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A theoretical perspective for explaining factors associated with cooperative membership in the Qassim Region of Saudi Arabia

Muhamad Suliman Al-Sakran
Iowa State University

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A theoretical perspective for explaining factors associated with cooperative membership in the Qassim Region of Saudi Arabia

Al-Sakran, Muhamad Suliman, Ph.D.

Iowa State University, 1992
A theoretical perspective for explaining factors associated with cooperative membership in the Qassim Region of Saudi Arabia

by

Muhamad Suliman Al-Sakran

A Dissertation Submitted to the Graduate Faculty in Partial Fulfillment of the Requirements for the Degree of

DOCTOR OF PHILOSOPHY

Department: Sociology
Major: Rural Sociology

Approved: 
Signature was redacted for privacy.

In Charge of Major Work
Signature was redacted for privacy.

For the Major Department
Signature was redacted for privacy.

For the Graduate College

Iowa State University
Ames, Iowa

1992
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Chapter</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>INTRODUCTION</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Agriculture and Cooperatives in Saudi Arabia</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Objectives of the Study</td>
<td>5</td>
</tr>
<tr>
<td>II</td>
<td>COOPERATIVES</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Cooperatives as an International Movement</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Definition and Nature of Farm Cooperatives</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>Cooperatives in Saudi Arabia</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td>Government policies</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td>Financial resources</td>
<td>19</td>
</tr>
<tr>
<td></td>
<td>Forms of cooperatives</td>
<td>19</td>
</tr>
<tr>
<td>III</td>
<td>THEORETICAL FRAMEWORK</td>
<td>22</td>
</tr>
<tr>
<td></td>
<td>Traditional Adoption-Diffusion Model and Membership in Farm Cooperatives</td>
<td>22</td>
</tr>
<tr>
<td></td>
<td>Application to Cooperative Membership and Critique of the Traditional Framework</td>
<td>31</td>
</tr>
<tr>
<td></td>
<td>Alternative Model</td>
<td>38</td>
</tr>
<tr>
<td>IV</td>
<td>METHODS AND PROCEDURES</td>
<td>44</td>
</tr>
<tr>
<td></td>
<td>Study Area</td>
<td>44</td>
</tr>
<tr>
<td></td>
<td>Questionnaire</td>
<td>47</td>
</tr>
<tr>
<td></td>
<td>Sample</td>
<td>48</td>
</tr>
<tr>
<td></td>
<td>Implementation of Research</td>
<td>49</td>
</tr>
<tr>
<td>V</td>
<td>FINDINGS</td>
<td>52</td>
</tr>
<tr>
<td></td>
<td>Characteristics of Farmers and Cooperative Membership</td>
<td>52</td>
</tr>
<tr>
<td></td>
<td>Farming Characteristics and Cooperative Membership</td>
<td>56</td>
</tr>
</tbody>
</table>
Characteristics of Farm Operations and Cooperative Membership .................................. 59
Marketing Patterns and Cooperative Membership ......................................................... 65
Agricultural Information Sources and Cooperative Membership ............................... 68

CHAPTER VI. DATA ANALYSIS ....................................................................................... 72
Cooperative Membership and Traditional Adoption-Diffusion Model .......................... 74
  Description of the independent variables ................................................................. 75
  Discriminant analysis ................................................................................................. 81
    Comparison based on the traditional adoption framework ........................................ 82
  Conclusions .............................................................................................................. 87

The Impact of Moral Conditions Associated with Culture on the Traditional Adoption-Diffusion Framework .......................................................... 88
  Description of the added independent variables .................................................... 89
  Discriminant analysis ................................................................................................. 92
    Comparison based on the combination of moral conditions and traditional adoption-diffusion framework ......................................................... 92
  Conclusion .............................................................................................................. 97

CHAPTER VII. DISCUSSION AND IMPLICATIONS ....................................................... 99
Summary and Discussion of the Results ........................................................................ 99
Implications of Findings ............................................................................................... 104
Limitations of the Study and Suggestions for Future Research .................................... 108

BIBLIOGRAPHY ............................................................................................................. 111
ACKNOWLEDGEMENTS ............................................................................................... 124
APPENDIX: QUESTIONNAIRE ..................................................................................... 126
<table>
<thead>
<tr>
<th>Table</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Table 1</td>
<td>Number and distribution of cooperatives in Saudi Arabia until 1988</td>
<td>21</td>
</tr>
<tr>
<td>Table 2</td>
<td>Classification of the cooperative members by interview status</td>
<td>51</td>
</tr>
<tr>
<td>Table 3</td>
<td>Characteristics of farmers by cooperative membership</td>
<td>53</td>
</tr>
<tr>
<td>Table 4</td>
<td>Farming characteristics by cooperative membership</td>
<td>58</td>
</tr>
<tr>
<td>Table 5</td>
<td>Characteristics of farm operations by cooperative membership</td>
<td>60</td>
</tr>
<tr>
<td>Table 6</td>
<td>Marketing patterns by cooperative membership</td>
<td>66</td>
</tr>
<tr>
<td>Table 7</td>
<td>Agricultural information sources by cooperative membership</td>
<td>69</td>
</tr>
<tr>
<td>Table 8</td>
<td>Measures of information content by cooperative membership</td>
<td>77</td>
</tr>
<tr>
<td>Table 9</td>
<td>Measures of sources of information by cooperative membership</td>
<td>78</td>
</tr>
<tr>
<td>Table 10</td>
<td>Measures of relative advantage by cooperative membership</td>
<td>80</td>
</tr>
<tr>
<td>Table 11</td>
<td>Discriminant function coefficients for the traditional adoption-diffusion model</td>
<td>83</td>
</tr>
<tr>
<td>Table 12</td>
<td>Canonical discriminant functions for the traditional adoption-diffusion model</td>
<td>85</td>
</tr>
<tr>
<td>Table 13</td>
<td>Classification of cooperative members and nonmembers based on the discriminant function of the traditional adoption-diffusion model</td>
<td>86</td>
</tr>
<tr>
<td>Table 14</td>
<td>Moral conditions related independent variables by cooperative membership</td>
<td>90</td>
</tr>
</tbody>
</table>
Table 15. Discriminant function coefficients for the modified traditional adoption-diffusion model incorporating subject's moral conditions ........................................ 93

Table 16. Canonical discriminant functions for the modified traditional adoption-diffusion model incorporating subject's moral conditions ........................................ 95

Table 17. Classification of cooperative members and nonmembers based on the discriminant function of the modified traditional adoption-diffusion model incorporating subject's moral conditions ......................... 96
LIST OF FIGURES

Figure 1. Factors influencing agricultural cooperative membership in Saudi Arabia ...... 43

Figure 2. Saudi Arabia: Administrative and main areas of settled agriculture (Beaumont and Melachlan, 1985:211) .................. 46
CHAPTER I. INTRODUCTION

Cooperation remains as one of the most important processes that enables societies and communities to maintain solidarity and integration among its members. In fact, cooperation as an idea is as old as civilization. In early civilizations, humans realized that tasks such as hunting animals and cultivating land would be better performed as groups than as individuals. Organized cooperation for realizing mutual benefits is so instinctive and embedded within the meaning of civilization that discovering its beginning is impossible (Ingalsbe and Groves, 1989).

The history of cooperation in Saudi Arabia goes back to the time of the beginning of Islam in the Arabian Peninsula. In Islam, the Quran encourages Muslims to cooperate. Roles and boundaries of cooperation among Muslims are clearly defined in verses of the Quran. In the second verse of Sura 5: Maida (Chapter VI) of the Holy Quran, it is stated: "Help ye one another in righteousness and piety, but help ye not one another in sin and rancour." Thus, a clear message is given to Muslims to help their neighbors in times of sickness, hunger and hardship and to protect the weak from their oppressors (Ali, 1983:239).

In the recent history of Saudi Arabia, cooperation was officially recognized in 1961 by the government when the
Cooperatives Act was passed. This act set policies concerning the establishment of cooperatives. However, nongovernmental induced cooperation started well before 1961 as citizens in different parts of the country cooperated on their own. Their efforts reflect the willingness of people in Saudi Arabia to work together on matters of shared interest.

Agriculture and Cooperatives in Saudi Arabia

Since Saudi Arabia is one of the world's driest countries, efforts are being made to improve its agricultural productivity. These efforts vary from time to time and according to the financial situation of the nation. Since the recent increase in oil revenues, personal changes in eating habits have brought about a greater demand for food products that are not produced domestically. Subsequently, importing food from other nations has become a common practice.

The government serves as the major planner for setting goals and allocating agricultural resources in Saudi Arabia. During the last three decades, significant policies concerning the development of the agricultural sector have been outlined. This new concern for agriculture is readily seen in the government's Third Development Plan:
The need for a sound agricultural sector has long been recognized by the government. The need for a prudent level of strategic food production and the opportunities for good levels of agricultural incomes underlie the agricultural policies and plans of the government (Ministry of Planning, 1980:137).

To improve agriculture, governmental support became the most critical component of policy for expanding agricultural production. Both financial and technical support were made available. Financial support was available in the form of interest free loans, input and output subsidies, and the distribution of fallow land. Other types of support were available through extension and research services, water resources development, construction of agricultural roads, and mobile veterinary services. Governmental support was also extended to cooperatives (Ministry of Planning, 1970, 1975, 1980, 1985; Saudi Arabian Agricultural Bank, 1985). As outlined in the Cooperatives Act of 1961, the Ministry of Labor and Social Affairs is responsible for cooperative efforts and activities in the country. Saudi Arabia's General Department of Cooperatives was made responsible for all forms of cooperative activities, including managing and supervising cooperative movements, informing people about cooperatives and helping with their establishment, and providing technical and financial support for the formation
of cooperatives (Ministry of Finance and National Economy, 1978; Ministry of Labor and Social Affairs, 1989).

As of 1988, 170 cooperatives existed in Saudi Arabia. They included both multiple purpose cooperatives and those limited to a specific purpose, e.g., agriculture, consumers, technical, fishermen, and marketing. Thirty-two of the 170 were agricultural cooperatives (Ministry of Labor and Social Affairs, 1989).

In spite of the efforts by the Department of Cooperation to expand cooperative activities, several studies have indicated a need for strengthening the role of agricultural cooperatives in the country (Saudi Arabian Agricultural Bank, 1982; Al-Humaidi, 1988; Al-Sakran, 1988; and Al-Oablly, 1988, 89). Recent statistics show that membership in agricultural cooperatives is very low in Saudi Arabia; while 25 percent of the Kingdom's civil labor force is employed in agriculture, fewer than one percent of those employed in agriculture are members of agricultural cooperatives. On average, the 32 agricultural cooperatives have less than 300 members per cooperative (Ministry of Planning, 1980; Ministry of Labor and Social Affairs, 1989).

These statistics, accompanied with the fact that cooperation is both promoted by the country's culture and supported through government policies, represent a problem
that needs to be addressed and carefully investigated. In the past, previous studies of cooperatives have looked on membership in agricultural cooperatives from a utilitarian perspective, ignoring the importance of other factors associated with the culture and moral obligations of Saudi citizens. This neglect represents a theoretical problem which needs to be corrected in an effort to study the potential impact of cultural or moral related factors on the decisions by farmers to accept new farming practices such as membership in Saudi's agricultural cooperatives.

Objectives of the Study

On the basis of the above discussion, the following four objectives guide this research. The first objective is to develop a conceptual framework that views cooperative membership in Saudi Arabia as a function of both utilitarian and deontological (moral) perspectives. The second objective includes an empirical test of the framework by comparing the conditions and perceptions of cooperative members with nonmembers. Based on the results of this comparison, recommendations will be outlined to inform policy makers on strategies to increase membership in agricultural cooperatives. Finally, recommendations will be made regarding the importance of cultural conditions for studying adoption behavior.
CHAPTER II. COOPERATIVES

This chapter provides a description of cooperatives as an organization. First, cooperation and cooperatives are discussed within the context of an international movement. The definition and nature of farm cooperatives are then provided. Finally, cooperatives within the context of Saudi Arabia are discussed.

Cooperatives as an International Movement

As early as the 14th century, Iban Khaldun argued that in order to survive, human beings must learn to cooperate with each other (Baali, 1988). He went on to point out that the use of cooperation for survival represented a unique quality that distinguishes humans from other living beings. Iban Khaldun added that because cooperation is necessary for survival, coercion may be used when people ignore the interests of other humans.

Courtis (1934) uses two words to define cooperation. The concept cooperation for Courtis means "working together." In this regard he argues that any working together toward some common achievement by two or more individuals is called cooperation, whatever the motive that influences the common activity. The cooperation process involves three elements: First, the principle of individualism which is the utmost development of each of
the units that compose the cooperating group. Second is the altruistic element. This refers to the radiation from each of the units comprising the group, and the utmost assistance available to every unit in the cooperating group. Third is the principle of balance. This element means that the first two elements must be kept in proper relationship in order to obtain the maximum benefits for the group as a whole. In the end, the greatest benefits for each of the units is possible. Any exaggeration, overuse, or underuse of one element means a net loss to all, and to each unit in the cooperating group (Durell, 1936).

Another distinctive definition of cooperation is provided by Nisbet, who defines the term as "a joint or collaborative behavior that is directed toward some goal in which there is common interest or hope of reward" (Nisbet, 1968:384). Reviewing this definition as well as others, Marwell and Schmitt (1975) conclude that there are five specific elements constituting cooperative relations: goal-directed behavior, rewards for each participant, distributed responses, coordination, and social coordination. The first two of these five elements are viewed as the central elements by most writers. The third element, or distributed responses, is important under specific conditions. The terms conjunctive or disjunctive
are used to refer to these conditions and to denote the presence and absence, respectively, of the distributed responses element. When the task is conjunctive, success depends upon all persons' making the correct response. The task requirement is disjunctive, however, when the correct response is required of only one or some of the participants. When the task requires a division of labor, the possibility of the fourth element (coordination) arises. When coordination is needed for social reasons, the fifth element (social coordination) arises.

A recent definition of cooperation is offered by Argyle (1991):

Acting together, in a coordinated way at work, leisure, or in social relationships, in the pursuit of shared goals, the enjoyment of the joint activity, or simply furthering the relationship (Argyle, 1991:15).

This definition in fact supports the previously mentioned definitions. Furthermore, the definition shows that cooperation is a type of social interaction necessary for achieving common goals shared by more than one person in society. Hence, definitions of cooperation show that it is a social phenomenon despite the fact that in most situations economic purposes may precipitate it. Cooperation can be described as social because it brings people together to perform a joint action benefiting and serving the needs of all involved.
Speaking on the importance of cooperation, Durell argues:

The transcendent value of cooperation is illustrated by the fact that by joining hands and working shoulder to shoulder in a mutually helpful way, a group of persons is often able to carry through a project and obtain a result otherwise impossible (Durell, 1936:8).

This argument shows how cooperation is important for individuals whose needs are similar. Through cooperation, these needs can be fulfilled with less effort and cost. In this regard, Enfield (1927) describes a cooperative movement as a movement gradually working out a new principle in the distribution of the world's wealth based on human needs rather than on the ownership of capital or on work done. Subsequently, the movement spread throughout the world. It is important to awaken the interest of individuals in cooperation so that they can realize the actual situation in which they find themselves, and the possibility of doing something to better their current circumstances (Packel, 1940).

It is difficult to distinguish between cooperation and cooperative movement, primarily because those who have written about the historical development or background of cooperatives make no clear distinction. In fact, a cooperative and cooperation often are used as interchangeable concepts, thus, a discussion of the historical development of cooperatives usually begins with
the identification of cooperation as the basic element or action leading to the formation of cooperatives. On the other hand, when the discussion is about the history of cooperation, cooperative movement and cooperatives are usually part of the discussion. Cooperatives are often considered a method of formalizing cooperative action in a way leading to provision of the best possible services (Roy, 1969; Groves and Ingalsbe, 1989).

Formalizing cooperation through an organization is a relatively recent phenomenon beginning some 150 years ago (Sargent, 1982). According to McBride (1986), cooperative legislation which exists today has been influenced by the Rochdale Society which began in England in 1844. McBride describes the Rochdale Society as follows:

It was a retail cooperative selling consumer goods and operated under what was referred to as certain principles. They are as follows:
1. Open membership - open to everyone.
2. One person - one vote.
3. Cash trading.
4. Membership education.
5. Political and religious neutrality.
6. No unusual risk assumption.
7. Limited return on stock.
8. Goods sold at regular retail prices.
9. Limitation on the number of shares of stock owned.

A majority of these principles remain today in the rules governing cooperatives in most countries.

During the late nineteenth century, the cooperative movement spread to developed countries as a self-help
method to attack the radical conditions of poverty which often accompanied industrialization (Hoyt, 1989). It was during this time when cooperation became a world-wide movement.

The International Labour Office estimates that today approximately 140 of the world's 171 countries have formally organized cooperatives. In 1985, the 72 country members of the International Cooperative Alliance (ICA) represented 740,000 cooperatives on five continents. Even though ICA member cooperatives represent many economic sectors (agriculture, consumer, credit, fishery, housing, employee, and others), the worldwide cooperative movement is dominated by agricultural cooperatives.

Agricultural cooperatives have become an important means for agricultural development. The importance of agricultural cooperatives to achieve agricultural and rural development is acknowledged by governments, international development organizations, and development researchers. At the national level, numerous governments view cooperatives as a vehicle to achieve sound rural development; some countries encourage the formation of cooperatives as a means to advance agricultural development. Developing countries such as India, Tanzania, Dahomey, and Bangladesh have used agricultural cooperatives with considerable success (Muneer, 1989). In other countries such as Burma,
Indonesia, Korea, and Nepal, agricultural cooperatives have been less successful (Lamming, 1980).

