

THE TRAINING NEEDS OF EXTENSION WORKERS RELATED  
TO MECHANIZED AGRICULTURE IN IRAN

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## CHAPTER I

### INTRODUCTION

Iran is a developing country located in southwest Asia with a population of about 35 million people. The country covers an area of 407.5 million acres. Of this area, about 14 percent or 55 million acres are dry farm land and only 2.5 percent or 10 million acres are irrigated farm land.

The high mountains all around the country, the Caspian<sup>ia</sup> Sea in the north, and the Persian Gulf in the south have provided a unique climate for Iran. Temperatures range from tropical to temperate. Annual rainfall varies from 50 inches southwest of the Caspian Sea to less than two inches in desert areas. It is for these reasons along with the wide range of soils that the agricultural products are extremely varied. Over 75 percent of the land cultivated in any year is devoted to growing wheat, barley, and other grains. Cotton, sugar beets, fruits, and nuts take up most of the remaining cultivated area.

Agriculture remains the primary occupation and the key economic factor in the socio-economic life of Iran. Although as much as 75 percent of the population depends on the land, Iran has been unable to achieve self-sufficiency in food production.

The majority of Iran's rural population are traditional peasant farmers. They have benefitted very little from the progress made in agricultural science. As a result, farming productivity is low.



Iran's rural population lives in some 49,000 villages, generally with a low standard of living. In the rural areas, many people are poorly housed. Safe drinking water is in short supply and environmental sanitation is lacking.

Agricultural mechanization has an important role in the fundamental changes in the farming system and the way of life of the rural population as a means to increase farm production and raise the standard of living of the rural population in Iran. Mechanized agriculture includes all the unspecialized mechanical activities needed on the farm and in the home, including farm shop work, farm power and machinery, farm buildings and conveniences, rural electrification, soil and water management.

#### Statement of the Problem

Mechanized agriculture in Iran is relatively undeveloped and characterized by many small holders faced with a shortage of capital and credit facilities. Also, the degree of mechanization is different within each part of Iran. The majority of Iranian farmers still use indigenous, primitive farm tools. There are parts of Iran, however, where farmers have some basic machinery of their own, usually a tractor with implements for the most common types of work. However, the majority of these farmers do not know how to use these farm machines to best advantage, and they are unaware of the special problems that are likely to arise with machinery. There are no facilities for repairs, maintenance, and servicing, and the supply of spare parts is quite inadequate. The roads are poor or nonexistent, and there is rapid depreciation, wear and tear on the machinery. Lack of

knowledge of irrigation practices, soil and water conservation techniques and construction and repair of agricultural buildings are other problems that exist relative to the mechanized agriculture situation in Iran.

In order to get this knowledge to the Iranian farmers, a mechanization education project could well be undertaken and coordinated with a definite plan of extension work. However, there is a shortage of adequately trained field extension workers. Extension workers face many adverse conditions when working in the rural area, such as inadequate housing facilities and lack of facilities and equipment for extension work. Any rapid progress in agricultural and rural development in Iran will depend, then, to a very large extent on an adequate number of well-trained extension personnel and a system for providing them with adequate housing and extension facilities. The main problem of this investigation, then, was to analyze, relate, and apply the importance of basic farmer training needs in the field of agricultural mechanics to agricultural extension workers in Iran.

#### Purpose of the Study

The purpose of this study was to identify and analyze the training needs of extension workers as related to mechanized agriculture in Iran.

#### Objectives of the Study

The specific objectives of this study were:

1. To identify the major agricultural problems and the problems with mechanized agriculture in Iran.

2. To determine the importance of establishing extension stations at the township level which would be composed of a house for the extension worker, proper facilities and equipment for extension activities, and a farm shop to maintain, repair, and service any farm implement and to provide facilities for other shop work.

3. To analyze extension workers' training needs in five different areas of mechanized agriculture--agricultural shop work, agricultural power and machinery, agricultural buildings and conveniences, farm electrification, and soil and water management--as perceived by Iranian agriculture students.

4. To identify the major problems encountered in agricultural extension and mechanized agriculture in developing nations, especially as related to Iran.

5. To determine if there are any significant differences between responses of those who were familiar and those who were not familiar with farming problems, and/or mechanized agriculture, and/or agriculture extension service in Iran.

#### Scope of the Study

In view of the difficulties involved in sending questionnaires to Iran for completion, the investigator decided to limit the population of this investigation to Iranian agricultural students enrolled in ten institutions of higher learning in the United States of America. The questionnaire was limited to the following areas relating to mechanized agriculture in Iran: agricultural shop work, agricultural power and machinery, agricultural buildings and conveniences, farm electrification, and soil and water management.

## Assumptions

It was assumed that:

1. The instrument accurately reflected the training programs for agricultural extension workers in Iran.
2. The instrument communicated the same information to all respondents.
3. The respondents answered each item of the questionnaire honestly and to the best of their knowledge.
4. The respondents were familiar with Iran's farming practices, extension education, and mechanized agriculture.
5. Unless respondents indicated that they did not understand terms and questions asked, they were responding knowledgeably.
6. Even though respondents were from different parts of Iran, their responses did not reflect regional needs but were reflective of the entire country's needs in relation to mechanized agriculture.

## Definition of Terms

Certain key words used in this study are defined here to enable accurate communication with the reader.

1. Agricultural Extension: An out-of-school system of education in agriculture developed to bring the farmer the knowledge and help that will enable him to farm more efficiently.
2. Agricultural Extension Worker: A specialist in agriculture at the village, district, or divisional level who is trained in the basic and also current, up-to-date agricultural practices. He delivers this knowledge to the farmers to help them increase their agricultural production.

3. Need: The difference between what is and what ought to be.
4. Training: A continuous, educational process which increases the skills, ability, and knowledge of the extension worker, thus enabling him to perform his duties more efficiently.
5. Training Need: The knowledge, skills, and understanding required to fill the gap between the farmer's knowledge and the extension worker's knowledge in order to allow the extension worker to carry out his responsibilities effectively.
6. Extension Station: Proposed centrally located buildings in a township where the extension worker could live and establish facilities for extension activities.
7. Farm Shop: Where the farmer can obtain information on the use and maintenance of machinery.
8. Familiarity With Farming Practices, and/or Mechanized Agriculture, and/or Agricultural Extension Service: Any individual who has expressed having some knowledge in farming practices, mechanized agriculture, and/or agriculture extension services in Iran.
9. Unfamiliarity With Farming Practices, and/or Mechanized Agriculture, and/or Agricultural Extension Service: Any individual who has expressed little or no knowledge about farming practices, mechanized agriculture, and/or agricultural extension in Iran.

## CHAPTER II

### REVIEW OF RELATED LITERATURE

This chapter is a summary of the literature related to the existing agricultural mechanization and educational conditions in Iran. Particular reference is made to specific existing problems in mechanized agriculture and agricultural extension in developing countries relevant to the development of mechanized agricultural programs.

#### Importance of Mechanics in Agriculture

Phipps (21) defined agricultural mechanics as "all the unspecialized mechanical activities performed on the farm and in agriculturally oriented business and services." He indicated that the following five areas of instruction usually constitute the content of mechanics in agriculture:

1. Agricultural Shop Work. Selection, sharpening, care, and correct use of shop tools and equipment; woodwork and simple carpentry; sheet metal work; elementary forge work; electric arc and oxyacetylene welding; pipe fitting; simple plumbing repairs; rope work.
2. Agricultural Power and Machinery. Selection, management, adjustment, specialized equipment and services of gas engines, tractors, trucks, and the principal machines used in farming and agriculturally oriented businesses and services.
3. Rural Electrification. Utilization of electricity in the home and in the productive enterprises; selection, installation, operation, and maintenance of electrical equipment.

4. Agricultural Buildings and Conveniences. Elementary scale drawing and plan reading; farmstead layout; functional requirements of houses, shelters, and storages; water systems; septic tanks, and sewage disposal.
5. Soil and Water Management. Elementary leveling, land measurement, and mapping; drainage; irrigation; terracing, contouring, and strip cropping (p. 4).

According to Phipps, farm mechanics of every kind is now recognized as one of the most important parts of productive agriculture. Most of the work in the many and diverse occupations in agriculture involves some type of mechanical activity. With the increasing mechanization of work, a farmer cannot be a success unless he possesses considerable mechanical knowledge and skill. He emphasizes that there are many mechanical jobs that a farmer should and can do after receiving training in agricultural mechanics, such as repairing agricultural implements and machinery, constructing buildings, remodeling buildings, maintaining electrical equipment, repairing and maintaining home conveniences, and staking out contours and terraces.

