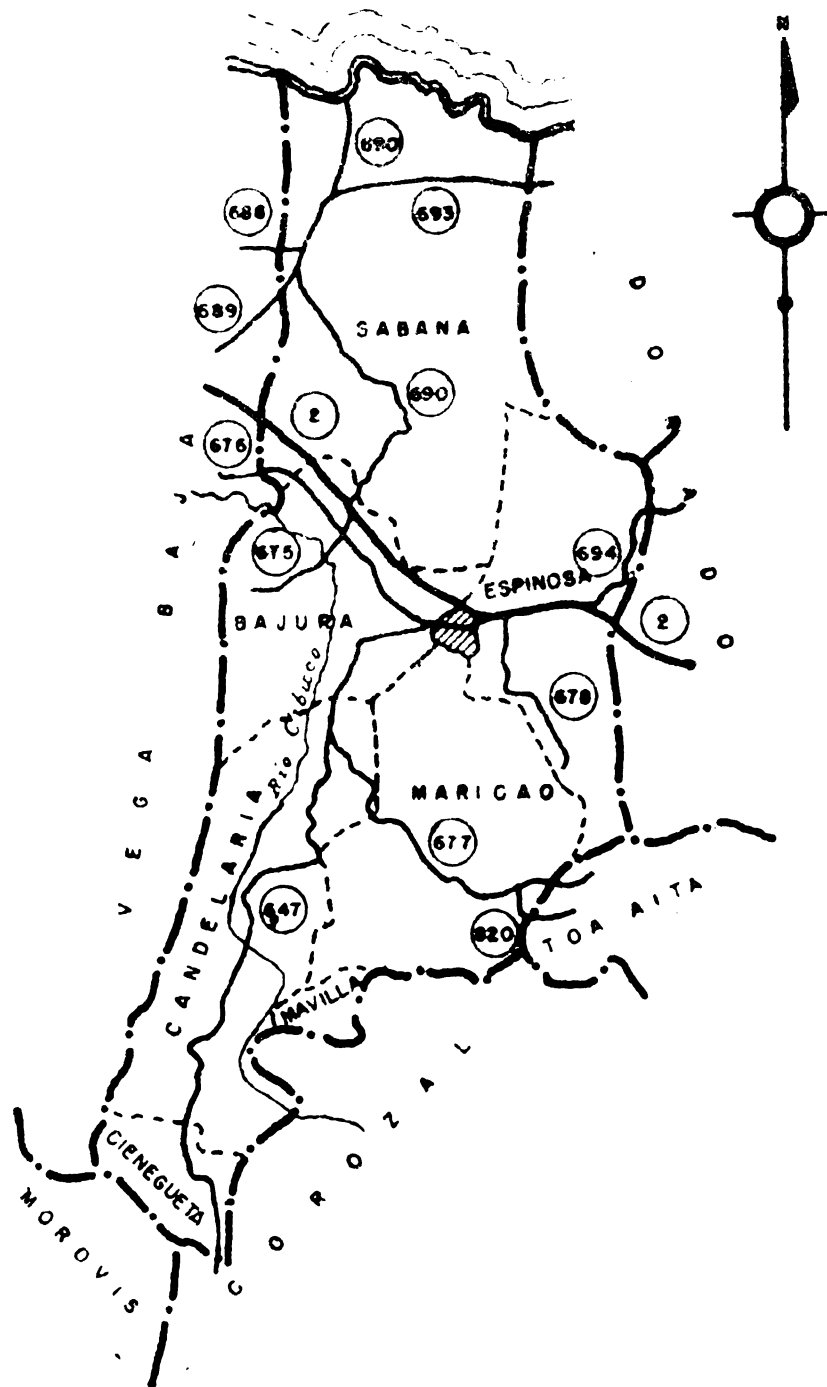
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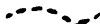