Definition and Nature of Farm Cooperatives

Kuhn (1974) defines a cooperative organization according to the benefits granted to members:

A cooperative organization is one whose sponsors are the recipients of its outputs and whose sponsor's goal is their own welfare as recipients. As noted we assign the cost and benefits to them in their role as recipients, not as sponsors, since it is only to receive its output that they sponsor the organization. The definition accepts some nonsponsors as recipients but no nonrecipients as sponsors (Kuhn, 1974:323).

Barton's definition of a cooperative denotes unique principles that distinguish the cooperative organization from other organizations:

A cooperative is a user-owned and user-controlled business that distributes benefits on the basis of use. More specifically, it is distinguished from other businesses by three concepts or principles: First, the user-owner principle. Persons who own and finance the cooperative are those who use it. Second, the user control principle. Control of the cooperative is by those who use the cooperative. Third, the user benefits principle. Benefits of the cooperative are distributed to its users on the basis of their use. The user-benefits principle is often stated as business-at-cost (Barton, 1989:1).

These two definitions are similar in that both explain how cooperatives vary from other social or business organizations. Barton's definition, however, provides more detail about the principles governing cooperatives by
emphasizing that cooperatives are service-oriented rather than profit-oriented, which is seldom the case in other businesses.

Agricultural cooperatives possess the same principles of other cooperatives, but are established to serve a limited sector of society. Beyond the services provided to farmers, however, benefits of cooperatives usually are extended to the communities in which these cooperatives are located. For instance Roy (1969) mentioned that under the authority provided by various acts rural cooperatives can develop community water systems, build rental housing for senior citizens, build housing units for farm labor, develop community recreation areas, organize some other community programs such as co-op health, job and educational programs and many more.

Regarding the definition of farm cooperatives, Rogers et al. (1988) provide the following description within the context of a cooperative definition:

A cooperative is a voluntary association of individuals who join together to secure goods and services at cost. Several farmers become associated so that a part of their individual business operations are conducted jointly, thus making these functions more efficient and less costly than if each farmer acted individually (Rogers et al., 1988:265).

This description of farm cooperatives clearly shows that cooperatives are usually established for the purpose of meeting certain needs of the farmers which cannot be
obtained otherwise. Thus need for congregational efforts in completing certain agricultural operations is the best method for promoting farmers' interest in cooperation.

Private agricultural businesses may serve the same functions as cooperatives. However, only the cooperatives are owned and run by the farmers. The patron-members form the farm cooperative. A board of directors is elected by members. The board of directors hires management personnel. In some cooperatives, hiring is left to the general manager; however, all major decisions are made up with the approval of the board of directors. Members are informed of any major changes in their cooperative. Distribution of profit among members is based on their patronage. Additionally members have the advantage of buying and selling from the farm cooperative at a competitive price, and in general the farm cooperative gives its members more marketing power (Evers et al., 1973; Rogers et al., 1988).

Cooperatives vary in size from a few members who join together to sell products to complex agribusiness organizations made up of thousands of members. Operationally, cooperatives can be defined in terms of products handled and functions performed. For instance, the majority of the agricultural cooperatives in the U.S. are service, marketing, and supply oriented organizations.
The types of farmer cooperatives reflect the nature of their activities and the extent of members' involvement. For instance, cooperative farming may be limited to situations where all means of production are the property of the cooperative; the Russian Kolkhoz or Polish cooperatives are representative of these organizations. Other types of cooperatives exist where members operate plots separately but join together for specific agricultural operations and share costs according to the extent of use of these services (Hussain, 1973).

Cooperatives benefit farmers in a variety of ways. In some situations, a cooperative provides goods and services that are not otherwise available through the local market. Through cooperatives, members are also in a position to carry out business activities that could not be performed efficiently by individual farmers. For instance, the Grange in the U.S. established cooperatives in 1867 to improve the price levels received by farmers for their products and to reduce costs of farming inputs through large-scale purchasing (Nelson, 1969). Serving members during hard times and providing a voice to obtain desired legislation are other important benefits of cooperatives (French et al., 1980).
In other situations, private firms may extract monopolistic profits at the expense of local farmers. Thus economic incentives are present for the formation of cooperatives as well as attracting cooperative membership in anticipation of receiving greater profits by acquiring inputs at less cost and/or marketing outputs for greater prices (Barton, 1989). A similar argument is made by Awolola (1974) who suggests that a cooperative is not set up to make money for itself as a business firm, but to make money for its members. By eliminating the profit margin as an organization, the cooperative has the potential to increase the members' net incomes.

There are other important functions of cooperatives that help small farmers in developing countries. These functions include credit for farmers, rural saving mobilization, input supply and use, marketing and related processes, knowledge input, and finance for cooperative development (Lamming, 1980; Hasan, 1987).

Warren et al. (1976) view farm cooperatives as utilitarian organizations since they must succeed financially to remain in business. Unlike other economic organizations, however, maximization of customer services rather than profit appears to be the main attraction of farm cooperatives. Their argument is identical to the one proposed by Roy (1969) who views the primary purpose of a
cooperative as maximizing the profits of users. Since members serve themselves through cooperation, they are both the owners of the organization and users of its services.

Cooperatives in Saudi Arabia

The cooperative movement in Saudi Arabia is discussed in terms of the government's role, financial resources available for cooperatives, and the various types of cooperatives now in existence in the country.

Government policies

Through the Cooperatives Act of 1961, the government through the Ministry of Labor and Social Affairs became the agency responsible for cooperation and cooperative activities in the country (Ministry of Finance and National Economy, 1978). The General Department of Cooperation is the specific department within the Ministry that is responsible for these activities. The broad responsibilities and objectives of the department include:

1. Managing cooperative movements and supervising policies of cooperative work.
2. Informing people of the importance of cooperation and helping in the establishment of cooperatives.
3. Helping cooperatives to accomplish the economic and social development of communities by investing local people's savings.
4. Improving cooperative administration and improving members' participation and loyalty to cooperatives and communities.

5. Supporting cooperatives through technical and financial support (The General Department of Cooperation, 1989).

Cooperation is the basis upon which the cooperative movement in Saudi Arabia was introduced. This is mainly because cooperation is encouraged and supported by the Islamic teachings. In this regard, Basar (1990) in his discussion of the agricultural cooperative movements in three Mid-Eastern countries including Saudi Arabia states:

It is worth mentioning that the cooperative activities supported by the Holy Quran and Sunnah of the Prophet Muhammad (Peace be upon him). Therefore one can find origins and roots of the movement right at the heart of muslim society (Basar, 1990:22).

Similarly Roy (1969) argues that at least one part of the Quran holds significance relative to cooperation. He adds that the essence of the Islamic teachings lends strong support to cooperation. Therefore, the cooperative act in Saudi Arabia is linked to the values and beliefs inherent within the culture of the society. In fact, the act refers to this by including verses of the Holy Quran that encourage cooperation.

The General Department of Cooperation of the Ministry of Labor and Social Affairs is solely responsible for the organizational aspects of the cooperative movement in the
country. It is regarded as the apex which has links with the primary cooperatives through 17 smaller departments representing the General Department of Cooperation in the five regions of Saudi Arabia (Ministry of Labor and Social Affairs, 1980, 1989; Basar, 1990).

Financial resources

Cooperatives in Saudi Arabia are financed from a combination of self-support and loans. Self-support includes credit and money that is available by selling stocks to members, and through deposits and savings that members provide to their cooperative. Loans are available through the banks, primarily Agricultural Banks (Al-Sabak, 1970). Other financial resources may come from government subsidies. Various types of subsidies are available such as subsidies for construction (generated for the cooperative building), specific projects, improvements, accounting and social services (Aftan, 1970; Ministry of Finance and National Economy, 1978).

Forms of cooperatives

There are seven different types of cooperatives in Saudi Arabia: multiple purpose, agricultural, consumer, technical, services, fishermen, and marketing cooperatives. The number and location by type of cooperative are shown in Table 1.
Farmers are served primarily through multiple purpose and agricultural cooperatives. Prior to 1988, 126 multiple purpose cooperatives existed in Saudi Arabia. These cooperatives provide several social and economic services or activities. Such activities may include providing goods for consumption. A few provide agricultural services for members. However, both the quality and quantity of their services fall short of meeting the needs of most farmers (Aftan, 1970; Al-Oablly, 1988, 89; The General Department of Cooperation, 1989).

As of 1988, 32 agricultural cooperatives were scattered across various regions of the country (Table 1). These cooperatives serve members by providing agricultural inputs (such as agricultural machinery, seeds, fertilizer, pesticides), land reclamation, parts for agricultural machinery, gasoline products, and marketing agricultural products (Aftan, 1970; The General Department of Cooperation, 1989). In spite of these services, few Saudi farmers have joined agricultural cooperatives (less than 1%). To date, there exists little information on why membership is low.
Table 1. Number and distribution of cooperatives in Saudi Arabia until 1988

<table>
<thead>
<tr>
<th>Region</th>
<th>Multiple Purposes</th>
<th>Agricultural</th>
<th>Consumptive</th>
<th>Services</th>
<th>Fishermen</th>
<th>Technical</th>
<th>Marketing</th>
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<td>37</td>
<td>8</td>
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<tr>
<td>Southern</td>
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<td>8</td>
<td>1</td>
<td>-</td>
<td>-</td>
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<tr>
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<tr>
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<td>-</td>
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<tr>
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<td><strong>5</strong></td>
<td><strong>2</strong></td>
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CHAPTER III. THEORETICAL FRAMEWORK

In this chapter, a theoretical framework is proposed for studying cooperative membership within the context of the culture of Saudi Arabia. From this framework, the traditional adoption-diffusion model is adapted to take into consideration the importance of cooperation which is imbedded within the culture through the teachings of Islam.

Traditional Adoption-Diffusion Model and Membership in Farm Cooperatives

Membership in agricultural cooperatives is treated in this study as an adoption of an innovation. This is possible since, unlike the United States, cooperative membership in Saudi Arabia is very low. Given its limited occurrence, cooperative membership is defined as an innovative practice.

The primary purpose of adoption-diffusion research is to explain the processes and/or factors that are associated with an individual's adoption of an innovation. Diffusion research shows agricultural researchers how to transfer their scientific results for use by farmers. Researchers in other social science disciplines such as social psychology, communication, public relations, advertising, marketing, consumer behavior, rural sociology, and other fields use adoption-diffusion research to study some of the
Three concepts are universal in diffusion research: innovation, diffusion, and adoption. Rogers (1983:11) states that an innovation is "an idea, practice, or object that is perceived as new by an individual or other unit of adoption." Diffusion is "the process by which an innovation is communicated through certain channels over time among the members of a social system" (Rogers, 1983:5). The three main elements in the diffusion process include first an innovation, then communication channels over time, and finally a social system.

Adoption is defined by Rogers (1983:21) as "a decision to make full use of an innovation as the best course of action available." The decision of adoption is usually made as a result of a process called the innovation-decision process which is the process through which an individual (or other decision-making unit) passes from first knowledge of an innovation to forming a decision to adopt or reject the innovation. This process consists of five main steps: knowledge, persuasion, decision, implementation, and confirmation.

The knowledge stage occurs when an individual is exposed to the innovation's existence. Persuasion occurs when an individual builds a favorable or unfavorable
attitude toward the innovation. Decision happens when an individual engages in activities that lead to a choice to adopt or reject the innovation. Implementation happens when an individual puts the innovation to use. Confirmation occurs when an individual seeks further information about the innovation which has already been adopted (Lionberger, 1961; Rogers, 1983; Rogers et al., 1988).

Innovation, diffusion and adoption obviously are related. In fact, innovation is a main element in the definitions of the other two concepts. This may explain why innovations were the subject on which adoption-diffusion research was first focused. This research study also follows this pattern by focusing on membership in agricultural cooperatives as an innovation to be adopted by Saudi farmers.

Adoption-diffusion researchers recognize the importance of providing information on the rate of adopting innovations. Five characteristics of innovations are usually perceived by members of a social system for determining an innovation's rate of adoption. They include its relative advantage, compatibility, complexity, trialability, and observability. Relative advantage has to do with the degree to which an innovation is perceived as better than what it replaces. Compatibility is the degree
to which an innovation is seen as consistent with the existing values, past experiences, and needs of the users. Complexity is the degree to which an innovation is hard to understand and use. Trialability is the degree to which an innovation can be tested on a limited basis. Observability is the degree to which the results of an innovation are visible to members of the social system (Rogers, 1983; Rogers et al., 1988).

The relative advantage of an innovation is perhaps the most important attribute influencing the adoption decision of individuals. Rogers argues:

When individuals (or an organization) pass through the innovation-decision process, they are motivated to seek information in order to decrease uncertainty about the relative advantage of an innovation. Potential adopters want to know the degree to which a new idea is better than an existing practice. So relative advantage is often the content of the network messages about an innovation. The exchange of such innovation-evaluation information lies at the heart of the diffusion process. Given this, it is not surprising that diffusion scholars have found relative advantage to be one of the best predictors of an innovation's rate of adoption (Rogers, 1983:217).

Accordingly, Rogers concludes that "The relative advantage of an innovation, as perceived by members of a social system, is positively related to its rate of adoption" (Rogers, 1983:218).

Rogers mentions several forms of an innovation's relative advantage: degree of economic profitability, low
initial cost, decrease in discomfort, saving time and effort, and immediacy of the reward. Findings of other investigators confirm the importance of the impact of an innovation's relative advantages on its rate of adoption (Kivlin and Fliegel, 1967, 68; Fliegel et al., 1968; Mahipal and Kherde, 1989; Marvin et al., 1990; Napier et al., 1991).

Implicit in emphasizing the importance of an innovation's relative advantage is the theoretical framework known as utilitarianism. Utilitarianism views individuals as seeking to maximize utilities by choosing the best means to achieve personal goals (Etzioni, 1988). Since the relative advantage of an innovation is important in evaluating its worth, the traditional innovation model rests on a utilitarian perspective where benefits must be realized if adoption is to occur.

Three main assumptions are inherent to the utilitarian perspective. The first is that people seek to maximize a personal utility such as happiness, pleasure, or consumption. The second is that people render decisions rationally. Rationality in utilitarianism is tied to the individual following his/her self-interest where the goals of one's actions are more important than are the means of achieving them. The third assumption is that the individual acts as the decision making unit (Etzioni,
Based on these three assumptions, individuals are expected to act based on their attempts to avoid pain and maximize pleasure. Accordingly, actions occur if and only if their consequences involve greater happiness (or pleasure or consumption) than would the alternative options available (Donagan, 1977; Wilson, 1983).

Exchange theory is based on the principles of classical utilitarianism (Etzioni, 1988). In fact, some social theorists identify exchange theory as part of the utilitarian perspective. Wilson (1983) argues:

At the core of exchange theory lies the very simple assumption that human beings will form and sustain relationships if they believe that the rewards they derive from such relationships will exceed the costs. This idea has a familiar ring to most of us because it is part of a very influential movement in social thought called "utilitarianism" (Wilson, 1983:19).

According to Blau (1974) the basic assumption of social exchange is that individuals enter into new associations with the expectations that they will be rewarding. They continue relations with old associates and increase interactions only to the extent that they have been rewarding in the past.

The above discussion is mainly concerned with the adoption-diffusion model which is based on a utilitarian perspective. Another important element in the diffusion process is communication through which messages about new ideas, innovations, or practices are transferred to the
members of a social system. Communication is defined as "the process by which participants create and share information with one another in order to reach a mutual understanding" (Rogers, 1983:17). Communication, therefore, is contingent upon two critical elements, namely the origin of information (sender) and the receiver of information. Both elements are important in understanding the communication process.

Knowledge or awareness about an innovation is the first stage of the innovation-decision process which leads to adoption or rejection (Lionberger, 1961; Brown, 1981; Rogers, 1983; Rogers et al., 1988). As previously indicated, knowledge takes place when an individual (or other decision making unit) is exposed to the innovation's existence and obtains some understanding of how it works. In this regard Rogers (1983) talks about needs and awareness of an innovation in terms of explaining which comes first. In his conclusion he claims that research does not provide a clear answer to this question of whether awareness of a need or awareness of an innovation (which creates a need) comes first. What seems important, however, is communicating awareness to the potential users of an innovation regardless of whether the information is about their needs or the innovation or about the innovation itself.
The likelihood of diffusion occurring is influenced by two basic communication factors. The content of information is one factor since it impacts an individual's level of awareness concerning a new practice. Content itself is influenced by decisions made by the sender of information. In this regard, Rogers (1983) argues that the decision to accept or reject an innovation begins with the knowledge stage which starts when the individual is exposed to the innovation's existence and gains understanding on how it functions:

(t)he innovation-decision process is essentially an information-seeking and information processing activity in which the individual is motivated to reduce uncertainty about the advantages and disadvantages of the innovation. An innovation typically contains software information which is embodied in the innovation and serves to reduce uncertainty about the cause effect relationships that are involved in achieving a desired outcome (such as meeting a need or problem of the innovation). Questions such as "What is the innovation?" "How does it work?" and "Why does it work?" are the main concerns of an individual, once he or she is aware that an innovation exists (Rogers, 1983:167).

When discussing information content, Rogers (1983) identifies two major types. The first is how-to knowledge which includes information necessary to use an innovation properly. The individual must understand what quantity to secure, how to use it correctly, and so on. Rogers adds that when a sufficient level of how-to knowledge is not gained rejection or discontinuance is likely to happen.
The second type is the principle knowledge which consists of information on how the innovation works. Rogers (1983) indicates that it is usually possible to adopt an innovation without principle knowledge, but the danger of misusing the new idea is greater and discontinuance is common. Both types of information, therefore, are critical to the diffusion process. Results of previous adoption-diffusion studies support Rogers's views regarding the importance of knowledge about innovations for their rates of adoption (Wilkening et al., 1962; Samhney, 1967; Mahipal and Kherde, 1989; Napier et al., 1991).