#### Major Problems in Agriculture Mechanization in Developing Countries

According to Lonnemark (15)<sup>4</sup>, there are both social and technical difficulties common to many developing countries which tend to inhibit rapid advances in mechanized agriculture. He indicated that most of the farmers in developing nations use small farm indigenous implements as well as other farm appliances for working the soil. The farms in these nations are mostly small and may be divided into several separate and scattered plots. Cheap labor with low value or low yield crops cannot carry the costs of mechanized production under a system

of small scattered farms. The majority of farmers have neither the capital nor can they get the necessary credit for the purchase of expensive powered machinery such as tractors. Imported machines and implements may be totally unsuitable for conditions that prevail, and in addition there is diversity of specialized types which inevitably increases replacement difficulties and costs of operation.

Lonnemark maintained that the majority of farmers lack the knowledge in the correct use of farm machines and cannot cope with special problems that are likely to arise. Satisfactory workshops for repairs, maintenance, and servicing may be lacking, while the supply of spare parts may be quite inadequate. Other unfavorable conditions which exist to complicate problems with machinery include poor or nonexistent roads; high costs of operation and maintenance; rapid depreciation, wear, and tear; and excessive unproductive traveling.

#### Development of Agricultural Mechanization in Developing Countries

A high degree of farm mechanization now exists in relatively few countries, but great interest in it is being shown in many countries which still rely to a large extent on animals for draft power. Governments in developing countries are anxious to promote mechanization as a means to increase farm production and raise the standard of living for their people. Developing countries are faced with the changes that are necessary, and introducing mechanization is no easy task, according to Lonnemark (14).

Hopfen (11) indicated that the improvement of hand- and animal-operated farm implements is of great importance, as it is one of the



first steps that can be taken to raise crop yields and subsequently farm income. He maintained that in areas where agriculture will continue to depend for many years mainly on hand and animal power, significant improvements in production can often be obtained by the introduction of better small farm implements and machines. The capital investments required are small, but they lead to a strengthening of the farm economy and fuller employment of the rural labor force. They also create the capital that is so much needed for larger investments, eventually in more developed forms of mechanization and organization.

Hopfen recommended that certain points should be borne in mind when attempting to improve tools and implements. The tools and implements should:

1. Be adapted to allow efficient and speedy work with the minimum of fatigue.
2. Not be injurious to man or animal.
3. Be of simple design, so that they can be made locally.
4. Be light in weight for easy transportation.
5. Be ready for immediate use without loss of time for preparatory adjustments.
6. Be made of easily available materials (p. 3).

Hopfen added that the development of farm implements in developing countries has often been limited by factors such as lack of adequate materials or facilities for construction, weak draught animals, unsuitable plant varieties, and unsuitable soil or climate conditions. These limitations which determine the construction of local farm implements should be studied carefully in order to remove, whenever possible, the main obstacles to their further development.

According to Lonnemark (14), the change from primitive hand-operated or animal-drawn implements to modern farm machinery cannot be

achieved overnight. No mechanization project should be proposed or undertaken without an accompanying plan of training and extension education of farmers. Development of mechanized agriculture in any country depends on many factors, such as the price of farm produce and machinery, the wages and supply of labor, and the rate of development of credit facilities. He maintains that the stage of development of the extension service, the standard of education of the farmer, and the farmers' disposition toward cooperation among themselves are other important factors. Finally, there are the general socio-economic conditions of the country to be considered which may inhibit the rapid development of mechanization.

Lonnemark recommended that trained operators, mechanics, and supervisory staff must be available, together with adequate maintenance and repair facilities and spare parts. Adequate financial and credit facilities must be available to farmers; land and machines should be suited to each other, and adequate roads and other communication, as well as access to the field for the machinery, must be in existence or constructed in advance.

#### Major Agricultural Problems and Mechanized Agriculture in Iran

Nyrop (18) has indicated that the major agricultural problems in Iran relate directly to generally poor conditions for farming and livestock because of poor soil and an unfavorable climate. He maintains that in most regions the natural cover has been insufficient to build up soil organic content, and on the steeper mountain slopes much of the original earth cover has been washed away. He emphasizes

that in food production, water is regarded as more important than land itself. Scarcity of water and the means for making use of it have proven a formidable constraint to agricultural development in Iran.

According to Ram, as quoted by Dooley (8),

It is well known that our country is not rich in water, and one of the most useful measures that could be taken for the agricultural development of the country is to provide more water for the farms (p. 83).

Because of insufficient manpower in the technical field, the development of water resources is difficult.

Smith et al. (28) maintain that

If improved irrigation methods were introduced, at least one-third more land could be put under cultivation. In addition, much of the potentially cultivable land now classified as wasteland could be cultivated if sufficient water were made available (p. 382).

Nyrop (18) states that the only hope of significant increases in food production lies in bringing more arable land under irrigation.

The degree of mechanization is different within each part of Iran. There are parts of the country where practically no farm machinery is used. On the other hand, there are parts of Iran where most farmers have some basic machinery of their own, usually a tractor with implements for the most common types of work.

Mechanization implements used in Iran are classified as power, animal-drawn, or hand-powered. The majority of Iranian farmers still use indigenous, primitive farm tools and other farm appliances for soil working. Indigenous implements for specific tasks differ in shape, detail, and materials from one part of the country to the other, but there are nearly always broad similarities. In most areas, plowing is still done with a wooden plow. Sowing of seed, harvesting,

threshing, and winnowing of grain are done almost entirely by hand or with animals. A spade, shovel, simple thresher, screen, and wooden fork are tools used for sowing, irrigating, and harvesting. According to Dooley (8),

Hand-powered machines that are improved, efficient, and useful under Iranian conditions and that can be locally manufactured, appear to be one area in which mechanization can be improved (p. 90).

He emphasizes that

One of the most promising areas of mechanization is that of small, machine-powered equipment that can, by its use, increase production and income as well as promoting employment. These machines include sprayers, pumps, small engines, and possibly garden-type tractors (p. 90).

According to Dooley, "the problem of improving the implements and farm power necessary for agricultural production began shortly after World War I." Smith et al. (28) maintain that there were about 17,500 tractors and 1100 combines at the end of 1968 in Iran. Nyrop (18) indicated that the number of farm tractors in use in 1977 was 50,000. By 1970, some 7,400 deep wells were producing ground water for irrigation in various parts of the country.

According to Warne, as quoted by Dooley (8),

Our original assumption was that in Iran, as in most underdeveloped countries, mechanization of the farms would be the most rewarding undertaking . . . Many obstacles stood in the way of mechanization. Gradual improvement of both the social and economic conditions of the farmers may be required before any large-scale mechanization will be successful (p. 91).

Major problems of agricultural mechanization in Iran, as in other developing nations which have been pointed out earlier, are characterized by the following factors: small farm size and irregular fields; lack of skills in use of modern machinery, especially in tractor

maintenance; lack of repair facilities; water shortage; lack of irrigation techniques; total absence of both concepts and practices in soil and water conservation; lack of knowledge of construction techniques of agricultural buildings, and the shortage or unavailability of credit. These problems must be removed or alleviated. A great step toward solution of the problems would be taken by providing an adequate in-service and field training program addressing the situation for potential personnel extension workers.

### Major Problems in Agricultural Extension in Developing Countries

The economic development of most developing countries depends to a large extent on their ability to develop and improve their agricultural resources. Agricultural education, research, and extension are three of the essential services that a government must provide for the country's agricultural development. However, Iran, as with other developing nations, faces problems in agricultural extension, specifically in the areas of extension organization, institutions of higher education in agriculture, training of extension workers, extension teaching methods, and communication in extension.

#### Extension Organization

According to Maunder (16), agricultural extension services are established for the purpose of changing the knowledge, skills, practices, and attitudes of masses of rural people. He maintains that the following factors influence the organization of extension services:

1. geographic factors, such as size of a country, natural

features, climate, and number and density of rural population;

2. economic factors, such as financial resources, type of farming, availability and type of farm supply and marketing services, and national food policy;
3. political factors, such as government administration and civic organization (pp. 28-34).