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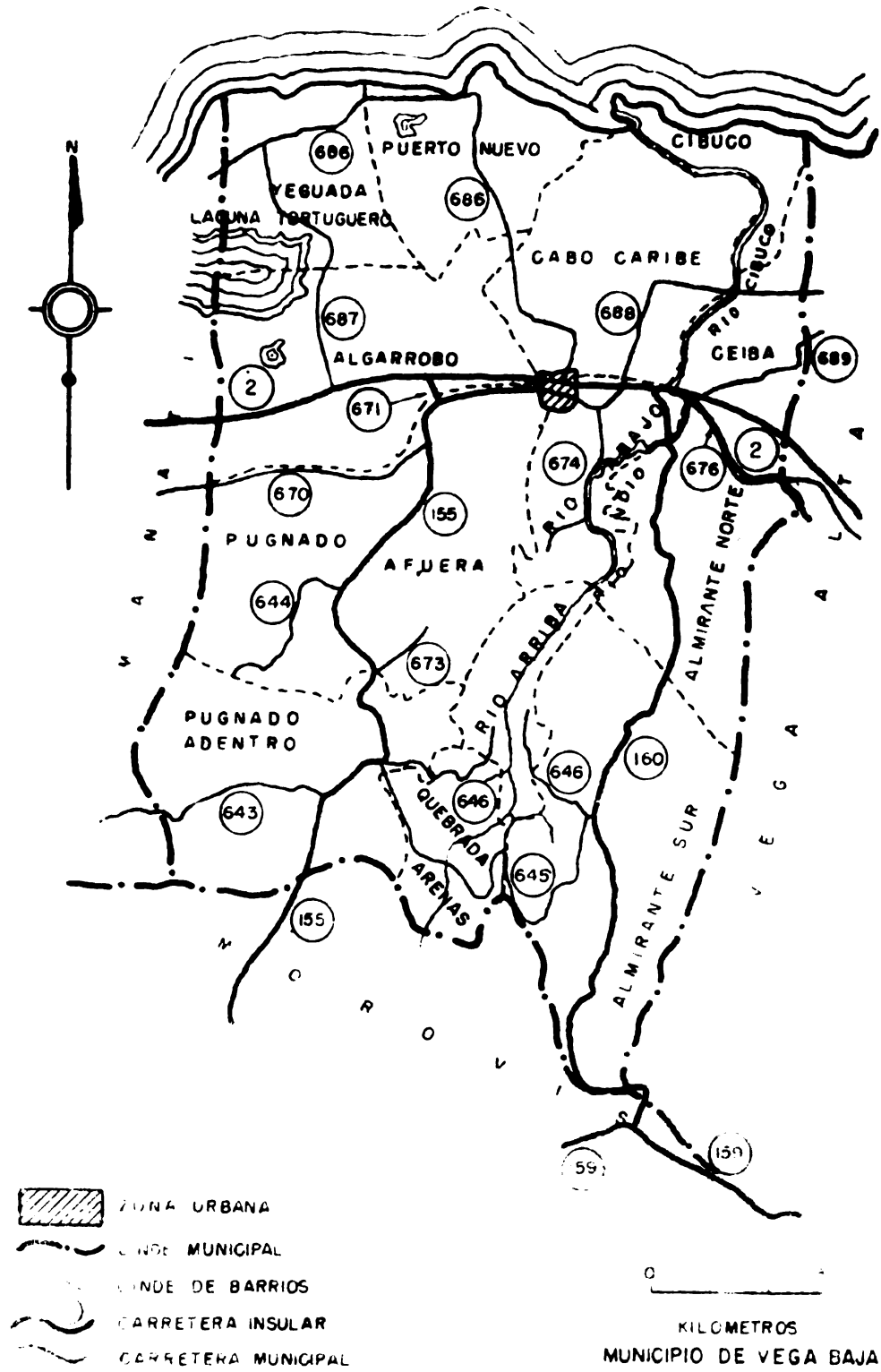
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