The second communication factor identified by Rogers (1983) involves the type of communication networks used to transmit information. Two basic types exist: interpersonal and mass media. These channels serve as the means through which messages travel from one individual to another. Interpersonal channels involve face-to-face exchanges between two or more individuals. Media channels include all forms of mass media such as radio, television and newspapers. Mass media channels are normally the most rapid and efficient tools to inform an audience about the existence of an innovation. Interpersonal channels are more effective in persuading an individual to adopt a new idea, especially if the interpersonal channel links close friends (Rogers, 1983; Rogers and Kincaid, 1981). Previous
studies on adoption-diffusion research indicate that the
more contact that the farmers have with scientific
information and other valuable information sources, the
more they are willing to adopt and accept new farming ideas
(Copp et al., 1958; Sibley, 1968; Noury, 1973; Quraishi,
1980; Mahipal and Kherde, 1989; Thomas et al., 1990; Napier
et al., 1991).

Application to Cooperative Membership and
Critique of the Traditional Framework

The traditional adoption-diffusion framework provides
evidence for determining factors that influence the process
of adopting new ideas or innovations. Since this study
assumes that membership in agricultural cooperatives in
Saudi Arabia is an adoption of innovation, this evidence
also is applicable to the investigation of factors
influencing membership in agricultural cooperatives. Thus,
results of early and previous cooperative studies concerned
with factors influencing farmers' involvement in farm
cooperatives are part of the following discussion. This is
because cooperative movement in Saudi Arabia at the present
time is somewhat similar to that of United States at its
eyear stages.

Like the relative advantage of an innovation, the
benefits of belonging to agricultural cooperatives are
important factors in influencing farmers' decisions to join
cooperatives. Several agricultural cooperative studies report findings indicating the importance of the amount of utilities or advantages expected to be gained as a result of belonging to an agricultural cooperative. Forms of the relative advantages found to attract farmers in joining cooperatives are similar to the relative advantages' subdimensions of innovations often identified by adoption-diffusion investigators. An important form of advantages is the economic benefits which farmers can gain as a result of joining farm cooperatives. Better prices when both selling and buying through farm cooperatives is one of the economic reasons most frequently mentioned by farmers for their involvement in farm cooperatives (Fetrow, 1928; Stern and Doran, 1948; Beal et al., 1951; Korzan, 1952; Copp, 1964; Taji, 1977).

Diversification of services is another economic incentive found to have a positive influence on farmers' decisions to join agricultural cooperatives (Fetrow, 1928; Korzan, 1952; Utterstrom et al., 1976; Taji, 1977; Krishnanra and Dubey, 1990). Good management is viewed as an important means for improving cooperatives' services and success which leads to more farmers joining agricultural cooperatives (Beal et al., 1951; Lamming, 1980; McBride, 1986; Sidhu and Sidhu, 1990).
Finally, the convenient location of the cooperative is considered as an advantage basically in terms of both saving time and money. Some investigators refer to this factor as a reason for joining cooperatives by members or as a condition under which nonmembers will consider joining cooperatives (Beal et al., 1951; Taji, 1977).

Knowledge about an innovation is another factor influencing rates of adoption. Knowledge about cooperatives is a precondition of farmers' decisions on cooperative membership. Several cooperative studies discuss this issue and report a positive relationship between awareness about cooperatives and farmers' involvement in farm cooperatives (Stern and Doran, 1948; Beal et al., 1951; Beal, 1956; Harp, 1959; Utterstrom et al., 1976).

As previously indicated, the relative advantage of an innovation is the main factor influencing adoption. This is receiver-oriented since it is the receiver who makes judgment on the utility of the innovation. Communication factors are also essential for the diffusion process to continue. Such factors include the information content and the communication network used. For both, the sender has control over the choice of options available, whether they involve content of the message or the type of communication network used.
Based on previous adoption-diffusion studies, two criticisms can be raised concerning the connection between the theoretical framework of the classical adoption-diffusion model. First, the relationships between socioeconomic characteristics and adoption dominates most of the adoption-diffusion studies. Despite the fact that the socioeconomic characteristics are excluded in the theoretical framework of the adoption-diffusion model, they are included in most diffusion studies. For instance, several researchers have investigated the association between age and adoption of new innovations (Atala, 1980; Bultena and Hoiberg, 1983; Al-Khelaifi, 1984; Adefuye, 1985; Al-Humaidi, 1988, Hatley et al., 1989). Education is another socioeconomic characteristic that has been investigated by many adoption-diffusion researchers (Ryan and Gross, 1943; Lionberger, 1961; Bose, 1961; Beal and Sibley, 1967; Sandhu and Allen, 1974; Bultena and Hoiberg, 1983; Rogers, 1983; Al-Khelaifi, 1984; Drame, 1986; Pratt and Rogers, 1986; Al-Humaidi, 1988; Hatley et al., 1989; Batt et al., 1990; Zepeda, 1990). Farm size or herd size is investigated as a socioeconomic characteristic by diffusion scholars for the purpose of explaining its effect on the decision to adopt new farming practices (Ryan and Gross, 1943; Fliegel, 1957; Copp, 1958; Lionberger, 1961; Brown et al., 1976; Abd-Ella et al., 1981; Rogers, 1983;
Farm income is also investigated by adoption-diffusion researchers for the purpose of testing its impact on the adoption behavior (Ryan and Gross, 1943; Fliegel, 1957; Finley, 1968; Carlson and Dillman, 1983; Rogers, 1983; Salama, 1983; Al-Humaidi, 1988; Mahipal and Kherde, 1989; Kumar et al., 1990). Other socioeconomic characteristics investigated include part-time farming, farming experience, and family size.

This shortcoming does not mean that investigators should ignore or neglect the impact of socioeconomic characteristics on adoption behavior. However, what is needed is a balance on emphasizing the impact of the various factors influencing the innovation-decision process especially those included as part of the theoretical framework of the adoption-diffusion model.

The second shortcoming is that most studies fail to consider cultural differences when studying adoption. Although the relative advantage of adoption is an important factor influencing an individual's decision, limiting the receiver to decisions based on utilitarian factors ignores other cultural factors within which adoption decisions are made. This is particularly prevalent in countries like Saudi Arabia where the cultural conditions do not make explanations based entirely on utilitarian grounds valid.
Thus there is a need to expand the criteria utilized by the receiving individual as decisions are made on adoption.

Other motives beyond utilitarian dimensions are expected to influence decisions. In addition to utilitarian motives, cooperation may also occur because of extra-individual factors. Cooperation is not a must action required of every person in the case of cooperative associations. Nonetheless, some individuals choose to cooperate. There are two main explanations for this decision to cooperate voluntarily. Both explanations must be grounded either in the means or the end result. First, cooperation may be chosen as a mean for a utilitarian derived ends. In this regard Regan (1980) argues that in certain situations, individuals find it more effective to cooperate with others to achieve personal goals. Alternatively, if personal goals can be achieved without cooperation, cooperation is not expected since individuals have no reason to cooperate based on personal utilities.

The second explanation is that in other situations cooperation is not chosen only for obtaining personal goals, but also to fulfill the moral obligations toward the collective to which the individual belongs. Therefore, cooperation is both a mean and an end by itself rather than serving solely as a means for personal gain. This situation is similar to that of Saudi Arabia where
individuals are morally encouraged to cooperate with other members of the society. It is attributed to the culture of the country that forms the context within which decisions such as cooperation are based.

When actions are driven by moral values, a deontological perspective supplants the utilitarian perspective. Although compatibility of an innovation is considered as an important attribute influencing its rate of adoption (Lionberger, 1961; Rogers, 1983; Rogers et al., 1988), this issue is viewed by adoption-diffusion theorists differently from the way in which it is viewed by deontological theorists, as in that the latter associate the issue with moral concerns influencing the decision of whether to adopt an innovation. There are many ways in which an innovation can be compatible (Rogers, 1983; Rogers et al., 1988). One way is compatibility with values, beliefs, or norms of people among whom the innovation is to be diffused. An example of this type of compatibility provided by adoption-diffusion theorists is that American farmers place a strong value on increasing farm production; soil-conservation innovations, therefore, are perceived as conflicting with this production value and have generally been implemented quite slowly. In this instance, individuals are more concerned with the impacts of the
adoption on monetary gains than with the related moral concerns.

Another type of the innovation's compatibility is that with previously introduced ideas. Again, this type of compatibility is unconcerned with moral issues. Rather, it is concerned with the similarity between the innovation and other already introduced innovations or ideas related to the same issue. A third type of innovation's compatibility is discussed by Rogers: namely that of the degree to which an innovation meets a need felt by clients. This type of compatibility is also more closely associated with the relative advantages of an innovation than with related moral concerns.

From the perspective of adoption-diffusion theorists, compatibility of an innovation clearly has more to do with its ability to generate benefits for the potential adopters than with the moral concerns associated with its adoption. Thus, in the diffusion literature there is little indication of the impact of moral concerns on the adoption process.

Alternative Model

Deontology considers the consequences of actions on communities as a whole rather than on the single individual. This perspective is based on the cultural context by considering the morality and beliefs of the
society in question. In this study, deontology is included to address non-utilitarian factors that influence decisions on agricultural cooperative membership in Saudi Arabia. Since the classical diffusion model focuses on knowledge and the relative advantages as perceived by individual members, the moral issues are omitted from consideration. Yet cooperation in societies like Saudi Arabia is driven by more than utilitarian forces; cooperation is encouraged by Islam which has significant influence on the culture of Saudi Arabia. In fact, signs of cooperation are in evidence among individuals and communities (especially within tribal linkages) throughout the history of the Arabian Peninsula. After the revelation of the Islamic Message by Prophet Muhammad (Peace be upon him) fourteen hundred years ago, cooperation became part of the people's religion as well as the values and traditions of the region's culture (Al-Jnooby, 1979; Muneer, 1989).

Contrary to utilitarianism, deontology considers the moral guidelines for action. Values that define right from wrong are important when weighing alternatives (Broad, 1959; Blanshard, 1961; Baier, 1970; Frankena, 1973; Frankena, 1976; Donagan, 1977; Regan, 1980; Goldworth, 1983). Etzioni states:

The essence of the deontological position is the notion that actions are morally right when they conform to a relevant principle or duty. (The term deontological is derived from the Greek deon
which means binding duty.) Deontology stresses that the moral status of an act should not be judged by its consequences, the way utilitarians do, but by "intention." For example, a person who sets out to defame another is acting immorally, whether or not the person succeeds in actually damaging whom he or she seeks to defame (Etzioni, 1988:12-13).

Etzioni (1988) identifies three core assumptions of what he calls the "I and WE" paradigm (one of a larger possible set of deontological paradigms). The first is that people seek at least two irreducible "utilities," one at the level of the individual and a second at the collective level. This assumption is opposite to utilitarianism which holds that people pursue only to maximize their own utility. The second assumption is that people select means, not merely goals, for the basis of their values and emotions. The consequences or goals, therefore, are not the only factors influencing individual actions (utilitarianism position), but the means of attaining such goals are also considered important. These means are affected by the morals and values of society. The third assumption is that social collectives serve as the main decision-making units. This does not preclude individual decisions, but rather that individual decisions occur largely within the context set by collectives. For deontologists, individuals make their own decisions but are expected to serve the interests of the group as well as themselves.
Morality is an important dimension of deontological arguments. According to Etzioni (1988), Durkheim sees morality as a system of rules and values that become integrated into culture. Individuals acquire rules as part of the general transmission of culture. Baier (1970) indicates that individuals are morally driven because it is equivalent to following rules designed to overrule self-interests. People sacrifice their own advantages when they believe others will make similar sacrifices; they recognize that the overall results will be to everyone's advantage. The collectivity, as a result, will benefit.

Religion helps shape a culture's moral system through its influence on people. Such beliefs and values are reflected in the actions of individuals. As Durkheim argues "The real function of religion is not to make us think, to enrich our knowledge, nor to add to the conception which we owe to science ... but rather, it is to make us act, to aid us to live" (Durkheim, 1955:677).

In conclusion, both relative advantages as stressed in utilitarianism and moral concerns as emphasized in deontology are important determinants of an individual's decision to adopt an innovation. Accordingly, Etzioni's assumption that social collectives influence individual's decisions is relevant. Both utilitarianism and moral
concerns are expected to influence decisions made by farmers in Saudi Arabia.

Figure 1 shows the theoretical model guiding this research agenda. Membership in farm cooperatives is dependent on several factors including socioeconomic characteristics (such as age, education, farm income, farm size, etc.), information content, source of information, relative advantage of adoption, and moral conditions associated with adoption. The first four factors are part of the traditional adoption-diffusion framework. In fact, these factors are included in most adoption-diffusion studies investigating the conditions of adoption behavior.

Moral conditions associated with adoption is the fifth factor assumed to influence farmers' decisions. This factor is added to represent the cultural factors expected to influence decisions on cooperation. To determine whether the addition has an impact on the decision on cooperative membership, the model will be examined in two steps. First, a test of the traditional adoption-diffusion framework is made. Second, deontological considerations are added to the traditional model. The theoretical framework of this study is tested by the results and comparisons of these two analyses.
Traditional Adoption-Diffusion Framework

1. Socioeconomic characteristics
2. Information content (sender based)
3. Sources of information (sender based)
4. Relative advantage of adoption (receiver based)

Addition to the Traditional Framework

5. Moral conditions associated with adoption

Decision on Cooperative Membership

Figure 1. Factors influencing agricultural cooperative membership in Saudi Arabia
CHAPTER IV. METHODS AND PROCEDURES

During a visit to Saudi Arabia in 1989, government officials and researchers with knowledge of the country's cooperative movement were contacted to obtain information related to the status of cooperatives. Based on these discussions, a decision was made to conduct research to identify problems hindering the agricultural cooperative movement in Saudi Arabia. A proposal was written and a decision was made to focus on one cooperative rather than many cooperatives throughout the country.

Study Area

This research was conducted in Qassim, an agricultural area located in the Central Region of Saudi Arabia. The selection process was made using two steps. First, the selection of the region was necessary. Then selection of the agricultural area within the region was determined.

Saudi Arabia consists of five socioeconomic regions: Central, Eastern, Northern, Western, and Southwestern. The major agricultural areas in the country are the Riyadh provinces and Qassim in the Central Region, Taif in the West, Asir and Jizan in the Southwest, and Hafuf and Qatif in the East (Figure 2). Other agricultural areas are smaller and limited primarily to oases such as Madina in the West, Hail and Jouf in the North, or to valleys such as
Wadi Fatima and Wadi Yanbu in the West, and Wadi Al-Dawaser in the Central Region (Al-Khelafi, 1984; Presley, 1984; Al-Sakran, 1988).

The selection of the Central Region was made primarily because two of the best agricultural cooperatives (as evaluated by the officials of the General Department of Cooperation) are located in this region. Officials of the General Department of Cooperation suggested these two cooperatives for study. Another reason for selecting this region is that access to information on cooperatives is better in the Central Region than in other regions.

The selection of Qassim area was made as a result of the cooperative chosen for study. Two agricultural cooperatives located in the Central Region were suggested by the General Department of Cooperation, Al-Butain Agricultural Cooperative Association in Burydah and Al-Karj Agricultural Cooperative in Al-Karj. Visits to both cooperatives were made. Based on results of these visits, Al-Butain Agricultural Cooperative was selected since management of this cooperative seemed more interested in the research and willing to offer assistance. In addition, an agricultural college located in Burydah made its facilities available for the research. Interviewers also were more available in Burydah.
Figure 2. Saudi Arabia: Administrative and main areas of settled agriculture (Beaumont and Melachlan, 1985:211)
Qassim is located 350 km northwest of the country's capital, Riyadh. It covers a total of 87,500 square kilometers (Al-Humaidi, 1988). According to the 1981-1982 agricultural census, there were 11,187 farms in Qassim covering an area of 4,934,621 donums (493,462.1 hectares) (Ministry of Agriculture and Water, 1982). Two major Agricultural Extension Departments serve farms in this area. The first is located in Burydah which has nine branches supervising 73 percent of the Qassim farmers. The remaining farmers are supervised by the three branches of the Onayzah office (Al-Humaidi, 1988).

Questionnaire

A questionnaire was designed to address the theoretical concepts identified in this research. An interviewing schedule was written and pretested prior to the implementation of the research. Input of knowledgeable individuals and researchers both in the General Department of Cooperation and the Agricultural Extension and Rural Sociology Department at King Saud University were consulted before deciding on the final draft of the questionnaire.

The questionnaire format is divided into five sections (see Appendix). The first section includes questions on individual and farm characteristics. Questions related to the decisions on farming operations are included in the second section. Questions on the importance of cooperation
to the individual comprise the focus of the third section. The fourth section consists of questions on agricultural cooperatives. Finally, questions related to the use of cooperatives by members and perceived barriers among nonmembers for becoming members are included in the final section of the survey.

**Sample**

Sampling of farmers was based on information available about membership in farm cooperatives. Since membership was estimated at 250-300, a random sample of 100 members was proposed. This size was selected in order to reach a 90% confidence in the results. Additionally, cost served as an important factor for determining the sample size. Face-to-face interviews were determined as the best technique for collecting data from farmers in countries like Saudi Arabia. Therefore the sample size selected was based on both the high cost of data collection and the limitation of the financial resources available. Furthermore, face-to-face interviewing requires interviewers to travel miles. Additionally, interviewers must arrange the interviewing at times when respondents are at their farms or homes.