Maunder (16) also states that deficiencies in the organization of agricultural extension service in developing countries stems primarily from six sources:

1. lack of general understanding and appreciation of the role of extension education in rural development;
2. failure to establish a national policy as to the scope of extension service responsibility and program;
3. lack of continuity of extension programs due to political instability and attendant change in agricultural policy, personnel, and proprieties in economic development;
4. weaknesses in the organizational structure of government which inhibit the development of cooperation between agricultural extension and other government services and institutions;
5. failure to provide an effective balance in the allocation of limited resources among the necessary elements of rural development, such as extension education, agricultural research, credit, agrarian reform, and other elements of agriculture modernization;
6. failure to provide a proper balance between technical and educational competence in the staffing of the extension service (p. 47).

#### Institutions of Higher Education in Agriculture

Institutions of higher education can play a role of significant importance in the development of agriculture. Thus, close relationships must be established between agencies and organizations involved

in agricultural work and the agricultural universities. Chang (5) indicated that most developing countries, agricultural colleges and schools are under a ministry of education, while research and extension are under a ministry of agriculture. Generally there is no mechanism to bring them together.

The three main functions of institutions of higher education in agriculture are teaching, research, and extension, according to Hannah, as quoted by Dada (6):

The purpose of an effective institution of higher learning in agriculture is to educate for service, experiment to solve real problems, conduct extension work to learn about problems and congregate solutions, and engage in public service so the leadership in agriculture will learn to respect and look to it for guidance and help (p. 16).

Casey and Price (4) categorize weaknesses of institutions of higher education in developing countries so far as their effectiveness in serving agriculture is concerned:

1. Little or no involvement of the college or school in the nation's efforts to improve agricultural production or rural development substantially. The potential role of the institutions in agriculture is either not recognized or assigned a low priority.
2. College or school experiment stations, even when functioning in the field of agriculture, are often ill-maintained and under-utilized. Rarely is there any attempt to provide experimentation focused on the farm level.
3. Perhaps as a result of being structured in a ministry other than agriculture, the college or school may be functioning at a level essentially out of touch with the mainstream of the nation's agricultural industry.
4. Faculty in agriculture, although perhaps academically able, often lack agricultural skills or field experience. Consequently, too often faculty members tend to confine themselves to classroom teaching, or to research based largely upon literature or upon

laboratory work which may be recognized as a mere extension of studies initiated in graduate school. Such instructors may be considered as ill-equipped to transmit skills to students via joint involvement in field experimentation. The all too common lack of dynamic, purposeful and applicable field research at institutions offering higher level studies in agriculture could well be closely associated with a possible lower level of competence, and confidence of the faculty to undertake such endeavors.

5. The students in attendance at institutions of higher education in developing nations are more often from urban areas. Even rural students are generally from subsistence farms and do not have experience in field management of crops or animals for high productivity. Unfortunately, they do not obtain this very essential experience at the college or school. Thus, often the student may graduate with an education but with very few or no accompanying skills. Often the student then is faced with the frustrating responsibilities of a change agent without having developed confidence in facing farmers and real farm problems.
6. An additional weakness related to number five (5) above is recognized in that quite often the college or school tends to perpetuate, rather than dissipate, the philosophy that 'working with the hands' or manual labor is beneath the dignity of the truly educated person. To engage in activities which might involve field contact with the soil or with animals is, in many cultures, considered inappropriate for the educator (pp. 64-65).

#### Training Extension Workers

Recruitment and training of village-level workers are of major importance in determining the success of the extension service in the developing countries. The extension worker is the only person in the organization who is in direct and daily contact with farm people. He is responsible for providing the necessary learning experiences that would enable the farmers to improve their farms, thus raising their



standard of living. Savile (27) maintains that the success of extension work will to a great extent depend on how the problems of the farmer and his family are handled. Penders (19) indicates that successful extension work depends to a considerable extent on the personality of extension workers as well as their experience and training. The significance of training in the professional preparation of extension workers cannot be over-emphasized. Maunder (16) states that the shortage of adequately trained personnel at all levels--supervisors, subject matter specialists, field extension workers, and regional and national administrators--limits the effectiveness of extension services in many countries. The problem of identifying the training needs of extension workers has been the subject of great investigation in different countries, and most of the developing nations are no exception. Watts (30) indicates that in the developing countries, a major cause for concern is that often the extension worker is not adequately equipped for his job. He is too young and too inexperienced, and his knowledge is too theoretical. Maunder (16) indicates that because of the scarcity of agriculturally trained men in developing nations and the difficulty of working in the rural areas, extension service will have to recruit field workers from among graduates of intermediate-level agricultural schools and institutions of lower than college or university level. According to Marvin (15), developing countries cannot afford to train, employ, and maintain university-trained agriculturists in sufficient numbers to be an effective farm advisory service. He maintains that even if a country could afford to deploy a sufficient number of university graduates with agricultural training among its farm population, it is doubtful

if they could communicate effectively. This is because most of them come from the upper middle socio-economic level and are of an urban background with no practical work on farms. Because of the insufficient number of extension workers in developing nations, he recommends training a relatively large number of rural youth as technicians to staff the development service of different fields of agriculture and make available to them the backup services of higher education and research.

Working in rural areas in the developing countries is a challenge to workers. As stated by El-Omari (9), extension workers are expected to work in adverse conditions, exemplified by inadequate or even total lack of proper transportation facilities, lack of electricity and running water, and lack of recreation and other facilities --to name only a few of the hardships. For these reasons, people are usually reluctant to work in rural areas, and only those who do not find jobs in cities and towns are available or willing to serve in the rural areas.

Other problems related to training personnel in developing countries are insufficient numbers of qualified teaching staff, lack of training facilities, inability to select appropriate training method, unavailability of funds, and lack of positive attitudes at the administrative level, which in no way is related to the college of agriculture which has not undertaken the training of extension workers as one of its functions.

According to Duncan, as quoted by El-Omari (9):

Systematic organization and coordination is the keynote to successful long-term extension training programs. An efficient and successful extension training program must

consider the total training needs of personnel in all phases of the extension program (p. 75).

Careful consideration should be given to the identification of training needs of on-the-job extension workers so that in-service training can be provided to meet these needs. According to Hashim, as quoted by El-Omari (9), the guidelines for determining training needs of on-the-job workers are as follows:

1. Job analysis, or activities of the worker;
2. Analysis of current social and economic changes and resulting program emphasis; i.e., the environment in which he is working;
3. self-survey by the individual worker; i.e., self-appraisal of the worker's training needs;
4. direct approach through supervisors or specialists, day-to-day observation; i.e., consciousness of supervisors and specialists of the worker's training needs through direct observation;
5. psychological tests: tests measuring aptitudes and abilities, interests and personality of the worker;
6. performance evaluation: determining the quality and quantity of output of the worker measured against stated objectives (p. 76).

#### Extension Teaching Methods

Extension education involves change in the behavior of rural people, presumably resulting in improved agricultural production, farm life, and standards of living and strengthening of the national economy.

Basendewa (2) suggests that success in bringing about desired changes in behavior with farmers frequently depends on the extension worker's skill in arranging the best learning situation and in using the most effective methods of teaching in that situation.

Everyone goes through certain mental steps before changing his ideas or practices. Lionberger (13) indicates that the adoption of a new idea or practice is a process through which the individual consciously or unconsciously passes when he first learns of a new practice until the time he adopts such a practice. The following steps are involved:

1. Awareness stage: The farmer is exposed to the new practice for the first time to the extent that he can recall having heard or read about the new practice;
2. Interest stage: A farmer who becomes aware of a new practice may become interested and seek more information;
3. Evaluation stage: As a result of interest, the farmer may try out the new practice mentally and decide whether actually to try out or abandon the whole idea;
4. Trial stage: If the evaluation of the practice is acceptable, the farmer may decide to try the idea by experimenting on a small scale;
5. Adoption stage: As a result of acceptable performance of the new practice during its trial, the farmer may decide to adopt it (pp. 3-4).

According to Lionberger (13), factors which relate to adoption are age, education, income, and size of farm. He maintains that another important index related to adoption is that of the participation index in activities and organization, particularly with respect to participation outside the community. According to Beal and Bohlen (3), where change is more complicated, adoption is more difficult to achieve through program of change. Rogers (26) reports that practices that display a high relative advantage over the old existing practices--those that are easily divisible and communicable, and those that are simple, and those that are compatible with the

existing culture--are more quickly adopted by people. Pesson (20) indicates that the diffusion of new ideas among people takes time, and the time that it takes people to adopt is affected by many different factors, including the nature of the practice that is being introduced, the person and/or agency that is espousing change, the environment in which people live, and the characteristics of the individuals themselves. There are many important variables; consequently, this must be understood and utilized if the process of change is to be sped up. According to Williams (31), the introduction of new technologies in many developing countries requires not only changes in agricultural techniques, but also in the attitudes and ways of life of the people. He maintains that the numbers of deep-rooted social and cultural factors constitute impediments to agricultural development. He also emphasizes that important criteria for local leadership are kinship positions, age, occupational class, and, lately, political position. If these leaders are not receptive to agricultural changes being introduced, agricultural development cannot progress.

#### Communication in Extension

Communication has been defined as "the act of transmitting information, ideas, and attitudes from one person to another" by Agee et al. (1). Communication is a process because it is dynamic and in motion, connecting the behavior of one person with that of another. Four aspects of the communication process consist of the communicator, the message, the channel, and the audience. Read (24) indicates that all communication has a purpose. Purpose is the functional reason for communication. He maintains that the process of

communication takes place when someone (the sender) says something (message) in some way (channel) to someone else (receiver) for a purpose (reason for communication).

Maunder (16) states that ability to communicate determines to a very large degree the success or failure of an extension worker. He has technical information from research and other sources. It is his responsibility to establish effective communication with the people he serves so they can use the information to improve their agricultural and rural life.

To communicate effectively, extension workers must understand and appreciate the role of purpose in the communication process. They must know exactly why they are communicating. What do they expect to accomplish? What is the farmer's interest, and what do they want the farmer to do?

Extension of teaching methods are channels of communication. These methods are classified into three groups: mass, group, and individuals, according to Reisbeck (25):

Mass Method

- a) posters
- b) newspapers
- c) pamphlets and leaflets
- d) fact sheets
- e) displays and exhibits
- f) radio
- g) TV
- h) demonstrations
- i) bulletin boards

Group Method

- a) lectures
- b) workshops
- c) tours
- d) classes--extension school  
or farmer training centers
- e) forums
- f) planning sessions
- g) field days
- h) clubs

Individual or Personal Method

- a) office calls
- b) farm and home visits
- c) personal calls
- d) telephone calls
- e) informal contacts

The characteristics of the audience will help to determine the teaching methods to be used. The extension worker must identify the audience and plan to reach it through contact and participation.

Maunder (16) indicates that factors such as social structures in rural communities, rural leadership, economics, and civic and community organization affect the method used in extension education programs. He recommends that extension workers should be aware of the limitations of experiences of people whom they are trying to teach, and then plan their teaching programs accordingly. When visual aids are used, extension workers should explain them and relate them to local experience common to the people in the group. This is necessary because very often sophisticated visual aids are not easily understood by village people. Simple language should be used and terms employed that the village people understand and use themselves. However, recent reports from many developing countries have shown that extension workers reach regularly not more than five percent of the population through personal contact extension methods.

The use of mass media is limited in a large number of developing countries. There are not enough radios to make a real impact, and television has not been introduced into the villages yet. There are not enough motion picture facilities in proportion to the population. In 1964, a publication by UNESCO suggested a basic minimum use of mass media for developing countries. This standard, along with the actual mass media use in India (1960) for every person is shown below (29):

<u>Suggested Facilities</u>		<u>Actual Facilities</u>
newspapers	10 copies	1.1 copies
radio	5 receivers	0.5 receivers
cinema	2 seats	0.6 seats
television	2 receivers	0.0 receivers

Additional means of reaching people must be sought. Phongparnich (22) suggested that one excellent way is to gain the confidence and support of leaders who can spread the extension message to more people. McGrath (17) indicates that most of the materials and communication techniques that work in the developed countries do not always work the same way in developing nations. Furthermore, much of the audio-visual training of extension workers is accomplished in modern facilities, and takes for granted resources and conditions that not many developing countries can offer. The common practice of operating outdoors in most instructional situations with adults in developing countries poses problems--rough roads, lack of amplification equipment, difficulties of carrying batteries or finding electrical outlets are also common problems for communication in developing countries. Outdoor meetings are further handicapped by distraction of passersby, curious children, insects, and sometimes, rain and wind. Showing films out of doors has a number of drawbacks. Even if extension workers have a power supply so that they can show a film where there is no electricity, they must wait for darkness to fall. Even where electricity is regularly available, and where meetings are held indoors, it is frequently impossible to darken the room for fullest quality of viewing of movies and slide films. According to McGrath (17), in addition to the physical problems, such as lack of facilities, equipment, and techniques, social and cultural problems arising from illiteracy represent other problems to communication in developing countries.

#### Agricultural Extension in Iran

Agricultural extension was organized in 1953 with a goal of



reaching every farm family in Iran with improved methods of farming and living. The extension service in Iran consists mainly of middle personnel trained at agricultural high schools or agricultural training centers. The training period is three years for full agents, and one year for associate agents. The importance of this level of training in agriculture in Iran cannot be over-emphasized.

Zaepour (32) indicates that teachers in the agricultural centers and high schools are chosen from graduates of colleges of agriculture. Selection is made on the basis of their knowledge of technical agriculture. Although these teachers have earned their degrees in technical agriculture, they are not required to have teaching methods or education courses as part of their college training.

Statistics show that the number of extension agents in Iran is hardly adequate to meet the need of agricultural development. According to Plan Organization, Manpower, as quoted by Dooley (8)

. . . is one of the most serious deficiencies in the Iranian workforce in the lack of experienced and technically capable supervisors. Indeed, the entire middle rank of the industrial, governmental and agricultural workforces is weak and inadequate (p. 199).

The illiteracy in rural areas of Iran seems to be the major problem of the country. A shortage of teachers, insufficient budgets, inadequate school facilities, and lack of classroom space are contributing factors, resulting in the majority of rural people in Iran being illiterate. Rassi (23) maintains that the major problem with today's education in Iran is to be found in the characteristics and philosophy of Iranian education. He emphasizes that centralization of education and weaknesses in the educational curricula have created the major problems in Iranian education.

## Summary

After reviewing the related literature, several specific problems can be identified for the development of mechanized agriculture in Iran. In Iran, as in other developing nations, mechanization implements fall into three broad categories: hand-powered, animal-drawn, and power. Improvement of hand- and animal-operated farm implements is very important, as it is one of the first steps that can be taken to raise crop yields and farm income. The tractor with implements is the basic form of power-operated machinery in Iran, as in other developing nations. However, since the majority of farmers lack the skills and supportive services (shop facilities and availability of spare parts), an adequate information system must be established to develop mechanized agriculture in Iran. There are many factors which contribute to providing and maintaining this extension or information system that will support the development of mechanized agriculture in Iran. The extension system needs to be improved and strengthened in the areas of extension organization, institutions of higher education in agriculture, training of extension workers, extension teaching, and communication in extension.

## CHAPTER III

### DESIGN AND METHODOLOGY

#### Introduction

The purpose of this chapter is to describe the procedures used in conducting this study. The design of the study was based on the main purpose of the study, which was to identify and analyze the training needs of extension workers as related to mechanized agriculture in Iran.

#### Population for the Study

The population for this study consisted of 120 Iranian agricultural students enrolled in ten selected institutions of higher learning in the United States of America, whose agricultural programs were ranked as "A" by The College Blue Book (7) and A Rating of American and International Universities (10). The quality of the courses in various doctoral fields, the number of students and staff, and the quality of the libraries were used as the basis for selecting the universities. The universities were ranked according to the above standards by the two books. Ten universities were selected randomly from the lists. From these universities, the respondents were selected. The ten universities include:

Texas A & M University  
Iowa State University  
University of California at Davis

Michigan State University  
University of Wisconsin  
Ohio State University

Kansas State University  
University of Missouri at Columbia

Penn State University  
Oklahoma State University

### Development of the Instrument

The questionnaire was developed for use in gathering data for this investigation (see Appendix). In formulating the statements used in the instrument, the author reviewed related literature and instruments that had been used by previous investigators. An instrument was then developed by adapting selected parts of one developed by Juby (12).

### Collection of the Data

The instrument was completed in late February, 1980. Ten questionnaires were mailed to the International Students' Advisory Office located in each of the ten selected universities, except Oklahoma State University, where 30 were sent. These were to be distributed among the Iranian students who were majoring in agriculture at each of these institutions. Ninety-three questionnaires were received by the end of March, 1980.