In addition to the sample of 100 cooperative members, an equivalent number of nonmembers was to be interviewed. Since an accurate list of all farmers was unavailable, the
closest (geographic) neighbor to each selected cooperative member was to be chosen for interviews. Bailly (1982) calls this convenience sampling.

**Implementation of Research**

The sampling design was modified because of circumstances resulting in the final selection of cooperative to study. Changes were required in order to come up with a sufficient sample size.

Al-Butain Agricultural Cooperative Association was established in 1987 to provide agricultural services for farmers in Burydah and other towns north and northwest of Burydah (Al-Butain Agricultural Cooperative Association, 1988). A list of farmers of the area served by the cooperative, however, was not available. According to the estimates of the Burydah Agricultural Extension Department's officials, approximately 4,000 farms are located in the area. Cooperative records list 222 farmers as members (Al-Butain Agricultural Cooperative Association, 1989). However, of the 100 members who were randomly selected, almost half were either absentee farmers or could not be reached because of outdated phone numbers. In some situations, the cooperative had neither an address nor a phone number. Also some were deceased or were no longer farming. Because of these problems, all absentee farmers
(24), deceased farmers (6), and members no longer farming (2) were excluded from the sample.

Cooperative's officials suggested that the remaining 190 members be interviewed. An intensive review of phone numbers and addresses was conducted with the assistance of the cooperative's staff. Of this number, 15 refused to participate and 92 were not located primarily because of incorrect phone numbers or addresses. Others were either out of the area at the time of data collection or not at their farms at the times chosen to visit them. Altogether, 83 of the 190 were interviewed. Table 2 provides a classification of all members in the original list of 222 farmers.

One hundred thirty-six nonmembers were interviewed. They were chosen based on their proximity to farmers who were to be interviewed as members. More nonmembers were interviewed than members since neighbors of members who were not at home or refused to be interviewed were included in the study. Therefore, the total number of farmers interviewed was 136 nonmembers and 83 members, or a total of 219 farmers.

Face-to-face interviews were conducted by trained interviewers during summer 1991. On average, interviews lasted between 30-45 minutes. It took close to two months to complete all of the interviews.
Table 2. Classification of cooperative members by interview status

<table>
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<tbody>
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<td>A. Total list</td>
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</tr>
<tr>
<td>B. Exclusions prior to field work</td>
<td></td>
</tr>
<tr>
<td>1. Absentee farmers</td>
<td>24</td>
</tr>
<tr>
<td>2. Deceased</td>
<td>6</td>
</tr>
<tr>
<td>3. No longer farming</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>32</td>
</tr>
<tr>
<td>C. Exclusions during field work</td>
<td></td>
</tr>
<tr>
<td>1. Unable to contact</td>
<td>92</td>
</tr>
<tr>
<td>2. Refusals</td>
<td>15</td>
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<td></td>
<td>107</td>
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<tr>
<td>D. Interviews completed</td>
<td>83</td>
</tr>
</tbody>
</table>
CHAPTER V. FINDINGS

In this chapter, contingency tables are used to compare members with nonmembers of the agricultural cooperative. This method is important for understanding the nature of the data and for detecting the relationship between different variables. Thus, the main purpose of this chapter is basically to explain the nature of association between cooperative membership and some selected variables including characteristics of farmers, farming characteristics, characteristics of farm operations, marketing patterns, and sources of agricultural information.

Characteristics of Farmers and Cooperative Membership

Age, education, marital status, and number of children are included as farmers' characteristics in the ensuing discussion. Results concerning these characteristics are summarized in Table 3.

Less than one-tenth (7.3%) of all farmers interviewed were under 30 years of age. More than twice as many (16.9%) were 60 years of age or older. Almost half (46.6%) were between 30-44 years of age.

Comparisons by age show important differences by membership of the agricultural cooperative. More members tend to be middle-aged (45-59 years) when compared with
Table 3. Characteristics of farmers by cooperative membership

<table>
<thead>
<tr>
<th>Cooperative Membership</th>
<th>Yes (n=83)</th>
<th>No (n=136)</th>
<th>Total (N=219)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Characteristics</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>29 or less</td>
<td>4.8%</td>
<td>8.8%</td>
<td>7.3%</td>
</tr>
<tr>
<td>30 - 44</td>
<td>44.6%</td>
<td>47.8%</td>
<td>46.6%</td>
</tr>
<tr>
<td>45 - 59</td>
<td>39.8%</td>
<td>22.8%</td>
<td>29.2%</td>
</tr>
<tr>
<td>60 or more</td>
<td>10.8%</td>
<td>20.6%</td>
<td>16.9%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
</tr>
<tr>
<td><strong>Educational Level</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No formal education</td>
<td>12.0%</td>
<td>33.0%</td>
<td>25.1%</td>
</tr>
<tr>
<td>Primary certificate</td>
<td>12.0%</td>
<td>11.8%</td>
<td>11.9%</td>
</tr>
<tr>
<td>Intermediate certificate</td>
<td>4.8%</td>
<td>11.0%</td>
<td>8.7%</td>
</tr>
<tr>
<td>Secondary certificate</td>
<td>26.6%</td>
<td>27.3%</td>
<td>26.9%</td>
</tr>
<tr>
<td>College degree</td>
<td>37.4%</td>
<td>16.2%</td>
<td>24.2%</td>
</tr>
<tr>
<td>Beyond college degree</td>
<td>7.2%</td>
<td>0.7%</td>
<td>3.2%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
</tr>
<tr>
<td><strong>Marital Status</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Married</td>
<td>95.2%</td>
<td>93.2%</td>
<td>94.0%</td>
</tr>
<tr>
<td>Unmarried</td>
<td>4.8%</td>
<td>6.8%</td>
<td>6.0%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
</tr>
<tr>
<td><strong>Number of Children</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No children</td>
<td>7.3%</td>
<td>6.6%</td>
<td>6.9%</td>
</tr>
<tr>
<td>1 - 5 children</td>
<td>25.6%</td>
<td>35.3%</td>
<td>31.7%</td>
</tr>
<tr>
<td>6 - 10 children</td>
<td>46.4%</td>
<td>42.7%</td>
<td>44.0%</td>
</tr>
<tr>
<td>11 or more children</td>
<td>20.7%</td>
<td>15.4%</td>
<td>17.4%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

*aThe number of nonrespondents per question was small and never exceeded 3 farmers (or 1.36%).

*Significant at .05 level of probability.

**Significant at .01 level of probability.
nonmembers. On the other hand, nonmembers were more likely to be elderly (20.6% versus 10.8%). The association between age and cooperative membership was statistically significant at .05 level of probability.

This finding is similar to the findings of studies conducted in the United States more than four decades ago. At that time, cooperative membership in the U.S. was relatively limited, and therefore thought of as an innovation. A study conducted in Pennsylvania (John, 1944) reported that only 34 percent of farmers interviewed were cooperative members. On the other hand, percentages reported by recent studies were almost twice as great (64 percent as reported by Slamet, 1984) or even three times greater (98 percent as reported by Utterstrom et al., 1976).

Studies reporting findings similar to those of the present study include those of John (1944) and Beal et al. (1951). Similar results were also reported by recent studies (Utterstrom et al., 1976; Nadarajah, 1982; Slamet, 1984) which indicates that the association between age and cooperative membership remains unchanged over time.

Three-fourths (74.9%) of the farmers who participated in this study had attended some formal school; more than one-fourth (27.4%) had a college degree. Members were more educated than nonmembers. In fact, while only 12 percent
of members had no formal education, one-third of the nonmembers had no formal education. At the other extreme, almost half (44.6%) of the members but less than one-fifth (16.9%) of the nonmembers achieved a college degree. The difference on educational achievement was statistically significant at the .01 level. This finding is supported by the results of past research which indicate a positive relationship between education and cooperative membership. This past research includes both early cooperative studies (John, 1944; Stern and Doran, 1948) and more recent ones (Slamet, 1984).

The results of this study are noteworthy for at least two reasons. First, most farmers (74.9%) participating had attended formal schools. This can be explained by the fact that most of the land distributed for farming, as a result of the Barren Land Distribution Law, is operated by young and middle-aged farmers who have had the chance to enroll in formal schools. Additionally, most improved farming is done in fallow lands developed and distributed since 1968 (Saudi Arabian Monetary Agency Annual Report, 1985). An alternative explanation is that Saudi farmers with relatively high educational achievements tend to be willing to join cooperatives. This explanation is supported by Rogers' conclusion that "earlier adopters have more years of education than later adopters" (Rogers, 1983:251).
Perhaps education is an important impetus for farmers to consider and adopt new ideas about farming activities.

Most farmers were married (94%). No difference was found between members and nonmembers based on their marital status.

Number of children reported included both those living at home and elsewhere. Less than one-tenth reported having no children; almost two-thirds (61.4%) reported having at least six children. This large number of children is not unusual since Saudi families traditionally have many children.

Farming Characteristics and Cooperative Membership

Farming characteristics of the participated were determined according to the responses to questions about primary work, present residence, gross annual farm income, and years of experience. These characteristics are summarized in Table 4. Less than one-third (30.4%) of the farmers depend upon farming as their primary occupation. In contrast, more than half (51.9%) report government work as their primary occupation. That greater than two-thirds are part-time farmers can be explained by the uncertainty of farmers about their farming work or income. Another possible explanation is their ability to hire foreign agricultural workers for low wages. This allows Saudi
farmers to continue farming while maintaining nonfarming jobs. In fact, part-time farming is typical in the Central Region of Saudi Arabia. In another area of this region, Al-Sakran (1988) found that 76.8 percent of farmers interviewed were part-time farmers. Occupational differences between members and nonmembers were not significant.

Farmers were equally divided between living in a city (51.6%) and living in a village (48.4%). This is typical of farmers in Saudi Arabia, and particularly in the Qassim area; only a few live in the country. In fact, the nomads are the only people who live in the country as they move continuously to find grass for their animals. No difference was found between members and nonmembers with respect to place of residence.

Approximately half (45.8%) of the farmers reported gross farm incomes of 200,000 SR or more for 1990. More than a third (37.4%) had gross farm incomes of less than 100,000 SR. (The exchange rate of the Saudi Ryal and the U.S. dollar is $1.00 = SR 3.75.) Gross farm income for members, however, was higher than that for nonmembers. Whereas less than one-tenth (7.5%) of the members earned less than 100,000 SR, more than half (55.2%) of the nonmembers had gross farm incomes below 100,000 SR. But more than three-fourths (76.2%) of the members compared to
Table 4. Farming characteristics by cooperative membership

<table>
<thead>
<tr>
<th>Cooperative Membership</th>
<th>Yes (n=83)</th>
<th>No (n=136)</th>
<th>Total (N=219)^a</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Primary Work</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Government work</td>
<td>50.6%</td>
<td>52.6%</td>
<td>51.9%</td>
</tr>
<tr>
<td>Agricultural work</td>
<td>28.9%</td>
<td>31.3%</td>
<td>30.4%</td>
</tr>
<tr>
<td>Commercial work</td>
<td>18.1%</td>
<td>9.2%</td>
<td>12.6%</td>
</tr>
<tr>
<td>Manual work</td>
<td>1.2%</td>
<td>3.1%</td>
<td>2.3%</td>
</tr>
<tr>
<td>Other</td>
<td>1.2%</td>
<td>3.8%</td>
<td>2.8%</td>
</tr>
<tr>
<td><strong>Present Place of Residence</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>City</td>
<td>53.0%</td>
<td>50.7%</td>
<td>51.6%</td>
</tr>
<tr>
<td>Village</td>
<td>47.0%</td>
<td>49.3%</td>
<td>48.4%</td>
</tr>
<tr>
<td><strong>Gross Farm Income Last Year (1990)^b</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than 100,000 SR</td>
<td>7.5%</td>
<td>55.2%</td>
<td>37.4%</td>
</tr>
<tr>
<td>100,000 - 199,999 SR</td>
<td>16.3%</td>
<td>17.2%</td>
<td>16.8%</td>
</tr>
<tr>
<td>200,000 SR or more</td>
<td>76.2%</td>
<td>27.6%</td>
<td>45.8%</td>
</tr>
<tr>
<td><strong>Years Doing Farm Work</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than 10 years</td>
<td>34.1%</td>
<td>34.1%</td>
<td>34.1%</td>
</tr>
<tr>
<td>10 - 19 years</td>
<td>41.5%</td>
<td>32.6%</td>
<td>35.9%</td>
</tr>
<tr>
<td>20 or more</td>
<td>24.4%</td>
<td>33.3%</td>
<td>30.0%</td>
</tr>
</tbody>
</table>

^a The number of nonrespondents per question was small, usually less than 3 and never exceeding 5 farmers (or 2.3%).

^b Exchange rate: $1.00 = SR 3.75.

**Significant at .01 level of probability.
compared to one-fourth (27.6%) of the nonmembers had gross farm incomes of 200,000 SR or more. The difference in gross farm income is statistically significant at the .01 level.

This positive relation between membership in agricultural cooperatives and farmers' incomes is consistent with the findings of previous studies that identify income as a major factor influencing farmers' involvement in cooperatives or associations (Kaufman, 1949; Beal, 1953; Rogers, 1971; and Slamet, 1984). The findings of this study are explained perhaps by the ability of high income farmers to pay membership fees or shares required for joining cooperatives. Additionally, most of the cooperative's services available are designed to benefit wheat growers, who usually have incomes larger than do growers of other crops.

**Characteristics of Farm Operations and Cooperative Membership**

Characteristics of farm operations are reported in Table 5. They include type of ownership, total farm size, area actually farmed, type of farming, presence of a farm manager, number of hired workers, and number of sons working on the farm.

Most (86.3%) of the farmers interviewed owned their farms. Of the remaining participants, the farms were
Table 5. Characteristics of farm operations by cooperative membership

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Yes (n=83)</th>
<th>No (n=136)</th>
<th>Total (N=219)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Type of Ownership</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Owned</td>
<td>88.0%</td>
<td>85.3%</td>
<td>86.3%</td>
</tr>
<tr>
<td>Rented</td>
<td>2.4%</td>
<td>5.9%</td>
<td>4.6%</td>
</tr>
<tr>
<td>Part owned</td>
<td>3.6%</td>
<td>5.9%</td>
<td>5.0%</td>
</tr>
<tr>
<td>Other</td>
<td>6.0%</td>
<td>2.9%</td>
<td>4.1%</td>
</tr>
<tr>
<td><strong>Total Farm Size</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>300 or fewer donums</td>
<td>8.5%</td>
<td>46.3%</td>
<td>31.9%</td>
</tr>
<tr>
<td>301 - 1000 donums</td>
<td>39.0%</td>
<td>37.3%</td>
<td>38.0%</td>
</tr>
<tr>
<td>More than 1000 donums</td>
<td>52.5%</td>
<td>16.4%</td>
<td>30.1%</td>
</tr>
<tr>
<td><strong>Area Actually Farmed</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>300 or fewer donums</td>
<td>8.5%</td>
<td>53.5%</td>
<td>36.0%</td>
</tr>
<tr>
<td>301 - 1000 donums</td>
<td>45.2%</td>
<td>35.7%</td>
<td>39.4%</td>
</tr>
<tr>
<td>More than 1000 donums</td>
<td>46.3%</td>
<td>10.8%</td>
<td>24.6%</td>
</tr>
<tr>
<td><strong>Type of Farming</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wheat**</td>
<td>100.0%</td>
<td>69.1%</td>
<td>80.8%</td>
</tr>
<tr>
<td>Dates</td>
<td>77.1%</td>
<td>80.9%</td>
<td>79.5%</td>
</tr>
<tr>
<td>Vegetables</td>
<td>68.7%</td>
<td>79.9%</td>
<td>75.3%</td>
</tr>
<tr>
<td>Raising animals*</td>
<td>62.7%</td>
<td>49.3%</td>
<td>54.3%</td>
</tr>
<tr>
<td>Fodder production</td>
<td>37.3%</td>
<td>30.1%</td>
<td>32.9%</td>
</tr>
<tr>
<td>Fruits* 27.7%</td>
<td>16.2%</td>
<td>20.5%</td>
<td></td>
</tr>
</tbody>
</table>

*The number of nonrespondents per question was small, usually less than 5 and never exceeding 8 farmers (or 3.6%).

Types of farming are not mutually exclusive since most farms have diversified operations.

*Significant at .05 level of probability.

**Significant at .01 level of probability.
Table 5. Continued

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Yes (n=83)</th>
<th>No (n=136)</th>
<th>Total (N=219)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Having a Manager for the Farm**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>30.1%</td>
<td>6.6%</td>
<td>15.5%</td>
</tr>
<tr>
<td>No</td>
<td>69.9%</td>
<td>93.4%</td>
<td>84.5%</td>
</tr>
<tr>
<td>Number of Hired Workers**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 or fewer</td>
<td>12.3%</td>
<td>56.7%</td>
<td>40.0%</td>
</tr>
<tr>
<td>3 - 4</td>
<td>50.7%</td>
<td>28.4%</td>
<td>36.7%</td>
</tr>
<tr>
<td>5 or more</td>
<td>37.0%</td>
<td>14.9%</td>
<td>23.3%</td>
</tr>
<tr>
<td>Number of Sons Working on the Farm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No sons working</td>
<td>77.1%</td>
<td>76.5%</td>
<td>76.7%</td>
</tr>
<tr>
<td>1 - 2</td>
<td>16.9%</td>
<td>15.4%</td>
<td>16.0%</td>
</tr>
<tr>
<td>3 or more</td>
<td>6.0%</td>
<td>8.1%</td>
<td>7.3%</td>
</tr>
</tbody>
</table>

either rented (4.6%), part-owned (5.0%), or experienced other forms of ownership (4.1%). There was no difference in the pattern of ownership between farmers who were members of the cooperative and those who were not.

Farm sizes of the operators varied, ranging from 300 or fewer donums (31.9%) to more than 1000 donums (30.1%). Membership, however, was strongly associated with larger operations; in fact, while over half (52.5%) of the members operated farms in excess of 1000 donums, only 16.4 percent of the nonmembers' farms were this large. On the other extreme, almost half of the nonmembers farmed less than 300 donums. Membership status and size of operation was
statistically significant at the .01 level. A similar pattern existed when comparing members and nonmembers by the actual size of area farmed.

The differences by size of operation are consistent with results of previous studies. Generally speaking, studies have found that larger operators are more likely to join farm cooperatives than are smaller operators (Beal et al., 1951; Beal, 1953; Stern and Doran, 1948; Nadarajah, 1982; and Slamet, 1984). In fact, the Saudi Arabian Agricultural Bank in 1982 reported that Saudi farmers who were members of farm cooperatives had larger farm sizes. The reasons for this, however, remain unclear. Perhaps operators with large land holdings are in a better position to produce wheat and other crops that normally are handled by services available through cooperatives. Or perhaps large operators are more inclined to adopt innovations than smaller operators. Whatever the reason, large operators more commonly join agricultural cooperatives.

Type of farming reflects the kinds of agricultural commodities produced in the region. Since most farmers produce multiple crops, each participant was asked to report all crops produced on his farm.

Wheat was produced by over four-fifths of all farmers. Every farmer who was a member of the cooperative produced wheat; two-thirds of the nonmembers were wheat growers.
This difference was statistically significant at the .01 level. This is to be expected since the Al-Butain Agricultural Cooperative specializes in offering services to wheat producers. Wheat has also become one of the major crops in the region largely because of the wheat subsidies that have been recently granted by the Grain Silo and Flour Mills Organization.

Date production was the second main commodity produced. Dates serve as a traditional crop that is produced in certain areas of Saudi Arabia; one such area is the Qassim. Additionally, date production is one of the few subsidized commodities in the area. Eighty percent (79.5%) of the farmers reported producing dates. No difference was found by cooperative membership.

Vegetables were the third most common commodity produced. Three-fourths (75.3%) of the farmers reported producing vegetables. No difference was found between members and nonmembers in vegetable production.

More than half (54.3%) of the farmers reported raising animals. Members (62.7%) more likely reported raising animals than nonmembers (49.3%). This difference is statistically significant at the .05 level.

Almost one-third (32.9%) of the participants indicated producing fodder. However, no significant difference
between members and nonmembers in producing fodder was present.

Less than one-fourth (20.5%) of the farmers were fruit tree growers. The percent of members who produced fruits, however, was higher (27.7%) than nonmembers (16.2%). The difference was statistically significant at the .05 level.

Less than one-fifth (15.5%) reported hiring farm managers. But almost one-third (30.1%) of the members reported having managers compared to only 6.6 percent of the nonmembers. This difference is statistically significant at the .01 level.

Two-fifths (40.0%) of all farmers hired two or fewer workers. More than a third (36.7%) employed three-to-four workers; one-fourth (23.3%) employed at least five workers.

Members and nonmembers reported a significantly different number of hired workers. Almost ninety percent (87.7%) of the members but less than half (43.3%) of the nonmembers reported employing three or more workers. This difference no doubt is due to the fact that the larger farms of members require a larger labor force.

Three-fourths (76.7%) of the farmers reported having no sons working on the farm. Sixteen percent reported having either one or two sons working on the farm, but only 7.3 percent had three or more sons working on the farm. No
difference was found between members and nonmembers with the respect to the number of sons working on the farm.

**Marketing Patterns and Cooperative Membership**

Marketing patterns of agricultural products are represented in Table 6. Before discussing these patterns, it should be mentioned that wheat is excluded from discussion since it is purchased by the Grain Silo and Flour Mills Organization. Therefore, farmers were not asked about wheat since every wheat producer sells to that organization and presumably has no problem with marketing the grain. Patterns to be discussed include types of crops marketed and the most frequent method of marketing.

More than three-fourths (78.5%) of the farmers were marketing at least some of their agricultural products. Fewer members (69.9%) than nonmembers (83.8%) reported marketing their agricultural products. This difference is statistically significant at the .01 level. This finding can be explained by the fact that some members are only wheat producers, and therefore had nothing to market. Besides this reason, also some nonmembers were not wheat producers, but were producing other crops for marketing.

Most of those who marketed their production reported selling vegetables (82.4%). No difference was found
Table 6. Marketing patterns by cooperative membership

<table>
<thead>
<tr>
<th>Cooperative Membership</th>
<th>Yes (n=83)</th>
<th>No (n=136)</th>
<th>Total (N=219)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marketing Farm Production**</td>
<td>69.9%</td>
<td>83.8%</td>
<td>78.5%</td>
</tr>
<tr>
<td></td>
<td>30.1%</td>
<td>16.2%</td>
<td>21.5%</td>
</tr>
<tr>
<td></td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
</tr>
<tr>
<td>Crops Marketed**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vegetables</td>
<td>82.8%</td>
<td>82.1%</td>
<td>82.4%</td>
</tr>
<tr>
<td>Dates**</td>
<td>41.4%</td>
<td>65.2%</td>
<td>57.1%</td>
</tr>
<tr>
<td>Fodder</td>
<td>24.1%</td>
<td>24.1%</td>
<td>24.1%</td>
</tr>
<tr>
<td>Fruits</td>
<td>24.1%</td>
<td>17.0%</td>
<td>19.4%</td>
</tr>
<tr>
<td>Animals</td>
<td>17.2%</td>
<td>8.9%</td>
<td>11.8%</td>
</tr>
<tr>
<td>Most Frequent Way of Marketing**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>By a middleman</td>
<td>70.7%</td>
<td>60.1%</td>
<td>63.8%</td>
</tr>
<tr>
<td>By self</td>
<td>17.2%</td>
<td>37.2%</td>
<td>30.4%</td>
</tr>
<tr>
<td>Other</td>
<td>12.1%</td>
<td>2.7%</td>
<td>5.8%</td>
</tr>
<tr>
<td></td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

a The number of respondents per question was small and never exceeded 1 farmer (or 0.45%).

b Crops marketed are not mutually exclusive since some farmers market more than one crop.

**Significant at .01 level of probability.

between members and nonmembers on the basis of marketing vegetables.

Dates were the second important marketed product. Of those marketing agricultural products, more than half (57.1%) were marketing dates. Fewer members (41.4%), however, reported selling dates than nonmembers (65.5%). This difference was statistically significant at the .01
level. Perhaps dates represent a main farming activity for nonmembers who own smaller farms since it requires less land to produce. Another explanation may be that date trees in recently developed lands are small and have not as yet reached the production stage.

Fodder, fruit, and animals were marketed by few farmers (24.1%, 19.4%, and 11.8%, respectively) when compared to other commodities. Members and nonmembers showed no differences in marketing these products.

Almost two-thirds (63.8%) of farmers who marketed products indicated marketing through middlemen; one-third (30.4%) marketed by themselves, while few (5.8%) used other means such as through their hired workers, sons, or neighbors. Members and nonmembers who marketed products differed in their methods of marketing; more nonmembers sold products by themselves (37.2% versus 17.2%). Members, on the other hand, more often sold through middlemen (70.7% versus 60.1%). Differences were significant at the .01 level. These results imply that cooperatives should consider providing marketing services for their members who tend to mostly sell their production through middlemen. This change, if conceived, would benefit both farmers and cooperative, in addition to attracting more farmers to join the cooperative.
Agricultural Information Sources and Cooperative Membership

Responses to the two questions on information sources are presented in Table 7. Over four-fifths (84.4%) of the farmers obtained information on their own. This was by far the most common method used. Less than one-tenth (9.2%) waited for friends, relatives, or neighbors to inform them about important information. Waiting for extension workers and using other techniques to acquire information were cited by only 4.1 percent and 2.3 percent, respectively. No difference was found between members and nonmembers in terms of the most frequent method of obtaining information.

Over two-fifths (42.9%) of the farmers rated relatives, friends, or neighbors as their most useful source of information when making decisions on farming. One-fourth (28.6%) indicated the extension office, while fewer than one-fifth (18.4%) indicated other sources such as agricultural and scientific publications and agricultural specialists. The least used information source was mass media channels.

Members and nonmembers differed in their information sources. While one-third (35.8%) of the nonmembers used the extension office, less than one-fifth (16.9%) of the members did so. In contrast, over one-fourth (27.7%) of the members but only 12.7 percent of the nonmembers indicated other sources such as agricultural and scientific
Table 7. Agricultural information sources by cooperative membership

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Yes (n=83)</th>
<th>No (n=136)</th>
<th>Total (N=219)^</th>
</tr>
</thead>
<tbody>
<tr>
<td>The most frequent way of obtaining information related to farming:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Seek information on their own</td>
<td>85.6%</td>
<td>83.8%</td>
<td>84.4%</td>
</tr>
<tr>
<td>Wait until their friends, relatives or neighbors tell them</td>
<td>6.0%</td>
<td>11.1%</td>
<td>9.2%</td>
</tr>
<tr>
<td>Wait for extension worker to tell them</td>
<td>3.6%</td>
<td>4.4%</td>
<td>4.1%</td>
</tr>
<tr>
<td>Other</td>
<td>4.8%</td>
<td>.7%</td>
<td>2.3%</td>
</tr>
<tr>
<td></td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
</tr>
<tr>
<td>The most useful information source when making decision on farming:**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Relatives, friends, or neighbors</td>
<td>37.3%</td>
<td>46.3%</td>
<td>42.9%</td>
</tr>
<tr>
<td>Extension office</td>
<td>16.9%</td>
<td>35.8%</td>
<td>28.6%</td>
</tr>
<tr>
<td>Agricultural cooperative</td>
<td>14.5%</td>
<td>.7%</td>
<td>6.0%</td>
</tr>
<tr>
<td>Mass Media channels</td>
<td>3.6%</td>
<td>4.5%</td>
<td>4.1%</td>
</tr>
<tr>
<td>Other</td>
<td>27.7%</td>
<td>12.7%</td>
<td>18.4%</td>
</tr>
<tr>
<td></td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

^The number of nonrespondents per question was small and never exceeded 2 farmers (or .90%).

^Scientific publications and consulting ag specialists.

**Significant at .01 level of probability.

publications, and agricultural specialists. Furthermore, almost fifteen percent of the members and less than one percent of the nonmembers relied on cooperatives as their primary source of information. No doubt cooperative
membership leads to the use of multiple information sources rather than with few sources.

In summary, contingency tables were used in this chapter to describe the nature of the data and to test the associations between cooperative membership and selected variables. More members than nonmembers were middle-aged. Also members are more likely to have higher educational levels and gross farm incomes, larger farm sizes, and a farm manager and more hired workers. Types of farming reported include wheat, dates, vegetables, husbandry, fodder, and fruits. All members reported producing wheat. Members raised animals and produced fruits more frequently than did nonmembers. Other than wheat (which was taken care of by the Grain Silo and Flour Mills Organization), all crops were marketed. More nonmembers than members reported marketing their products. Furthermore, members tended to use more information sources than did nonmembers when making farming decisions.

In closing, the results pertaining to socioeconomic characteristics are consistent with those of voluntary association studies in general and with agricultural cooperative studies in particular. These facts indicate that socioeconomic characteristics have an impact on decisions made to join agricultural cooperatives in the Qassim region of Saudi Arabia similar to that impact on
decisions made by individuals in other locations, namely in the United States (e.g., Beal, 1953; Rogers, 1971; Utterstrom et al., 1976; Nadarajah, 1982; and Slamet, 1984).
CHAPTER VI. DATA ANALYSIS

Discriminant analysis is used to test the hypotheses derived in this research. This tool "allows the researcher to study the differences between two or more groups of objects with respect to several variables simultaneously" (Klecka, 1986:7). The purpose of discriminant analysis is to classify objects by a set of independent variables into one of two or more mutually exclusive and exhaustive categories (Morrison, 1969, 1974).

To use discriminant analysis, the following conditions are necessary (Klecka, 1986:11).

1. two or more groups
2. at least two cases per group
3. any number of discriminating variables provided that it is less than the total number of cases minus two
4. discriminating variables are measured at the interval level
5. no discriminating variable may be a linear combination of other discriminating variables
6. covariance matrices for each group must be (approximately) equal, unless special formulas are used
7. each group has been drawn from a population with a multivariate normal distribution on the discriminating variables.

When discriminant analysis is used carefully and special attention is given to the satisfaction of these conditions, calculated canonical correlations and the percentage of cases classified correctly are taken as indices of the effectiveness of the discriminant function (Norusis, 1990). This technique has been used successfully by psychologists,
political scientists, sociologists, and marketing researchers to study and analyze a wide variety of situations where differences of predetermined groups are estimated.

In this study, discriminant analysis is used to distinguish members from nonmembers based on a set of variables derived from the theoretical concepts discussed earlier. Three concepts derived from adoption-diffusion are expected to influence farmers' decisions on cooperative membership: information content, source of information, and perceived relative advantages of membership. Socioeconomic characteristics also are included since prior research has shown that the adoption of an innovation is influenced by personal traits of individuals.

A fourth theoretical concept is included to represent the moral conditions associated with adoption. This concept is an addition to the adoption-diffusion framework. In fact, the focus of this study's theoretical argument is based on this addition to the traditional utilitarian perspective underlying the adoption-diffusion framework. Discriminant analysis is used first to examine the traditional adoption-diffusion model, and then to add variables related to the moral conditions associated with adoption.
Two groups are discriminated, members and nonmembers of Al-Butain Agricultural Cooperative Association. These two groups are formed by responses to the following question: "Are you presently a member of Al-Butain Agricultural Cooperative Association?" Those indicating membership are coded one and nonmembers are coded two.

Cooperative Membership and Traditional Adoption-Diffusion Model

Twelve discriminating variables are used to test the traditional adoption-diffusion framework. Responses to the following questions serve as measures of the framework:

Personal Characteristics:
1. AGE of farmer
2. EDUCATION of farmer
3. FARMSIZE
4. FARMINCOME

Information Content:
5. INFCON1: "Do you get information on what cooperatives provide to their members?"
   1. Yes 2. No
6. INFCON2: "Most farmers know little about cooperatives."
   1. Agree 2. Disagree 3. Undecided

Sources of Information:
7. INFSOR1: "Did you receive information about cooperatives from relatives, friends or neighbors?"
   1. Yes 2. No
8. INFSOR2: "Agricultural extension offices do a good job in encouraging farmers to join agricultural cooperatives."
   1. Agree 2. Disagree 3. Undecided
9. INFSOR3: "There is not enough advertising about cooperatives."
   1. Agree 2. Disagree 3. Undecided
Relative Advantage:
10. RELADV1: "Monetary benefits should be the main reason why farmers join agricultural cooperatives."
   1. Agree  2. Disagree  3. Undecided

11. RELADV2: "The long distance from agricultural cooperatives limits their membership."
   1. Agree  2. Disagree  3. Undecided

12. RELADV3: "Agricultural cooperatives are of little value when free interest loans and subsidies are available through the agricultural bank for agricultural production."
   1. Agree  2. Disagree  3. Undecided

Description of the independent variables

To facilitate understanding of the independent variables, a brief description of the data is provided. Personal characteristics, however, are not included in this discussion since they were summarized in the previous chapter. The categories and values of the personal characteristics include: age (1 = 29 or younger, 2 = 30-44, 3 = 45-59, and 4 = 60 years or older); education (1 = no formal education, 2 = primary certificate, 3 = intermediate certificate, 4 = secondary certificate, 5 = college degree, and 6 = beyond college degree); farm size (1 = 300 donums or fewer, 2 = 301-1000 donums, 3 = more than 1000 donums); and gross farm income (1 = less than 100,000 SR, 2 = 100,000-199,999 SR, 3 = 200,000 SR or more).

The remaining independent variables are shown in Table 8. Concerning INFCON1, less than one-half (46.5%) of the
farmers received information about cooperatives. Yet twice as many members compared to nonmembers (67.1% versus 34.1%) received such information. This difference was statistically significant at the .01 level.

INFCON2 is used to measure farmers' attitudes concerning the amount of information about cooperatives that is available to their peers. As reported in Table 8, most farmers (92.6%) feel that the majority of others know little about cooperatives. No significant difference was found between members and nonmembers on this item. Thus, all farmers presumably are in need of additional information about cooperatives.

Table 9 presents results for items on information sources. Three variables are selected for the discriminant analysis. INFSOR1 measures whether farmers received information about cooperatives from relatives, friends, or neighbors. Over half (53.7%) received information on cooperatives through these sources. No difference existed between members and nonmembers. The second and third variables measured farmers' evaluations of two important information sources. INFSOR2 evaluated the role of extension offices in informing and encouraging farmers to join agricultural cooperatives. Over half (54.6%) of all farmers did not feel that extension offices were doing an adequate job. Members were more negative in their
Table 8. Measures of information content by cooperative membership

<table>
<thead>
<tr>
<th>Cooperative Membership</th>
<th>Yes (n=83)</th>
<th>No (n=136)</th>
<th>Total (N=219)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variable</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. INFCON1**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Do you get information on what cooperatives provide to their members:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Yes</td>
<td>67.1%</td>
<td>34.1%</td>
<td>46.5%</td>
</tr>
<tr>
<td>2. No</td>
<td>32.9%</td>
<td>65.9%</td>
<td>53.5%</td>
</tr>
<tr>
<td></td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
</tr>
<tr>
<td>6. INFCON2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&quot;Most farmers know little about cooperatives&quot;:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Agree</td>
<td>89.2%</td>
<td>94.9%</td>
<td>92.6%</td>
</tr>
<tr>
<td>2. Disagree</td>
<td>6.0%</td>
<td>2.2%</td>
<td>3.7%</td>
</tr>
<tr>
<td>3. Undecided</td>
<td>4.8%</td>
<td>2.9%</td>
<td>3.7%</td>
</tr>
<tr>
<td></td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

*The number of nonrespondents per question was small and never exceeded 2 farmers (or .90%).