### Analysis of Data

The questionnaires were coded and sent to the Oklahoma State University Computer Center to be keypunched and programmed. The mean and frequency distributions relative to each item were calculated. A group T-test was utilized to determine if there were any significant differences between responses of those participants who were familiar and those who were not familiar with farming practices and/or mechanized agriculture and/or agricultural extension services in Iran.

## CHAPTER IV

### PRESENTATION AND ANALYSIS OF DATA

#### Introduction

The purpose of this study was to identify and analyze the training needs of extension workers as they relate to mechanized agriculture in Iran. The objective of the study was to determine extension workers' training needs for farmers in five areas of mechanized agriculture as perceived by Iranian agriculture students. The five areas which could serve as a basis for training agricultural extension workers in Iran are the following:

1. Agricultural shop work
  - a) orientation, organization, and safety
  - b) repairing and sharpening tools
  - c) metal work
  - d) arc welding
  - e) oxyacetylene welding
2. Agricultural power and machinery
  - a) small engines
  - b) tractor maintenance
  - c) farm machinery and equipment
3. Agricultural buildings and conveniences
  - a) farm structures and carpentry
  - b) concrete

- c) sketching and drawing
- 4. Farm electrification
- 5. Soil and water management

#### Treatment of Data

The training needs of extension workers in these five categories of training as perceived by the Iranian agriculture students were measured with the help of a four-point rating scale. Each item of the instrument was rated by respondents on a scale of 0 to 4, with 4 being the highest rating. In order to determine the response for the training needs of each item, a range of absolute values was established. The range used was 0 to 0.49, "none;" 0.5 to 1.49, "little;" 1.5 to 2.49, "some;" 2.5 to 3.49, "much;" and 3.5 to 4.0, "very much."

On items 6, 7 and 8, relating to background information (Appendix), respondents were asked to indicate on a scale from "none" to "very much" their familiarity with farming practices, extension service, and mechanized agriculture in Iran. Numerical values were assigned to the response categories, and mean responses to these three questions were calculated. In this way, the respondents were divided into two groups. Respondents whose mean responses were above 1.49 were classified as being "familiar" (Group 1), for a total of 66 respondents. Respondents whose mean responses were 1.49 and below were classified as being "unfamiliar" (Group 2), for a total of 27 respondents. These two groups were used for the remainder of the comparisons made in the study.

A group T-test was utilized to determine what relationship existed between the responses of those familiar (Group 1) and those

not familiar (Group 2) with farming practices, mechanized agriculture, and/or the agricultural extension service in Iran and their perceptions as to training needs of extension workers in the five different areas of mechanized agriculture already stated. Differences were tested at the 0.05 level of significance.

## Findings

### Description of Respondents

Respondents in this investigation were 93 Iranian agriculture students currently enrolled in ten institutions of higher learning in the United States of America. Table I shows the number and percentage of respondents in terms of major areas of study and education classifications.

Of the 93 respondents included in this investigation, 26 (27.96 percent) were studying at the B.S. level, 37 (39.78 percent) at the M.S. level, and 30 (32.26 percent) at the doctoral level. Information collected revealed that the majority of respondents were studying agronomy (36.56 percent), agricultural engineering (25.81 percent), agricultural education (11.83 percent), horticulture (8.60 percent), animal science and mechanized agriculture (6.45 percent), and agricultural economics (4.30 percent). Data reported in Table II indicated whether respondents were born and reared in a District (Shahrestan), Subdistrict (Baksh), or Township (Dehistan). A total of 74 (79.57 percent) of the 93 respondents said they were born on the District level (Shahrestan). Only nine (9.68 percent) and 10 (10.75 percent) of the respondents were born on the Subdistrict level (Baksh) and

TABLE I  
RESPONDENTS' MAJOR AREAS OF STUDY AND CLASSIFICATION

Level of Study	Distribution by Field of Study															
	Agricultural Economics		Agricultural Education		Agricultural Engineering		Agronomy		Animal Science		Horticulture		Mechan. Agric.		Total	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
B.S.	0	0	0	0	12	12.90	8	8.60	0	0	1	1.08	5	5.38	26	27.96
M.S.	3	3.23	8	8.60	6	6.45	11	11.83	3	3.23	5	5.38	1	1.08	37	39.78
Ph.D.	<u>1</u>	<u>1.08</u>	<u>3</u>	<u>3.23</u>	<u>6</u>	<u>6.45</u>	<u>15</u>	<u>16.13</u>	<u>3</u>	<u>3.23</u>	<u>2</u>	<u>2.15</u>	<u>0</u>	<u>0</u>	<u>30</u>	<u>32.26</u>
Total	4	4.31	11	11.83	24	25.81	34	36.56	6	6.45	8	8.60	6	6.45	93	100.00



Township level (Dehistan), respectively. Also, in this investigation it was found that 77 (82.79 percent) were reared on the District level (Shahrestan). Only nine (9.68 percent) and seven (7.53) percent of the respondents were reared on the Subdistrict level (Baksh) and Township level (Dehestan), respectively.

TABLE II  
AREAS IN WHICH RESPONDENTS WERE BORN AND REARED

Areas	Born		Reared	
	N	%	N	%
District (Shahrestan)	74	79.57	77	82.79
Subdistrict (Balesh)	9	9.68	9	9.68
Township (Dehistan)	10	10.75	7	7.53

In this investigation it was found that 68 (73.12 percent) of the respondents had worked on a farm. Twenty-five (26.88 percent) had not worked on a farm.

Table III was developed to illustrate respondents' familiarity with farming practices, agricultural extension service, and mechanized agriculture in Iran. The ratings ranged from "none" to "very much." Data reported in Table III indicated that 38 (40.86 percent) of the respondents were "some" familiar with farming practices in Iran; only

26 (27.96 percent) "much;" 15 (16.13 percent) "little;" 11 (11.83 percent) "very much;" and three (3.22 percent) reported they were not familiar with farming practices in Iran.

TABLE III

FAMILIARITY OF RESPONDENTS WITH FARMING PRACTICES, AGRICULTURAL EXTENSION SERVICE, AND MECHANIZED AGRICULTURE

Ratings Range	Familiarity With Farming Practices		Familiarity With Agricultural Extension Service		Familiarity With Mechanized Agriculture	
	(N)	(%)	(N)	(%)	(N)	(%)
None	3	3.22	12	12.90	10	10.75
Little	15	16.13	23	24.73	19	20.43
Some	38	40.86	30	32.26	34	36.56
Much	26	27.96	20	21.51	26	27.96
Very much	<u>11</u>	<u>11.83</u>	<u>8</u>	<u>8.60</u>	<u>4</u>	<u>4.30</u>
Total	93	100.00	93	100.00	93	100.00

According to Table III, 30 (32.26 percent) "some;" 23 (24.73 percent) "little;" 20 (20.51 percent) "much;" 12 (12.90 percent) "none;" and eight (8.60 percent) "very much" familiar with the agricultural extension service in Iran. And, finally, 34 (36.56 percent) "some," 26 (27.96 percent) "much," 19 (20.43 percent) "little," 10 (10.75 percent) "none," and four (4.30 percent) "very much" were familiar with

mechanized agriculture.

Table IV shows the combination of familiarities of respondents with the farming practices in Iran, and/or agricultural extension service, and/or mechanized agriculture. According to this table, 49 (52.69 percent) of the respondents were familiar with farming practices, agricultural extension service, and mechanized agriculture; 12 (12.90 percent) were not familiar with either farming practices, agricultural extension service, or mechanized agriculture; 10 (10.75 percent) were familiar with farming practices but were not familiar with agricultural extension service; nine (9.68 percent) were familiar with farming practices and mechanized agriculture but were not familiar with agricultural extension service; seven (7.53 percent) were familiar with farming practices and agricultural extension service but were not familiar with mechanized agriculture but were not familiar with farming practices and agricultural extension services; and, finally two (2.15 percent) were familiar with agricultural extension services but were not familiar with farming practices.

Information collected revealed that the two respondent groups (1 and 2) felt that establishing farm shops for repairing, maintaining, and servicing farm implements and establishing extension stations with a house for the extension worker and proper facilities for extension activities at the Township (Dehistan) level was "much" important. There were significantly different responses between the two groups (0.021 percent). The mean response of Group 1 ("familiar") was 3.30 percent. The mean response of Group 2 ("unfamiliar") was 2.81 percent. This indicates that Group 1, those familiar with farming practices, agricultural extension, and agricultural mechanization in Iran,

felt that establishing extension stations and farm shops was more important than did Group 2, those unfamiliar.