**Significant at .01 level of probability.

evaluations than were nonmembers (67.4% versus 46.7%). This difference was significant at the .01 level.

INFCON3 addresses advertising cooperatives which is usually done through mass media channels. Most (88.1%) farmers feel that there is not enough advertising about cooperatives. Members and nonmembers were no different in their responses to this question. As a result, members and nonmembers exhibited few noteworthy differences in regard
### Table 9. Measures of sources of information by cooperative membership

<table>
<thead>
<tr>
<th>Cooperative Membership</th>
<th>Yes (n=83)</th>
<th>No (n=136)</th>
<th>Total (N=219)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Variable</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. INFSOR1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Did you receive information about cooperatives from relatives, friends or neighbors?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Yes</td>
<td>56.6%</td>
<td>51.9%</td>
<td>53.7%</td>
</tr>
<tr>
<td>2. No</td>
<td>43.4%</td>
<td>48.1%</td>
<td>46.3%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
</tr>
<tr>
<td>7. INFSOR2**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&quot;Agricultural extension offices do a good job in encouraging farmers to join agricultural cooperatives&quot;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Agree</td>
<td>16.9%</td>
<td>22.2%</td>
<td>20.2%</td>
</tr>
<tr>
<td>2. Disagree</td>
<td>67.4%</td>
<td>46.7%</td>
<td>54.6%</td>
</tr>
<tr>
<td>3. Undecided</td>
<td>15.7%</td>
<td>31.1%</td>
<td>25.2%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
</tr>
<tr>
<td>8. INFSOR3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&quot;There is not enough advertising about cooperatives&quot;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Agree</td>
<td>89.2%</td>
<td>87.4%</td>
<td>88.1%</td>
</tr>
<tr>
<td>2. Disagree</td>
<td>8.4%</td>
<td>7.4%</td>
<td>7.8%</td>
</tr>
<tr>
<td>3. Undecided</td>
<td>2.4%</td>
<td>5.2%</td>
<td>4.1%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

*aThe number of nonrespondents per question was small and never exceeded 1 farmer (or .45%).

**Significant at .01 level of probability.

Data on perceived relative advantage variables are reported in Table 10. Three variables are selected for
measuring farmers' perceptions on the merits of cooperative membership. These variables focus on the utilitarian benefits associated with membership. RELADV1 looks at monetary benefits as the main reason why farmers join agricultural cooperatives. Approximately two-fifths (38.5%) of all farmers feel that this should be the main reason for membership. However, less than one-third (28.9%) of members compared with almost one-half (44.4%) of nonmembers expressed this attitude. This difference was statistically significant at the .01 level.

The second measure of the relative advantages of membership is RELADV2. Over half (56.4%) of all farmers agreed that distance limits membership. Nonmembers, however, were more likely to express their opinion than were members (65.2% versus 42.2%). This difference was significant at the .01 level.

The third variable related to the advantages of membership concerns the value of cooperatives in terms of no-interest loans and subsidies (RELADV3). Almost half (45.9%) of all farmers saw little value of cooperatives considering that free interest loans and subsidies are available through the agricultural bank. This attitude was more often expressed by nonmembers (52.6%) than by members (34.9%). The difference was significant at the .01 level.
Table 10. Measures of relative advantage by cooperative membership

<table>
<thead>
<tr>
<th>Variable</th>
<th>Cooperative Membership</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n=83</td>
<td>n=136</td>
<td>N=219</td>
<td></td>
</tr>
<tr>
<td>10. RELADV1**</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&quot;Monetary benefits should be the main reason why farmers join agricultural cooperatives&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Agree</td>
<td>28.9%</td>
<td>44.4%</td>
<td>38.5%</td>
<td></td>
</tr>
<tr>
<td>2. Disagree</td>
<td>57.8%</td>
<td>34.1%</td>
<td>43.2%</td>
<td></td>
</tr>
<tr>
<td>3. Undecided</td>
<td>13.3%</td>
<td>21.5%</td>
<td>18.3%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
<td></td>
</tr>
<tr>
<td>11. RELADV2**</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&quot;The long distance from agricultural cooperatives limits their membership&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Agree</td>
<td>42.2%</td>
<td>65.2%</td>
<td>56.4%</td>
<td></td>
</tr>
<tr>
<td>2. Disagree</td>
<td>45.8%</td>
<td>19.2%</td>
<td>29.4%</td>
<td></td>
</tr>
<tr>
<td>3. Undecided</td>
<td>12.0%</td>
<td>15.6%</td>
<td>14.2%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
<td></td>
</tr>
<tr>
<td>12. RELADV3**</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&quot;Agricultural cooperatives are of little value when free interest loans and subsidies are available through the agricultural bank for agricultural production&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Agree</td>
<td>34.9%</td>
<td>52.6%</td>
<td>45.9%</td>
<td></td>
</tr>
<tr>
<td>2. Disagree</td>
<td>51.8%</td>
<td>24.4%</td>
<td>34.9%</td>
<td></td>
</tr>
<tr>
<td>3. Undecided</td>
<td>13.3%</td>
<td>23.0%</td>
<td>19.2%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
<td></td>
</tr>
</tbody>
</table>

a The number of nonrespondents per question was small and never exceeded 1 farmer (or .45%).

**Significant at .01 level of probability.
Discriminant analysis

For discriminant analysis, variables measured with a Likert scale were collapsed into two categories instead of three. "Undecided" was combined with "disagree" and recoded as "2" instead of as "3." This was done for INFCON2, INFSOR2, INFSOR3, RELADV1, RELADV2, and RELADV3.

To derive an appropriate model, stepwise variable selection was used. The main purpose of this method is to eliminate unnecessary variables by selecting the most useful discriminators. Stepwise analysis employs measures of discrimination as the criteria for selection; Wilks's Lambda is one criterion frequently used. The variable producing the smallest lambda value in a step is normally selected to include (Klecka, 1986).

Based on the stepwise variable selection, three variables were eliminated since their tolerance levels were too low (below 0.001) to permit further computation. The remaining nine variables were included in the stepwise analysis.

Correlations among discriminating variables are small, with correlation between age and education (.55), and farm size and income (.47) being the only values exceeding .22. As a result, multicollinearity was not considered a problem.
Comparison based on the traditional adoption-diffusion framework

Of the 12 independent variables, nine are associated with cooperative membership. They included four personal characteristics (AGE, EDUCATION, FARMSIZE, and FARMINCOME), two information content variables (INFCON1 and INFCON2), one information source variable (INFSOR1), and two measuring relative advantages of membership (RELADV2 and RELADV3). Standardized coefficients for these variables are reported in Table 11. The standardized coefficients can be used as indicators of the relative importance of each variable. Variables with large coefficients are thought to make a relatively greater contribution to the overall discriminant function (Klecka, 1986; Norusis, 1990).

Variables in Table 11 are listed according to the values of their standardized coefficients. FARMINCOME represents the best discriminator, followed by EDUCATION. INFCON1, or the amount of knowledge about cooperatives received by farmers, ranks third. The lowest contributing variable INFCON2, which is related to participants' attitudes toward farmers' levels of awareness of cooperatives. INFSOR1 is concerned with information from relatives, friends, and/or neighbors. This variable has little impact on the discriminant function.
Table 11. Discriminant function coefficients for the traditional adoption-diffusion model

<table>
<thead>
<tr>
<th>Significant* Variables Entered (N=207)</th>
<th>Standardized Canonical Discriminant Function Coefficients</th>
</tr>
</thead>
<tbody>
<tr>
<td>CN=207</td>
<td></td>
</tr>
<tr>
<td>FARMINCOME</td>
<td>.584</td>
</tr>
<tr>
<td>EDUCATION</td>
<td>.385</td>
</tr>
<tr>
<td>INFCON1</td>
<td>-.355</td>
</tr>
<tr>
<td>RELADV2</td>
<td>.278</td>
</tr>
<tr>
<td>FARMSIZE</td>
<td>.269</td>
</tr>
<tr>
<td>AGE</td>
<td>.210</td>
</tr>
<tr>
<td>RELADV3</td>
<td>.197</td>
</tr>
<tr>
<td>INFSC01</td>
<td>.149</td>
</tr>
<tr>
<td>INFSC02</td>
<td>.121</td>
</tr>
</tbody>
</table>

*aCases with missing data on any of the variables were excluded.

*Significance based on a minimum F-value (1.000) for entry or removal and a minimum tolerance level of 0.001.

The canonical discriminant function represents the linear combination that is formed to satisfy certain conditions. Discriminant analysis creates combinations of the independent variables as a single discriminant function that provides the "best" separation of cases (Klecka, 1986; Norusis, 1990; Ryan et al., 1989). In this study, the discriminant function is used to classify respondents as either members or nonmembers of the cooperative. Values of the canonical discriminant functions are computed by using group means and unstandardized coefficients:
D = B_0 + B_1X_1 + B_2X_2 + \ldots + B_pX_p,

where \( D \) = discriminant function, 
\( B_0 \) = constant, 
\( B_p \) = coefficient for the independent variable \( p \), and 
\( X_p \) = value for the independent variable \( p \).

The canonical discriminant function for the traditional adoption-diffusion model shows values of 1.077 for members and -.651 for nonmembers. That these values are different indicates that the locations of the group's centroids (the most typical positions) on the function are unique.

Another discriminant statistic is actually made up of three interrelated indicators: eigenvalue, canonical correlation, and Wilks's Lambda. The eigenvalue is the ratio of the between-groups to the within-groups sums of squares:

\[
\text{Eigenvalue} = \frac{\text{between-groups SS}}{\text{within-groups SS}}
\]

Eigenvalues are used to measure group separation. They are always positive or zero, and larger values represent greater separation. For the traditional adoption-diffusion model, an eigenvalue is of .7076, suggesting that the discriminating function successfully separates members from nonmembers (Table 12).

The canonical correlation is a measure of the degree of association between the discriminant function and the groups. This correlation is equivalent of the eta used in a one-way analysis of variance.
Table 12. Canonical discriminant functions for the traditional adoption-diffusion model

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>.7076</td>
<td>100.0</td>
<td>100.0</td>
<td>.6437</td>
</tr>
</tbody>
</table>

Wilks's Lambda  | Chi-Square | DF  | Sig.   |
                | .5856      | 107.289 | 9  | .001   |

\( \text{Eta}^2 \), which is the ratio of the between-groups sum of squares to the total sum of squares, represents the proportion of the total variance attributed to differences among groups (Norusis, 1990):

\[
\text{eta} = \frac{\text{between-groups SS}}{\text{total SS}}
\]

A value of zero indicates no association, whereas larger values (always positive) represent larger degrees of association; 1.0 is the maximum value.

For the traditional adoption-diffusion model, the canonical correlation value is .6437, or \( \text{CC}^2 = .414 \), showing that forty percent (41.4\%) of the variance for membership is accounted by the nine variables used to create the function.

Wilks's Lambda is the ratio of the within-groups sum of squares to the total sum of squares. It represents the portion of the total variance in the discriminant values
Table 13. Classification of cooperative members and nonmembers based on the discriminant function of the traditional adoption-diffusion model

<table>
<thead>
<tr>
<th>Actual Group</th>
<th>Number of Cases(^a)</th>
<th>Predicted Group Membership</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Members</td>
<td>Nonmembers</td>
<td></td>
</tr>
<tr>
<td>Members</td>
<td>78</td>
<td>66</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>84.6%</td>
<td>15.4%</td>
<td></td>
</tr>
<tr>
<td>Nonmembers</td>
<td>129</td>
<td>31</td>
<td>98</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>24.0%</td>
<td>76.0%</td>
<td></td>
</tr>
</tbody>
</table>

Percent of all cases correctly classified: 79.2%

\(^a\)207 cases were used in the analysis because 12 cases had at least one missing discriminating variable.

that is not explained by differences among groups (Wilks's Lambda + CC\(^2\) = 1) (Norusis, 1990):

\[
\text{Wilks's Lambda} = \frac{\text{within-groups SS}}{\text{total SS}}
\]

Lambda values near zero denote high discrimination. The traditional adoption-diffusion model's computed lambda (.5856) is transformed to a Chi-square value of 107.289 (9 degrees of freedom), which has an observed significance level lower than .01 (Table 12). It is unlikely, therefore, that members and nonmembers of the cooperative would have the same means on the discriminant function, a fact suggesting that the independent variables are sufficient to identify respondents as either members or nonmembers of the cooperative.
The percentage of cases classified correctly with the discriminant function calculated is an indicator of the effectiveness of the discriminating variables in separating the two groups. Of the 78 cooperative members, 66 (84.6%) were predicted correctly (Table 13). Of the 129 nonmembers, 98 (76.0%) were predicted correctly. The overall percent correctly classified was 79.2%. This is further indication of the discriminating variables' effectiveness in distinguishing cooperative members from nonmembers.

**Conclusions**

The foregoing analysis indicates that members of the cooperative are quite different from nonmembers. This dissimilarity is made evident by the discriminant analysis used to examine the theoretical concepts related to the adoption-diffusion framework. Twelve variables measuring personal characteristics and three theoretical concepts were chosen as discriminating variables. Statistical indicators of the discriminant analysis, including canonical discriminant functions, eigenvalues, Wilks's Lambdas, and canonical correlations, were conveniently used. From the results, we can conclude that the combined effect of the discriminating variables was sufficiently strong to distinguish members and nonmembers.
The discriminating variables, however, made dissimilar contributions to the discriminant function. Personal characteristics were, in fact, the best discriminators. Of the nine variables used in the analysis, gross farm income and education were the most powerful discriminators. Information content and the measure of relative advantage ranked next in regard to the contribution to the discriminant function. Information source variables were least influential.

In overview, the test of the traditional adoption-diffusion model is a weak confirmation of the theoretical framework. According to the theoretical framework, the relative advantage of an innovation should be the most important attribute influencing its rate of adoption. But this was not the case of membership in the agricultural cooperative. Instead members of cooperative considered the relative advantages of cooperative membership to be a less important reason for joining than did nonmembers. Another less compelling explanation for why the results did not fit the model is that information sources had minimal impact on the decision to join the cooperative.

The Impact of Moral Conditions Associated with Culture on the Traditional Adoption-Diffusion Framework

In addition to the nine variables used to test the adoption-diffusion model, four variables were added to
measure the relative importance of the moral conditions associated with Saudi Arabia's culture. These variables were included to determine whether moral considerations impact farmers' decisions to join the cooperative:

13. MORCON1: "Over the past 12 months did you personally provide direct assistance to another farmer or farmers?"
   1. Yes 2. No

14. MORCON2: "Farmers should help others even when they don't personally know them."
   1. Agree 2. Disagree 3. Undecided

15. MORCON3: "Cooperation with other farmers should be a high priority for every farmer."
   1. Agree 2. Disagree 3. Undecided

16. MORCON4: "Farmers should feel obligated to help other farmers even when they are not asked for assistance."
   1. Agree 2. Disagree 3. Undecided

**Description of the added independent variables**

Responses to the measures of moral considerations are displayed in Table 14. MORCON1 represents behavior by asking whether the farmers have provided direct assistance to other farmers. Over half (56.6%) had provided direct assistance during the preceding year. Over two-thirds (68.7%) of the members compared with half (49.3%) of the nonmembers had provided assistance to other farmers. This difference is significant at the .01 level.

The other three variables, MORCON2, MORCON3, and MORCON4, were included to determine the perceptions of
### Table 14. Moral conditions related independent variables by cooperative membership

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Yes (n=83)</th>
<th>No (n=136)</th>
<th>Total (N=219)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>MORCON1:</strong> &quot;Over the past 12 months did you personally provide direct assistance to another farmer (or farmers)?&quot;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Yes</td>
<td>68.7%</td>
<td>49.3%</td>
<td>56.6%</td>
</tr>
<tr>
<td>2. No</td>
<td>31.3%</td>
<td>50.7%</td>
<td>43.4%</td>
</tr>
<tr>
<td>Total</td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
</tr>
<tr>
<td><strong>MORCON2:</strong> &quot;Farmers should help others even when they do not personally know them&quot;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Agree</td>
<td>83.1%</td>
<td>69.9%</td>
<td>74.9%</td>
</tr>
<tr>
<td>2. Disagree</td>
<td>13.3%</td>
<td>17.6%</td>
<td>16.0%</td>
</tr>
<tr>
<td>3. Undecided</td>
<td>3.6%</td>
<td>12.5%</td>
<td>9.1%</td>
</tr>
<tr>
<td>Total</td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
</tr>
<tr>
<td><strong>MORCON3:</strong> &quot;Cooperation with other farmers should be a high priority for every farmer&quot;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Agree</td>
<td>94.0%</td>
<td>78.7%</td>
<td>84.5%</td>
</tr>
<tr>
<td>2. Disagree</td>
<td>2.4%</td>
<td>8.8%</td>
<td>6.4%</td>
</tr>
<tr>
<td>3. Undecided</td>
<td>3.6%</td>
<td>12.5%</td>
<td>9.1%</td>
</tr>
<tr>
<td>Total</td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
</tr>
<tr>
<td><strong>MORCON4:</strong> &quot;Farmers should feel obligated to help other farmers even when they are not asked for assistance&quot;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Agree</td>
<td>74.7%</td>
<td>54.1%</td>
<td>61.9%</td>
</tr>
<tr>
<td>2. Disagree</td>
<td>10.8%</td>
<td>28.9%</td>
<td>22.0%</td>
</tr>
<tr>
<td>3. Undecided</td>
<td>14.5%</td>
<td>17.0%</td>
<td>16.1%</td>
</tr>
<tr>
<td>Total</td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

^The number of nonrespondents per question was small, never exceeding 1 farmer (or .45%).

*Significant at .05 level of probability.

**Significant at .01 level of probability.
farmers about cooperating with other farmers. A Likert scale was used to measure their responses. For MORCON2, when asked whether farmers should help other farmers even when they do not personally know them, three-fourths (74.9%) of them responded affirmatively. More members than nonmembers expressed this attitude (83.1% versus 69.9%). The difference was significant at the .05 level.

MORCON3 measures whether cooperation with other farmers should be a high priority for farmer. Most (84.5%) agreed with this statement. Members, however, were more likely to define cooperation as a priority than were nonmembers (94% versus 78.7%). The difference was significant at the .01 level.

MORCON4 was used to measure whether farmers felt obligated to help other farmers even when not asked to do so. Over sixty percent (61.9%) felt such an obligation. Three-fourths (74.7%) of the members compared to only half (54.1%) of the nonmembers expressed this attitude. This difference was significant at the .01 level.

These data indicate that members of the cooperative were generally more committed than nonmembers to cooperating with other farmers. Perhaps this higher commitment is reflected in their willingness to join the cooperative.
Discriminant analysis

As with the response categories used to measure the previous variables, responses to questions on moral responsibilities were collapsed into two categories: agree was coded as 1 and both undecided and disagree were coded as 2.

Based on the stepwise method, three of the original thirteen variables were eliminated since their levels of tolerance were too low (below 0.001) to permit further computations. Altogether, 10 discriminating variables were included in the analysis: Four were personal characteristics, two measured information content, two dealt with relative advantages, and the remaining two variables were associated with the moral conditions associated with cooperation. The variable related to information source was eliminated in the stepwise analysis. Also, multicollinearity was not considered a problem since the correlations between the discriminating variables were relatively small.

Comparison based on the combination of moral conditions and traditional adoption-diffusion framework

The standardized coefficients for the 10 discriminating variables are reported in Table 15. They are listed according to their relative contributions to the overall discriminant function. FARMINCOME is the first best
Table 15. Discriminant function coefficients for the modified traditional adoption-diffusion model incorporating subject's moral conditions

<table>
<thead>
<tr>
<th>Significant* Variables Entered (N=206)</th>
<th>Standardized Canonical Discriminant Function Coefficients</th>
</tr>
</thead>
<tbody>
<tr>
<td>FARMINCOME</td>
<td>.569</td>
</tr>
<tr>
<td>MORCON3</td>
<td>-.381</td>
</tr>
<tr>
<td>INFCON1</td>
<td>-.347</td>
</tr>
<tr>
<td>EDUCATION</td>
<td>.337</td>
</tr>
<tr>
<td>FARMSIZE</td>
<td>.253</td>
</tr>
<tr>
<td>RELADV3</td>
<td>.249</td>
</tr>
<tr>
<td>AGE</td>
<td>.235</td>
</tr>
<tr>
<td>RELADV2</td>
<td>.195</td>
</tr>
<tr>
<td>MORCON1</td>
<td>-.165</td>
</tr>
<tr>
<td>INFCON2</td>
<td>.147</td>
</tr>
</tbody>
</table>

^Cases with missing data on any of the variables were excluded.

*Significant based on a minimum F-value (1.000) for entry or removal and a minimum tolerance level of 0.001.

discriminator of all ten variables. The second best discriminator is MORCON3, which measures the priority respondents place on cooperating with other farmers. This indicates that moral obligations related to cooperation stand out as an important factor that distinguishes members from nonmembers. INFCON1 is ranked third; this is similar to its ranking in the previous model. As before, the importance of information on what cooperatives provide to members is important for discriminating members from nonmembers.
The fourth and fifth discriminators are EDUCATION and FARMSIZE, suggesting the importance of personal characteristics in adoption behavior.

The two measures of relative advantages are among the five least contributing discriminatory variables. Although important, these advantages do not affect the overall discriminant function as greatly as do the previously mentioned five variables.

The canonical discriminant functions of the modified model are 1.161 for members and -.708 for nonmembers. That these figures are different indicate uniquely located group centroids. Their difference is only slightly greater than that calculated in the traditional adoption-diffusion model.

The eigenvalue (.8298) suggests that the discriminating function successfully distinguishes members from nonmembers (Table 16). This value is greater than the value reported for the adoption-diffusion model (.7076). Therefore, moral considerations have improved the discrimination possible from the traditional adoption-diffusion model.

The canonical correlation for the combined model is .6734, or $CC^2 = .453$. Therefore, over forty-five percent of the variance in membership is accounted for by these ten variables. This value exceeds the value for the
Table 16. Canonical discriminant functions for the modified traditional adoption-diffusion model incorporating subject's moral conditions

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>.8298</td>
<td>100.0</td>
<td>100.0</td>
<td>.6734</td>
</tr>
</tbody>
</table>

Wilks's Lambda  | Chi-Square  | DF  | Sig.  |
----------------|-------------|-----|-------|
.5465           | 120.240     | 10  | .001  |

Although only a minor increase, this indicates the importance of the moral obligations that presumably influence farmers to join the cooperative.

The modified model's computed Wilks's Lambda (.5465) is transformed to a Chi-square value of (120.240), which has an observed significance below .001 (Table 16). Thus, members and nonmembers have unique means on the discriminant function, suggesting that the independent variables successfully differentiate the two groups. Because this value is smaller than that of the original adoption model (.5856), this function discriminates better between the two groups.

Another measure of the model is the ability of discriminant function to correctly classify members of the two groups. Of the 78 cooperative members, 69 (88.5%) were
Table 17. Classification of cooperative members and nonmembers based on the discriminant function of the modified traditional adoption-diffusion model incorporating subject's moral conditions

<table>
<thead>
<tr>
<th>Actual Group</th>
<th>Number of Cases&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Predicted Group Membership</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Members</td>
<td>Nonmembers</td>
</tr>
<tr>
<td>Members</td>
<td>78</td>
<td>69</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td></td>
<td>88.5%</td>
<td>11.5%</td>
</tr>
<tr>
<td>Nonmembers</td>
<td>130</td>
<td>25</td>
<td>105</td>
</tr>
<tr>
<td></td>
<td></td>
<td>19.2%</td>
<td>80.8%</td>
</tr>
</tbody>
</table>

Percent of all cases correctly classified: 83.7%

<sup>a</sup>208 cases were used in the analysis because 11 cases had at least one missing discriminating variable.

classified correctly (Table 17). Of the 130 nonmembers, 105 (80.8%) were correctly classified. Overall 83.7 percent of all respondents were correctly classified as members or nonmembers. Based on the traditional adoption-diffusion model, 79.2% were correctly classified. In the absolute sense, this represents a 4.5 percent improvement. But it also means that 21.6 percent of the cases incorrectly classified by the traditional adoption-diffusion model have now been correctly classified by considering measures of moral obligations. Additionally, the moral conditions associated with cooperation may have an impact on the results of the traditional adoption-diffusion model since members rated lower the importance of
relative advantages than did nonmembers. Thus, the modified model provides a better explanation and a more effective means of distinguishing members from nonmembers.

**Conclusion**

Results of the discriminant analyses suggest that the decision to join the cooperative is affected by factors usually associated with the adoption of innovations. Important factors include personal (socioeconomic) characteristics, knowledge about cooperatives, and relative advantages expected of membership. The only exception is that members are similar to nonmembers in terms of their exposure to information sources about the cooperative. Perhaps this is caused by the fact that information about cooperatives is unavailable through information sources normally used by farmers.

But members of cooperatives were not only more educated and had larger farms, more gross farm income, and more knowledge about cooperatives; they also provided more assistance to other farmers, more often played down personal gains and economic advantages of membership, and viewed cooperation with others as an important matter. In short, farmers became members because of economic (utilitarian) expectations and also because of their desire to cooperate with other farmers. Deontology therefore
plays an important role in distinguishing members from nonmembers.
CHAPTER VII. DISCUSSION AND IMPLICATIONS

In this chapter, results of the research are discussed. Implications of the findings and their association with the research problem as theoretically and empirically defined are then drawn. Finally, limitations of the study and suggestions for further research are discussed.

Summary and Discussion of the Results

The scope of this study does not evaluate or test specific hypothesis. Instead, implications are based mainly on the theoretical framework presented in Chapter III. Moral concerns appear to have unique impacts on decisions made by farmers to join the cooperative. This was expected along with other factors identified by adoption-diffusion theorists. These factors include socioeconomic characteristics, information content, and sources of information.

Results of this study are presented in the preceding two chapters. In both chapters, belonging or not belonging to the cooperative served as the basis for comparison. Contingency tables were used to make the necessary comparisons.

Results show that members are middle-aged more often than are nonmembers. Also, members are more educated than
nonmembers. Finally, members report higher gross farm incomes than do nonmembers. Farm characteristics also distinguish members from nonmembers. More members operate larger farms than do nonmembers. Also, cooperative members tend to hire more laborers.

While the above five factors represent the main socioeconomic characteristics, other factors associated with membership include type of farming (wheat production, raising animals, and fruit production), presence of a farm manager, and exposure to multiple sources of information. Members more often than nonmembers hire managers for their farms. Also, members use multiple information sources when making decisions on farming more often than do nonmembers. However, marketing farm productions other than wheat is done more often by nonmembers. Additionally, nonmembers more often take farm produce to market themselves.

Discriminant analysis is used to examine the theoretical framework of this study. Two models are examined, the first model is based on the traditional adoption-diffusion framework. Thus, discriminating variables included in the first model are related to the socioeconomic characteristics of respondents, information content (knowledge about cooperatives), sources of information (about cooperatives), and advantages of membership in agricultural cooperatives.
Findings of the discriminant analysis reveal a relatively high value of the canonical correlation (0.6437), as well as a high percentage of correctly classified cases (79.2%). It can therefore be concluded that the discriminating variables included in the analysis were powerful enough to identify farmers as either members or nonmembers of the cooperative. The discriminating variables, however, made dissimilar contributions to the discriminant function. Personal characteristics were found the best indicators. Variables related to information content ranked second; those related to relative advantages, third; and those related to information sources, last in terms of their contribution to the discriminant function.

It can also be concluded that the findings of the discriminant analysis do not fit within the theoretical framework of the traditional adoption-diffusion model. The crux of this argument is that although the relative advantages' related variables contributed significantly to the discriminant function, nonmembers considered the relative advantages of membership more important reasons for joining than members did. For the traditional adoption-diffusion model to be valid theoretically, such a relation must be in the opposite direction. In other words, members should give more consideration to the
utilitarian benefits of membership than should nonmembers. As stated, the data of this study do not indicate such a relation.

In the second model, discriminating variables pertaining to moral conditions were used in addition to the original discriminating variables. Results of the subsequent discriminant analysis reveal better values for both the canonical correlation (.6734) and the percentage of cases classified correctly (83.7%) than were obtained in the first model.

Even though the values represent minor change, these results seem in accord with the theoretical framework of this study, basically because high contributions to the discriminant function were associated with the moral conditions discriminating variables. Additionally, the moral conditions associated with cooperation may have some impacts on the results of the traditional adoption-diffusion model because members gave lower weights to the relative advantage of membership than did nonmembers, a weighting that can be considered morally derived. Thus, members of the cooperative who participated in this study may have become cooperative members not only because of expected advantages but also out of desire to cooperate with other farmers.
These results of the discriminant analysis are supported by perceptions of both members and nonmembers concerning their reasons for joining cooperatives. Almost half of members and only one-third of nonmembers indicated the desire to cooperate with others as a possible reason for joining. On the other hand, monetary benefits was indicated as a reason by less than thirty percent of members and more than forty percent of nonmembers. Furthermore, the cooperative chosen for this study is considered as one of the best in the nation and is, by extension, likely to provide better services for its members than are other cooperatives. But very few farmers are listed as members of the cooperative, despite its reputation, a fact providing additional support for the theoretical framework of this study. On this basis, the research employs a quite conservative test.

In conclusion, Saudi farmers seem willing to cooperate among themselves, as indicated by the number of farmers involved in agricultural cooperatives, despite the limited services provided. The majority of farmers, however, do not belong to cooperatives, mainly because planners of agricultural development do not emphasize cooperatives enough as a sound means of agricultural development and improvement in the well-being of farmers. An evidence of this neglect is the fact that the total of only 32
agricultural cooperatives exist in the whole of Saudi Arabia, and most of these cooperatives are unable to meet their goals and are consequently unable to provide good services to farmers. Because of the positive attitudes towards cooperation among Saudi farmers, an attitude promoted by their religion, it should be easy to increase the adoption rate of farm cooperatives when services are improved and awareness about them is raised.

Implications of Findings

Results of this study suggest implications to consider if a positive impact of cooperatives in developing agriculture in Saudi Arabia is to be achieved. Implications are both theoretically and important relevant to policy considerations.

The first implication is theoretical in nature. The overall objective of this study was to identify determinants of farmers' involvement in an agricultural cooperative. Membership in farm cooperatives in Saudi Arabia was treated as an innovation, and cooperation was considered a behavior encouraged through Islamic teachings. Therefore, two models of adoption-diffusion were examined, one the traditional framework based on a utilitarian perspective, and the other which looks at moral concerns as a cultural obligation.
Results support the theoretical argument that both utilitarian advantages and moral concerns are important for influencing farmers' decisions of becoming cooperative members. On the basis of this finding, it is recommended that more studies are needed to investigate this issue in different cultures.

Another related theoretical implication is that results of this study are quite important in testing of the applicability of utilitarian based theories (e.g., exchange theory) for studying the social behavior of individuals in Islamic countries in general and in Saudi Arabia in particular, where there are other factors that influence people's actions and relationships. These theories must therefore be modified to become suitable for societies in which cultural/moral concerns influence people's actions to a great extent. Results of this study provide strong evidence supporting this argument. Additional investigation, however, needs to be conducted over a longer time span and in different locations.

A third theoretically derived implication is that for more successful cooperatives in Saudi Arabia the issue of cooperation as related to the morals and the beliefs of the people must be addressed clearly on both the official and the cooperative levels. This can be done in different ways, for example, it can be achieved through encouraging
nonofficial cooperation activities among members of the cooperatives. If this issue is considered and addressed well, more farmers may be encouraged to join agricultural cooperatives.

Based on the results of this research the following policies are recommended: First, both the Ministry of Agriculture and Water and Ministry of Labor and Social Affairs should extend their support to agricultural cooperatives. More coordination between the two agencies is needed. Additionally, the Ministry of Agriculture should recognize the importance of farm cooperatives by providing them support similar to what is provided to agricultural companies.

Second, information about agricultural cooperatives must be transferred to farmers. All farmers need to be informed about what agricultural cooperatives can provide to them. This can be done by making use of various communication channels, such as television, radio, and newspapers. Assuming this policy were implemented, more farmers would gain knowledge of cooperatives and presumably would consider becoming members. In fact, three-fourths of the nonmembers who participated in this study indicated that they would consider becoming cooperative members assuming they had sufficient information about the cooperative.
Third, more services should be provided through existing cooperatives. However, these services should not be specialized at providing services for a single crop, but rather diversification of services must be a goal. If considered, this policy will encourage more farmers with different production specializations to join cooperatives.

Fourth, for cooperatives to be judged as fair by farmers, it is important to distribute their net profits among members as often as possible, even if some members prefer not to. This is so because some members will always think that the cooperative is deceiving them. Such a principle will improve people's concept of cooperatives and will tend to rout bad images or unpleasant experiences associated with prior membership in other cooperatives.

Fifth, management must be by those who are creative and who are willing to improve and to accept suggestions from farmers instead of by those who will render the cooperative ineffective due to poor management. Strict regulations should be applied to management of cooperatives showing little or no improvement.

Sixth, cooperatives must use all the available support provided to them through the Agricultural Bank, in addition to demanding more support than is presently available. In this regard, Agricultural Bank officials should consider providing additional incentives to farm cooperatives in the
form of both loans and subsidies. In this way, some of the problems related to loans to farmers will be alleviated. The number of loans provided to farmers will also decrease inasmuch as loans are provided for machinery to be shared by several individuals. Thus, providing this equipment for farmers through cooperatives may benefit all parties involved.

Seventh, farmers, especially members, must be informed of cooperative regulations. They should also be encouraged to make suggestions regarding the cooperative and the improvement of its services. Furthermore, members must be assured that if their suggestions are practical, they may be implemented.

Finally, cooperative locations must be accessible to all farmers. This can be achieved by increasing the number of cooperatives or by establishing new branches accessible to many farmers. In fact, almost two-thirds of nonmembers who participated in this study would consider becoming cooperative members if the location of the cooperative were closer to them.

Limitation of the Study and Suggestions for Future Research

Notwithstanding the theoretical and empirical findings just discussed, this study faces certain limitations. One is its scope, which was limited to a single cooperative and
to a small number of farmers who operated farms located in the area served by the cooperative. It is therefore impossible to generalize the results of this study. Consequently, similar studies should be conducted of other cooperatives located in other regions of the country in order to allow comparison of results and generalizations regarding cooperatives in Saudi Arabia.

Another limitation is the time of data collection. Data were collected after the wheat harvest, which limited the number of participants because some farmers were unavailable in their farms most of the time after harvesting their crops. Thus, future researchers should take this into consideration and try to collect data regarding farmers prior to the end of harvesting seasons.

Third, data were collected through face-to-face interviews, which limited the number of subjects who could be studied because of the high cost of such a method. Although this technique is the most accurate for collecting data in countries such as Saudi Arabia, especially when farmers are the subjects, researchers must think of other ways in which to reduce cost, to increase the number of respondents, and to collect accurate data.