TABLE IV  
COMBINATION OF RESPONDENTS' FAMILIARITIES WITH FARM PRACTICES  
AND/OR AGRICULTURAL EXTENSION SERVICE AND/OR  
MECHANIZED AGRICULTURE

Familiarity With Farming Practices	Familiarity With Agricultural Extension Serv.	Familiarity With Mechanized Agriculture	N	%
0	0	0	12	12.90
0	0	*	4	4.30
0	*	*	2	2.15
*	0	0	10	10.75
*	0	*	9	9.68
*	*	0	7	7.53
*	*	*	49	52.69

\* Familiar

0 Unfamiliar

Training Needs in the Area of Agricultural  
Mechanization

Table V is a comparison of respondents' perceptions of the amount of training needed in agricultural shop work. Overall, respondents

TABLE V  
COMPARISON OF RESPONDENTS' PERCEPTIONS OF AMOUNT OF  
TRAINING NEEDED IN AGRICULTURAL SHOP WORK

Area of Training	Group I	Group II	Overall
<u>A. Orientation, Organization, and Safety</u>			
Aim and purpose of training	3.378	3.481	3.408
Arrangement and placement of tools and equipment in shop	3.151	3.185	3.161
Introduce system to keep clean and orderly shop with tools in good working condition	3.318	3.148	3.268
Fire extinguisher and first aid instruction	3.045	3.037	3.043
Safe working habits (understanding color code and other safety practices)	3.151	3.222	3.172
Use of standard shop safety inspection list	2.753	3.185	2.880
<u>B. Repairing and Sharpening Tools</u>			
Tool-fitting equipment and supplies	3.318	3.148	3.268
Sharpening and repairing various tools	3.227	2.962	3.150
Cleaning and storing tools	3.106	3.259	3.150
Tool identification	3.075	3.074	3.075
<u>C. Metal Work</u>			
Mark, cut, and bend metal	2.787	2.962	2.838
Using drill press	2.818	2.777	2.806
Proper use of grinder	3.015	2.925	2.989
Threading bolts and nuts	2.696	2.555	2.655

TABLE V (continued)

Area of Training	Group I	Group II	Overall
Cutting flat plate with cold chisel	2.590	2.407	2.537
Threading and cutting pipe	2.803	2.555	2.731
<b>D. <u>Arc Welding</u></b>			
Introduction and orientation	3.045	2.814	2.978
Selecting and caring for arc welding equipment	2.969	2.777	2.913
Recognizing and using safety precautions	3.257	3.037	3.193
Striking arc and running bead	2.818	2.592	2.752
Making a flat butt weld	2.757	2.481	2.677
Position welding	2.772	2.592	2.720
Running a continuous bead	2.757	2.444	2.666
Preparation of metal for welding	2.803	2.666	2.763
Selection of electrodes	2.969	2.518	2.838
Welding cast iron	2.787	2.592	2.731
Skill training	3.287	2.814	3.150
Construction of projects	3.121	2.629	2.978
<b>E. <u>Oxyacetylene</u></b>			
Becoming acquainted with safe operation of oxyacetylene cutting equipment	3.136	2.703	3.010
Adjusting valves, gauges, and flames	3.015	2.444	2.849*
Proper use of cutting torch and cutting flat plate	2.939	2.740	2.881

TABLE V (continued)

Area of Training	Group I	Group II	Overall
Selecting proper tip size, gas pressure rod size, flux, and materials	2.893	2.740	2.849
Making various welds with milled steel	2.636	2.592	2.623
Bronze welding	2.363	2.444	2.387
Use of powder torch (hard surface)	2.545	2.518	2.537
<b>F. <u>Plumbing</u></b>			
Identification of plumbing fittings	2.757	2.703	2.741
Cutting and flanging of copper	2.181	2.481	2.268
Sweating of copper fittings	2.151	2.296	2.193
Soldering	2.500	2.296	2.440

\* Significant at the 0.05 level.

reported that "much" training was needed in all of the specific items in the areas of "Orientation, organization, and safety," "Repairing and sharpening tools," "Metal work," and "Arc welding." However, three of the specific items with the overall rating of "much" were rated differently by the two groups. On the specific items "Cutting flat plate with cold chisel," "Making a flat butt weld," and "Running a continuous bead," Group 2 (unfamiliar) reported that only "some" training is needed.

Overall, respondents felt that extension workers needed "much" training in six of the seven items of "oxyacetylene" and "some" training in the remaining one item of "oxyacetylene." One item of training with "some" overall rating was rated "some" by both groups. One of the items with the overall rating of "much" was rated differently by the two groups. Of this, "Adjusting valves, gauges, and flames," was rated "some" by Group 2 (unfamiliar).

Overall, respondents felt extension workers needed "much" training in one of the four items of "plumbing," and "some" needed training in the remaining three items of training. The two respondent groups (1 and 2) rated four items of training the same. One item of training with the "much" overall rating was rated "much" by both groups. Similarly, three items of training with the "some" overall rating were rated "some" by both groups.

There were no significant differences between responses of the two groups on any of the training areas of "Orientation, organization and safety," "Repairing and sharpening tools," "Metal work," "Arc welding," and "Plumbing" as shown in Table V. The only significantly different response between the two groups was in "Adjusting valves,



gauge, and flames" (0.02 percent) as indicated in Table V by asterisks.

Table VI is a comparison of respondents' perceptions of the amount of training needed in agricultural power and machinery. Overall, respondents felt that extension workers needed "much" training in three areas of "Small engines." Overall, respondents rated as "very much" the need for training extension workers in "servicing the tractor." According to the respondents, training was "much" needed in "Minor tractor repair" and "Selecting and storing tractor fuels and lubricants." Two of the items with the overall rating of "very much" and "much" were rated differently by the two groups. Of these, "Servicing the tractor" and "Minor tractor repair" were rated "very much" by Group 1 (familiar).

Overall, respondents felt extension workers needed "very much" training in "operation," and needed "much" training in "selection," "maintenance," and "safety precautions." Two of the items with the overall rating of "very much" and "much" were rated differently by the two groups. Of these, "selection" was rated "very much" by Group 1 (familiar), and "maintenance" was rated "very much" by Group 2 (unfamiliar). There was no significant difference between responses of the two groups for any of the training areas of small engines, tractor maintenance, and farm machinery and equipment as shown in Table VI. This indicates both groups viewed training needs in the same way.

Table VII is a comparison of respondents' perceptions of amount of training needed in "Agricultural buildings and conveniences." According to Table VII, overall the respondents felt extension workers needed "much" training in seven of the ten items of "Farm structures and carpentry," and "some" needed training in the remaining three items. Five

TABLE VI  
 COMPARISON OF RESPONDENTS' PERCEPTIONS OF THE AMOUNT OF  
 TRAINING NEEDED IN AGRICULTURAL POWER AND MACHINERY

	Group I	Group II	Overall
<u>A. Small Engines</u>			
Principles of operation	3.136	3.148	3.139
Disassemble and assemble	3.000	3.000	3.000
Servicing small engines	3.136	3.111	3.129
<u>B. Tractor Maintenance</u>			
Servicing tractor	3.590	3.444	3.548
Minor tractor repair	3.515	3.333	3.462
Selecting and storing tractor fuels and lubricants	3.318	3.259	3.301
<u>C. Farm Machinery and Equipment</u>			
Selection	3.469	3.444	3.462
Operation	3.575	3.481	3.548
Safety precautions	3.409	3.296	3.376
Maintenance	3.500	3.370	3.462

TABLE VII  
COMPARISON OF RESPONDENTS' PERCEPTIONS OF AMOUNT OF TRAINING  
NEEDED IN AGRICULTURAL BUILDING AND CONVENIENCES

	Group I	Group II	Overall
<b>A. <u>Farm Structures and Carpentry</u></b>			
Selecting and using construction materials	3.075	2.962	3.043
Recognizing desirable construction practices	3.075	2.851	3.010
Recognizing ordinary construction and repair jobs	3.075	2.888	3.021
Ability to lay a foundation	2.969	3.000	2.978
Woodworking and farm carpentry projects	2.606	2.703	2.634
Selecting and using wood fasteners	2.348	2.740	2.462
Identifying nails, bolts, and screws	2.469	2.666	2.526
Framing and bracing	2.484	2.518	2.494
Fence construction and repair	2.484	2.692	2.516
Figuring bill of materials	2.469	2.407	2.451
<b>B. <u>Concrete</u></b>			
Basic fundamentals	2.878	2.851	2.870
Mixing and placing concrete	2.818	2.629	2.763
<b>C. <u>Sketching and Drawing</u></b>			
Making simple sketches and reading blueprints	2.545	2.481	2.526
Designing projects	2.500	2.666	2.548

items of training with a "much" overall rating were rated "much," and one item of training with "some" overall rating was rated "some" by both groups. Two of the items with the overall rating of "much" and two of the items with the overall rating of "some" were rated differently by Groups 1 and 2. Of these, "Identifying nails, bolts and screws" and "Fence construction and repair" were rated "some" by group 1 (familiar) and "Selecting and using wood fasteners" and "Framing and bracing" were rated "much" by Group 2 (unfamiliar). According to Table VII, overall the respondents felt extension workers needed "much" training in the items of "Concrete."