Finally, the questionnaire of this study involved a large number of questions, and thus some respondents were discouraged from participating. Future researchers should
eliminate unnecessary questions and ask only those related to the problem under investigation.
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ACKNOWLEDGMENTS

All thanks and praise are due to God whose help and guidance are the most important factors on the completion of my graduate study and other fortunate events in my life.

I am also indebted to several individuals for their encouragement and support during my graduate study at Iowa State University. Dr. Vernon Ryan, my major professor, deserves my thanks and appreciation for the guidance and encouragement he has provided me during my Master's and Ph.D. programs. Thanks are also due to my other committee members: Dr. John Tait, Dr. Mushtaq Rahman, Dr. Paul Lasley, Dr. Danny Hoyt, and Dr. Robert Martin.

I am also thankful for my parents, brothers and sister whose encouragement and prayers were important things in my life. My wife deserves my appreciation for her patience, support and understanding she has shown me during my study and our stay in the United States. I am also grateful for her unlimited care for our beloved children, Hend, Naeelah and Suliman. All of my relatives and friends deserve my thanks for their encouragements.

Thanks are also due to Mrs. Judith Jarboe for her patience and understanding while typing this dissertation.

I would like to thank King Saud University for financing my graduate studies. I am also thankful for the General Department of Cooperation's officials and the
officials of Al-Butain Agricultural Cooperative Association for their support and encouragement during the data collection. Thanks are also due to the faculty members of the Department of Agricultural Extension and Rural Sociology in the College of Agriculture in Riyadh and also the faculty and officials of the College of Agriculture in Burydah for their suggestions and assistance.

Last but not least I am thankful for all the farmers who participated and provided their comments for this research and for all individuals who have contributed to the completion of this study.
APPENDIX: QUESTIONNAIRE
QUESTIONNAIRE

Factors Affecting Agricultural Cooperatives
Membership in the Central Region of Saudi Arabia

Name of Interviewer:

Date:

Information in this questionnaire will be used only for research purposes
Dear Farmer,

I would like to ask you to participate in this study regarding agricultural cooperatives. The main purpose of this study is to identify factors influencing farmers' decisions in joining farm cooperatives. Thus, your voluntary participation is very important for reaching the best possible recommendations for the improvement of the agricultural cooperatives in our country. Finally, I would like to assure you that information you provide is for statistical purposes only and will remain confidential.

Thank you very much for your cooperation.

Sincerely yours,

Muhamad Al-Sakran
Department of
Agricultural Extension
and Rural Sociology
Part I. Information about the Farmer and Farm Characteristics:

To begin, I will ask you some questions about yourself and your farm.

1. Age: ______ years

2. Place of birth:
   1 ( ) City 2 ( ) Village 3 ( ) Beduin area

3. Present place of residence:
   1 ( ) City 2 ( ) Village 3 ( ) Beduin area

4. Are you
   1 ( ) Never 2 ( ) Married 3 ( ) Divorced 4 ( ) Widowed

5. Number of total children, if any: ______ sons and daughters

6. Number of sons working on the farm? ______ son(s)

7. Do you have a manager for your farm?
   1 ( ) Yes 2 ( ) No

8. How many hired workers in your farm if any? ______ Worker(s)

9. How many years have you been farming? ______ Year(s)

10. Level of education
    1 ( ) Cannot read or write
        2 ( ) Can read and write without primary certificate
        3 ( ) Primary certificate
        4 ( ) Intermediate certificate
        5 ( ) Secondary certificate
        6 ( ) College or university degree
        7 ( ) Other (specify: ____________________________)
11. Is farming your primary job?

1 ( ) Yes 2 ( ) No

11.a. If no, what is your primary job?

1 ( ) Government work  
2 ( ) Commercial work  
3 ( ) Manual work not with the government  
4 ( ) Other (specify: ________________________________)

12. What is your farm's size:

Total size: _____ donums

12a. Area actually farmed: _____ donums

13. Type of ownership:

1 ( ) Owned  
2 ( ) Rented  
3 ( ) Part Owned  
4 ( ) Other (specify: ________________________________)

14. What kind of farming do you practice? (Check all that apply.)

1 ( ) Wheat farming  
2 ( ) Vegetable farming 
3 ( ) Date farming  
4 ( ) Dairy farming  
5 ( ) Poultry farming  
6 ( ) Raising animals  
7 ( ) Other (specify: ________________________________)

15. Do you market any of your agricultural products?

1 ( ) Yes 2 ( ) No

15a. If yes, what agricultural products do you market
(Explain: ________________________________

15b. Where do you market your agricultural products?

1 ( ) in the local market
2 ( ) in larger markets of big cities
3 ( ) Other (specify: ______________________)

15c. How do you most frequently market your agricultural products?

1 ( ) By myself
2 ( ) Through a middleman
3 ( ) Through a marketing organization
4 ( ) Through a farm cooperative
5 ( ) Other (specify: ______________________)

16. How much was your gross annual farm income during the past twelve months?

1 ( ) less than 10,000 SR
2 ( ) 10,000 - 19,999 SR
3 ( ) 20,000 - 39,999 SR
4 ( ) 40,000 - 59,999 SR
5 ( ) 60,000 - 79,999 SR
6 ( ) 80,000 - 99,999 SR
7 ( ) 100,000 - 199,999 SR
8 ( ) 200,000 SR or more

17. How much was your gross nonfarm income during the past twelve months? ________ SR
18. Do you use agricultural machinery?
1 ( ) Yes 2 ( ) No

If Yes, fill in the following chart:

<table>
<thead>
<tr>
<th>Type of Machine</th>
<th>Type of Ownership</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Own by self</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Part owned</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Rent</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Other (specify):</td>
<td></td>
</tr>
</tbody>
</table>

Part II. Information About Agricultural Decision Making:

I'll now turn to questions on how you make decisions about farming.

19. Who makes the important decisions on your farming work?
1 ( ) self 2 ( ) farm manager
3 ( ) hired workers 4 ( ) relatives
5 ( ) others (specify: ______________________)

20. Thinking back over the last 12 months, what important decisions that you had to make about your farming operation, that is, any decisions made by you that had major impact on your successes or failures in farming. (Probe: can you think of other important decisions?)
1 ( ) Buying agricultural land
2 ( ) Buying agricultural machine
3 ( ) Deciding on producing certain agricultural product
4 ( ) Taking loan from the agricultural bank
5 ( ) Adding or selling farm animals
6 ( ) Becoming agricultural cooperative member
7 ( ) Other (specify: ______________________)
21. Of these, which would you rate as the most important decision?

22. Let's talk about (most important decision). As you recall, where did you get information that helped you decide? (Check all that apply.) (Probe: What else?)
   1 ( ) The extension office
   2 ( ) Radio
   3 ( ) TV
   4 ( ) Newspapers/magazines
   5 ( ) Relatives, friends, or neighbors
   6 ( ) The agricultural cooperative
   7 ( ) None, made decision on my own
   8 ( ) Other (specify: _________________________)

23. Of these, which was the most important?

24. Please describe as best you can the type of information received from (main source) on (most important decision).

25. Looking back, would you say the information received from (main source) was:
   1 ( ) Very helpful
   2 ( ) Somewhat helpful
   3 ( ) Of little or no use

26. What about agricultural decisions in general? How do you normally obtain information related to your farming operations? Do you mostly (check one only):
   1 ( ) Seek out information on your own?
   2 ( ) Wait for the extension worker to tell you?
   3 ( ) Wait until your friends, relatives, or neighbors tell you?
   4 ( ) Rely on some other option?
      (Specify: _________________________)

27. What information source is most useful to you as you make decisions on farming?
   1 ( ) Extension office
   2 ( ) Mass media channels (TV, Radio, Newspapers and Magazines)
   3 ( ) Agricultural cooperative
   4 ( ) Relatives, neighbors or friends
   5 ( ) Other (specify: _________________________)
Part III. Information about Cooperation:

Now I would like to ask you some questions about your contact with other farmers in the area.

28. Over the past 12 months, about how often did you discuss farming with other farmers? Would you say you spoke to someone about farming:
   1 ( ) At least once a week?
   2 ( ) Once every two weeks?
   3 ( ) Once a month?
   4 ( ) Less than once a month? or
   5 ( ) Did not talk to other farmers about farming?

29. What about direct assistance received from other farmers such as taking care of your farm in your absence? Over the past 12 months, did another farmer (or farmers) provide you with direct assistance in your farming activities?
   1 ( ) Yes 2 ( ) No

   29a. Please describe the type (or types) of assistance you received? (Probe: What other type assistance did you receive from farmer?)

   29b. Did you pay those providing assistance?
      1 ( ) Yes (Which ones?__________________________)
      2 ( ) No

   29c. How often did you receive assistance from others during the last 12 months? ________ times

30. What about yourself? Over the past 12 months, did you personally provide direct assistance to another farmer (or farmers)?
   1 ( ) Yes 2 ( ) No

   30a. Please describe the type (or types) of assistance you provided? (Probe: What other type of assistance did you provide?) ____________________________

   30b. Were you paid for your assistance?
      1 ( ) Yes (Which ones?__________________________)
      2 ( ) No

   30c. Approximately how many times did you provide assistance to others during the past 12 months? ________ times
31. I'm going to read you some statements. After each statement, please say whether you agree or disagree with each one.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Agree</th>
<th>Disagree</th>
<th>Undecided</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Farmers should help each other in times of need.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>b. Farmers should help others even when they don't personally know them.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>c. When there is a necessity, farmers should help one another even when it means that their own work will be delayed.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>d. Farmers should help one another even when it means that will limit their own financial gain.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>e. Cooperating with other farmers should be a high priority for every farmer.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>f. Farmers should feel obligated to help other farmers when they are asked for assistance.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>g. Farmers should feel obligated to help other farmers even when they are not asked for assistance.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>h. I personally help other farmers as much as I feel I should.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>i. I personally place as much value on helping others than on increasing my own financial gains.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>
Part IV. Information about Cooperatives

Now I would like to ask you some questions concerning cooperatives.

32. Why do you think some farmers join agricultural cooperatives? (Probe: What else?)

1 ( ) Gaining monetary benefits
2 ( ) The cooperative location is close to them.
3 ( ) Services provided by the cooperatives are good.
4 ( ) They like the cooperation and want to cooperate with other farmers.
5 ( ) Other (specify: _____________________________)

33. Why, in your opinion, do other farmers not join agricultural cooperatives? (Probe: What else?)

1 ( ) Services provided by agricultural cooperatives are very limited.
2 ( ) The lower management level of agricultural cooperatives.
3 ( ) Insufficient advertising about agricultural cooperatives.
4 ( ) Farmers do not understand the role of agricultural cooperatives.
5 ( ) Difficulties of contacting cooperatives because of their far location from farms.
6 ( ) Other (Specify: _____________________________)
34. As I read the following statements, please indicate whether you agree or disagree with each statement.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Agree</th>
<th>Disagree</th>
<th>Undecided</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Most farmers know little about cooperatives.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>b. Agricultural extension offices do a good job in encouraging farmers to join agricultural cooperatives.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>c. Monetary benefits should be the main reason why farmers join agricultural cooperatives.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>d. The long distance from agricultural cooperatives limits their membership.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>e. Most farmer's needs are not met through the services provided by agricultural cooperatives.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>f. There is not enough advertising about cooperatives.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>g. Agricultural cooperatives are of little value when free interest loans and subsidies are available through the agricultural bank for agricultural production.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

35. Do you get enough information on what cooperatives provide to their members?

1 ( ) Yes 2 ( ) No

If yes: 35a. Has the information you received been helpful?

1 ( ) Yes 2 ( ) No

If no: 33b. Why do you say this?
36. Have you ever received information about cooperatives from any of the following information sources? (If yes, follow with second question.)

<table>
<thead>
<tr>
<th>Source of Information</th>
<th>Information Received</th>
<th>If yes, Was the information</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>1. Extension office</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>2. Newspapers or magazines</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>3. TV or radio</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>4. The agricultural cooperatives themselves</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>5. Relatives, friends, or neighbors</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

37. Would you like to receive more information about cooperatives?
1 ( ) Yes  2 ( ) No
If Yes:

37a. Specifically what type of information on cooperatives would you like to receive?

Part V. Information about Al Butain Agricultural Cooperative Association:

In this section I will ask you some questions related to Al Butain Agricultural Cooperative Association.

38. Have you ever heard about Al Butain Agricultural Cooperative Association?
1 ( ) Yes  2 ( ) No
If yes:

38a. How did you first hear about Al Butain Agricultural Association?


39. To your knowledge is any of your neighbors a member of Al Butain Agricultural Cooperative Association?

1 ( ) Yes  
2 ( ) No  
3 ( ) Don't know

If yes:

39.a. Approximately how many that you know are members? ___________ farmer(s)

40. How far from your farm is Al Butain Agricultural Cooperative Association located?

1 ( ) Less than 5 Km  
2 ( ) 5 - 9 Km  
3 ( ) 10 - 14 Km  
4 ( ) 15 - 19 Km  
5 ( ) 20 Km or more  
6 ( ) Don't know

41. Are you presently a member of Al Butain Agricultural Cooperative Association?

1 ( ) Yes  
2 ( ) No

IF YES, ANSWER QUESTIONS 42-56.  
IF NO, ANSWER QUESTIONS 57-63.

42. How long have you been a member of Al Butain Agricultural Cooperative Association? _______ year(s)

43. What is the main reason for your belonging to Al Butain Agricultural Cooperative Association?

__________________________________________

44. What kind of services are provided by Al Butain Agricultural Cooperative Association? (check all that are available)

1 ( ) Seeds  
2 ( ) Fertilizers  
3 ( ) Pesticides  
4 ( ) Renting agricultural machinery  
5 ( ) Agricultural machinery spare parts  
6 ( ) Marketing  
7 ( ) Other (specify:__________________________________ )
45. Which of Al Butain Agricultural Cooperative’s services have you used during the past 12 months?

<table>
<thead>
<tr>
<th>Services</th>
<th>Time of use last year</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 ( ) Seeds</td>
<td></td>
</tr>
<tr>
<td>2 ( ) Fertilizers</td>
<td></td>
</tr>
<tr>
<td>3 ( ) Pesticides</td>
<td></td>
</tr>
<tr>
<td>4 ( ) Renting agricultural machinery</td>
<td></td>
</tr>
<tr>
<td>5 ( ) Agricultural machinery spare parts</td>
<td></td>
</tr>
<tr>
<td>6 ( ) Marketing</td>
<td></td>
</tr>
<tr>
<td>7 ( ) Other (specify: _______________________)</td>
<td></td>
</tr>
</tbody>
</table>

46. Are there any services you want that are not presently available through your cooperative?
1 ( ) Yes 2 ( ) No

If yes:
46a. What services would you like? ________________________

47. Approximately what percentage of your produce do you sell through your cooperative? _____%

48. Approximately what percentage of your total expenses for farm supplies are purchased through your cooperative? _____%

49. What do you normally do when you find another source providing the services that are provided by the cooperative for the same price? Do you get them from
1 ( ) the cooperative or 2 ( ) the other source

50. Other than the cooperative where else can you obtain agricultural production needs?
1 ( ) The Agricultural Bank
2 ( ) Agricultural commercial businesses
3 ( ) Other (specify: ________________________)

51. How many shares do you have in the cooperative? _____ shares
52. Have you ever been a member in the executive committee of the cooperative?
1 ( ) Yes 2 ( ) No

53. Would you be willing to accept a position on the executive committee if asked?
1 ( ) Yes 2 ( ) No 3 ( ) Don't know

54. Do you usually attend the general committee meetings?
1 ( ) Yes 2 ( ) No

If yes:
54a. How often do you attend?
1 ( ) every meeting
2 ( ) most meetings
3 ( ) some meetings

If no:
54b. Why?
1 ( ) I did not receive an invitation.
2 ( ) Schedule of such meetings are unorganized.
3 ( ) These meetings are not important.
4 ( ) My attendance of such meetings is unimportant.
5 ( ) Other (specify: )

55. How would you evaluate the benefits you have received from the cooperative? (Read each one)
1 ( ) No benefits
2 ( ) Few benefits
3 ( ) Many benefits

56. During the next five years, do you think you will remain as a member of this cooperative?
1 ( ) Yes 2 ( ) No
56a. Why not? __________________

57. Why aren't you a member of a farm cooperative?

58. Have you been a member of a farm cooperative in the past?
1 ( ) Yes 2 ( ) No

59. Is there a farm cooperative in your area?
1 ( ) Yes 2 ( ) No 3 ( ) Don't know
60. Do you do any business with Al Butain Agricultural Cooperative Association?
   1 ( ) Yes                2 ( ) No
   If yes:
       60a. What type? ________________________________

61. If you were asked to become a member of Al Butain Agricultural Cooperative Association would you do so?
   1 ( ) Yes                2 ( ) No                3 ( ) Don't know
   If No:
       61a. Why not? ________________________________

62. Where do you obtain your agricultural production needs? (Read each, check all that apply).
   1 ( ) Agricultural Bank
   2 ( ) Agricultural commercial businesses
   3 ( ) Agricultural cooperative
   4 ( ) Other (specify: ________________________________)

63. Which case of the following do you think is important for you to consider becoming a member of a farm cooperative?

<table>
<thead>
<tr>
<th>The Case</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The location of the cooperative is close to my farm.</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>2. The monetary benefits of the cooperative is higher than what I now make.</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>3. The cooperative is properly managed.</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>4. When there is enough information available about the cooperative.</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>5. When I hear of the benefits of membership from a relative, friend, or neighbor.</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>6. When the cooperative provides marketing services.</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>7. When the cooperative provides extension services.</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>8. When the cooperative provides financial services.</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>