Overall, the respondents felt extension workers needed "much" training in two items of "Sketching and drawing." Two of the items with the overall rating of "much" were rated differently by the two groups. Of these, "Making simple sketches and reading blueprints" was rated "some" by Group 2 (unfamiliar) and "Designing of projects" was rated "some" by Group 1 (familiar).

No significant difference existed between the responses of the two groups in any of the training areas, Farm structures and carpentry, Concrete, and Sketching and drawing, as shown in Table VII. This indicates that both groups viewed extension workers' training needs in much the same way.

Table VIII is a comparison of respondents' perception of the amount of training needed in "Farm electrification." According to Table VIII, overall the respondents felt extension workers needed "much" training in the five items of "Farm electrification."

There were no significant differences between responses of the two groups on the items of "Farm electrification" as shown in Table

VII. This indicated that both groups viewed training needs in the same way.

TABLE VIII  
COMPARISON OF RESPONDENTS' PERCEPTIONS OF AMOUNT OF  
TRAINING NEEDED IN FARM ELECTRIFICATION

	Group I	Group II	Overall
Fundamentals of electricity	2.939	2.851	2.913
Electrical safety	3.303	3.111	3.247
Planning wiring layout	2.772	2.740	2.763
Basic electrical wiring	2.969	2.851	2.935
Electric motors	3.-00	2.703	2.913

Table IX is a comparison of respondents' perceptions of amount of training needed in "Soil and water management." Overall, respondents felt that extension workers needed "very much" training in "Recognize soil conservation and water management problems," and needed "much" training in the remaining eight items of "Soil and water management." Six items of training with "much" overall rating were rated "much." One of the items with the overall rating of "very much" and two of the items with the overall rating of "much" were rated differently by the two groups. One of these, "Recognize soil conservation and water management problems," was rated "much" by Group 2

(unfamiliar) and "Irrigation water required" and "Methods of applying water to the soil" were rated "very much" by Group 1 (familiar).

The only significantly different response between the two groups in Table IX was "Methods of applying water to the soil" (0.04 percent).

TABLE IX  
COMPARISON OF RESPONDENTS' PERCEPTIONS OF AMOUNT OF  
TRAINING NEEDED IN SOIL AND WATER MANAGEMENT

Soil and Water Management	Group I	Group II	Overall
Recognize soil conservation and water management problems	3.590	3.246	3.505
Recognize soil and water conservation techniques	3.484	3.222	3.408
Lay out terrace lines, construct and maintain them	3.196	3.000	3.139
Land leveling	3.272	2.851	3.150
Irrigation water required	3.545	3.148	3.430
Irrigating crops	3.469	3.222	3.397
Methods of applying water to the soil	3.530	3.148	3.419
Ditch construction	3.242	3.111	3.204
Farm drainage	3.196	3.148	3.182

## CHAPTER V

### SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

#### Summary

The purpose of this study was to identify and analyze the training needs of extension workers as related to mechanized agriculture in Iran. Respondents in this study comprised 93 Iranian agriculture students currently enrolled in ten institutions of higher learning in the United States of America. Respondents checked on a five-point scale to provide relative perceptual weights to various selected steps which dealt with the amount of need for extension training in the area of mechanized agriculture.

A group T-test was utilized to determine what relationship existed between respondents familiar and those not familiar with farming practices, the mechanized agriculture and the agricultural extension service in Iran. Also, respondents were asked their perceptions as to the importance of establishing farm shops and extension stations at the Township (Dehistan) level and the amount of need for extension training in the area of mechanized agriculture.

This chapter summarizes the findings concerning the amount of training need of extension workers in the five different areas of mechanized agriculture:

1. Agricultural Shop Work
2. Agricultural Power and Machinery

3. Agricultural Buildings and Conveniences
4. Farm Electrification
5. Soil and Water Management

Respondents felt that establishing farm shops for repairing, maintaining, and servicing farm implements and establishing extension stations with a house for the extension worker and proper facilities for extension activities at the Township (Dehistan) level was "much" important.

Respondents felt extension workers in Iran needed "very much" training in two items in the area of Agricultural Power and Machinery, and one item in the area of Soil and Water Management. Extension workers also needed "much" training in 35 items in the area of Agricultural Shop Work, eight items in the area of Agricultural Power and Machinery, eleven items in the area of Agricultural Buildings and Conveniences, five items in the area of Farm Electrification, and eight items in the area of Soil and Water Management. Finally, extension workers needed "some" training in four items in the area of Agricultural Shop Work and three items in the area of Agricultural Buildings and Conveniences.

Since there were no significant differences between responses of the two groups as to any of the items in the five areas of Mechanized Agriculture, it was concluded that the two groups of respondents viewed the training needs of extension workers in essentially the same way. There were significant differences between the group responses on the importance of establishing farm shops and extension stations at the Township (Dehistan) level, "Adjusting Valves, Gauges, and Flames" in the area of Oxyacetylene and "Methods of Applying Water to the Soil" in the area of Soil and Water Management.



Data in Table X indicates the summary of the overall ratings of the respondents' perceptions of the five areas of Mechanized Agriculture.

TABLE X  
SUMMARY OF OVERALL RATINGS OF RESPONDENTS' PERCEPTIONS OF  
AMOUNT OF TRAINING NEEDED IN MECHANIZED AGRICULTURE

Area of Training	Overall	Category
1. Agricultural Shop Work	2.935	much
Orientation, organization, and safety	3.156	much
Repairing and sharpening tools	3.161	much
Metal work	2.759	much
Arc welding	2.863	much
Oxyacetylene	2.734	much
Plumbing	2.421	some
2. Agricultural Power and Machinery	3.329	much
Small engines	3.089	much
Tractor maintenance	3.437	much
Farm machinery and equipment	3.462	much
3. Agricultural Buildings and Conveniences	2.712	much
Farm structures and carpentry	2.713	much
Concrete	2.817	much
Sketching and drawing	2.712	much
4. Farm Electrification	2.924	much
5. Soil and Water Management	3.315	much

## Conclusions

Based upon an analysis of the findings of this investigation, the researcher felt certain conclusions could be drawn. Among them would be the following:

1) The main agricultural problem in Iran is low farming productivity because the majority of the rural population are traditional peasant farmers who use indigenous primitive farm implements. Also, the scarcity of water and means for making use of it are contributing factors.

2) Mechanized agriculture in Iran, as in other developing nations, has an important potential role as a means to raise the standard of living and change the way of life of the rural population, improve the farming system, and increase farm production.

3) Iranian extension workers possess very low levels of skill and expertise in all of the areas of mechanized agriculture considered in this study.

The areas and topics of mechanized agriculture, in order of need of emphasis for training and thus their priority for training efforts would be as follows:

A. Agricultural Power and Machinery

- a) farm machinery and equipment
- b) tractor maintenance
- c) small engines

B. Soil and Water Management

- a) recognition of soil conservation and water management problems

- b) irrigation water required
- c) methods of applying water
- d) irrigation crops
- e) ditch construction
- f) farm drainage
- g) land leveling
- h) terracing

C. Agricultural Shopwork

- a) repairing and sharpening tools
- b) orientation, organization, safety
- c) arc welding
- d) metal work
- e) oxyacetylene
- f) plumbing

D. Farm Electrification

- a) safety
- b) basic wiring
- c) motors
- d) fundamentals
- e) planning wiring layouts

E. Agricultural Buildings and Conveniences

- a) concrete
- b) farm structures and carpentry
- d) sketching and drawing

4) Extension workers, through an arrangement of township-level programs, can provide necessary training for farmers in mechanized agriculture. However, they themselves must first be trained and

provided with proper equipment and facilities for working with farmers. Priorities for extension worker training needs could best be established through a system of pre-testing to determine their current skill levels.

5) Overall, there was no difference in the manner in which mechanized agriculture needs were perceived by persons who were familiar and those who were unfamiliar with agriculture. Both groups considered these needs to be of a high level of importance.

### Recommendations

The writer makes the following recommendations:

✓ 1. Establish extension stations in each Township (Dehistan) with a house for the extension worker and provide proper facilities and equipment for extension activities.

✓ 2. Establish a farm shop as part of the extension station in order to repair, maintain, and service any farm implement and to provide facilities for other shop work.

3. Incorporate training in the five areas of mechanized agriculture as established in this study into Iran's extension training system.

4. Make findings of this study available to the Ministry of Agriculture to be discussed in workshops for agriculture extension personnel.

5. Make findings of this study available to extension training centers and agricultural schools.

6. Include instruction about the five areas of mechanized

agriculture in the curriculum of the extension workers' training program.

7. Provide for continuous training program for extension workers in the field of mechanized agriculture.

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APPENDIX

BACKGROUND INFORMATION OF RESPONDENTS  
AND QUESTIONNAIRE

1. Please check your present classification:
  - B.S.
  - M.S.
  - Ph.D.
  - Other (specify) \_\_\_\_\_
2. Major area of study: \_\_\_\_\_
3. You were born in a \_\_\_\_\_ District (Shahrestan)
  - Subdistrict (Baksh)
  - Township (Dehistan)
4. You were reared in a \_\_\_\_\_ District (Shahrestan)
  - Subdistrict (Baksh)
  - Township (Dehistan)
5. Have you ever worked on a farm? Yes \_\_\_\_\_ No \_\_\_\_\_
6. How familiar are you with the farming practices in Iran?
  - None
  - Little
  - Some
  - Much
  - Very much
7. How familiar are you with the work of the agricultural extension service in Iran?
  - None
  - Little
  - Some
  - Much
  - Very much
8. How familiar are you with mechanized agriculture (farm shop work, farm power and machinery, farm buildings and conveniences, soil and water management and rural electrification)?
  - None
  - Little
  - Some
  - Much
  - Very much
9. Indicate the importance of establishing farm shops and extension stations at the Township (Dehistan) level:
  - None
  - Little
  - Some
  - Much
  - Very much

We assume we have shops at the Township (Dehistan) level. Please review each training need and react to the amount of need for extension training in the area of mechanized agriculture:

<u>AREAS OF TRAINING</u>	<u>NEED FOR TRAINING</u>				
	<u>Great</u>	<u>Much</u>	<u>Some</u>	<u>Little</u>	<u>None</u>
<u>Agricultural Shop Work</u>					
<u>Orientation, Organization, and Safety</u>					
Aims and purpose of training	4	3	2	1	0
Arrangement and placement of tools and equipment in the shop	4	3	2	1	0
Introduce a system to keep a clean orderly shop with tools in good working condition	4	3	2	1	0
Fire extinguisher and first aid instruction	4	3	2	1	0
Safe working habits (understanding color code and other safety practices)	4	3	2	1	0
Use of standard shop safety inspection list	4	3	2	1	0
Others (please list)	4	3	2	1	0
_____	4	3	2	1	0
_____	4	3	2	1	0
<u>Repairing and Sharpening Tools</u>					
Tool-fitting equipment and supplies	4	3	2	1	0
Sharpening and repairing various tools	4	3	2	1	0
Cleaning and storing tools	4	3	2	1	0
Tool identification	4	3	2	1	0
Others (please list)	4	3	2	1	0
_____	4	3	2	1	0
_____	4	3	2	1	0
<u>Metal Work</u>					
Mark, cut, and bend metal	4	3	2	1	0
Using the drill press	4	3	2	1	0
Proper use of grinders	4	3	2	1	0
Threading bolts and nuts	4	3	2	1	0
Cutting flat plate with cold chisel	4	3	2	1	0
Threading and cutting pipe	4	3	2	1	0
Others (please list)	4	3	2	1	0
_____	4	3	2	1	0
_____	4	3	2	1	0

<u>AREAS OF TRAINING</u>	<u>NEED FOR TRAINING</u>				
	<u>Great</u>	<u>Much</u>	<u>Some</u>	<u>Little</u>	<u>None</u>
<u>Arc Welding</u>					
Introduction and orientation	4	3	2	1	0
Selecting and caring for arc welding equipment	4	3	2	1	0
Recognizing and using safety precautions	4	3	2	1	0
Striking an arc and running a bead	4	3	2	1	0
Making a flat butt weld	4	3	2	1	0
Position welding	4	3	2	1	0
Running a continuous bead	4	3	2	1	0
Preparation of metal for welding	4	3	2	1	0
Selection of electrodes	4	3	2	1	0
Welding cast iron	4	3	2	1	0
Skill training	4	3	2	1	0
Construction of projects	4	3	2	1	0
Others (please list)					
	4	3	2	1	0
	4	3	2	1	0
<u>Oxyacetylene</u>					
Becoming acquainted with safe operation of oxyacetylene cutting equipment	4	3	2	1	0
Adjusting valves, gauges, and flames	4	3	2	1	0
Proper use of the cutting torch and cutting flat plate	4	3	2	1	0
Selecting proper tip size, gas pressure rod size, flux, and materials	4	3	2	1	0
Making various welds with mild steel	4	3	2	1	0
Bronze welding	4	3	2	1	0
Use of the powder torch (hard surface)	4	3	2	1	0
Others (please list)					
	4	3	2	1	0
	4	3	2	1	0
<u>Plumbing</u>					
Identification of plumbing fittings	4	3	2	1	0
Soldering	4	3	2	1	0
Cutting and flanging of copper	4	3	2	1	0
Sweating of copper fittings	4	3	2	1	0
Others (please list)					
	4	3	2	1	0
	4	3	2	1	0

<u>AREAS OF TRAINING</u>	<u>NEED FOR TRAINING</u>				
	<u>Great</u>	<u>Much</u>	<u>Some</u>	<u>Little</u>	<u>None</u>
<u>Agricultural Building and Conveniences</u>					
<u>Concrete</u>					
Basic fundamentals	4	3	2	1	0
Mixing and placing concrete	4	3	2	1	0
<u>Farm Structures and Carpentry</u>					
Selecting and using construction materials	4	3	2	1	0
Recognize desirable construction practices	4	3	2	1	0
Recognize ordinary construction and repair jobs	4	3	2	1	0
Ability to lay out a foundation	4	3	2	1	0
Woodworking and farm carpentry projects	4	3	2	1	0
Selecting and using wood fasteners	4	3	2	1	0
Identifying nails, bolts, and screws	4	3	2	1	0
Framing and bracing	4	3	2	1	0
Fence construction and repair	4	3	2	1	0
Figuring bill of materials	4	3	2	1	0
Others (please list)	4	3	2	1	0
_____	4	3	2	1	0
_____	4	3	2	1	0
<u>Sketching and Drawing</u>					
Making simple sketches and reading blueprints	4	3	2	1	0
Designing of projects	4	3	2	1	0
Others (please list)	4	3	2	1	0
_____	4	3	2	1	0
_____	4	3	2	1	0
<u>Farm Electrification</u>					
Fundamentals of electricity	4	3	2	1	0
Electrical safety	4	3	2	1	0
Planning the wiring layout	4	3	2	1	0
Basic electrical wiring	4	3	2	1	0
Electric motors	4	3	2	1	0
Others (please list)	4	3	2	1	0
_____	4	3	2	1	0
_____	4	3	2	1	0

<u>AREAS OF TRAINING</u>	<u>NEED FOR TRAINING</u>				
	<u>Great</u>	<u>Much</u>	<u>Some</u>	<u>Little</u>	<u>None</u>
<u>Soil and Water Management</u>					
Recognize soil conservation and water management problems	4	3	2	1	0
Recognize soil and water conservation techniques	4	3	2	1	0
Lay out terrace lines, construct and maintain them	4	3	2	1	0
Land leveling	4	3	2	1	0
Irrigation water required	4	3	2	1	0
Irrigating crops	4	3	2	1	0
Methods of applying water to the soil	4	3	2	1	0
Ditch construction	4	3	2	1	0
Farm drainage	4	3	2	1	0

VITA<sup>2</sup>

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