ANALYSES OF FUTURE MANPOWER NEEDS IN AGRICULTURE AS PERCEIVED BY SELECTED GROUPS OF AGRICULTURALISTS IN THE EASTERN PROVINCE OF SAUDI ARABIA

By

HAMEED MOHAMMAD ABOJOBALL

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University of Riyadh

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Thesis Approved:

Robert R. Price
Thesis Adviser

Robert Terry

Robert T. Kimbrough

Norman N. Durham
Dean of the Graduate College

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TABLE OF CONTENTS

LIST OF TABLES

FIGURE

CHAPTER I

INTRODUCTION

Agriculture comes next to oil as a source of wealth in the economy of the Eastern Province of the Kingdom of Saudi Arabia. The discovery of oil and its prosperous development has paved the way for a progressive and rapidly developing economy in the Eastern Province.

The main oases in the Eastern Province are Al-Hasa and Qatif. Al-Hasa is located some 40 kms. from the Arabian Gulf, and about 100 kms. south of Dhahran. It is also approximately 320 kms. northeast of the capital city of Riyadh. The population of Al-Hasa totals nearly 200,000, about 110,000 of whom live in the two sizable cities, Hafuf (75,000) and Mubaraz (35,000). The remainder of population is distributed among 50 villages. Al-Hasa is an area of traditional agriculture where a large percentage of the population depend on agriculture for a living. The rest are merchants, craftsmen, and civil servants. Qatif is located along the coast of the Arabian Gulf. Its population totals about 100,000, some 20,000 of them living in the town, and the rest distributed among 30 villages. The people living in this area are largely small farm operators, fishermen, and civil servants (9).

The Eastern Province is characterized by a hot climate for the greater part of the year. Since it is close to the sea, the humidity at times reaches over 90 percent. The average annual temperature is 109° F. during summer and 51° F. during winter. The average annual rainfall

ranges from two to three inches.

Growth of the agricultural sector is constrained by natural phenomena, state of technology, human know-how, investment capital, and the availability of additional land and water.

At the present time, agricultural production in the Eastern Province is limited largely as a result of manpower shortages in agriculture. It is apparent that a significant portion of agricultural output must depend upon the product of traditional knowledge and skills presently possessed by farmers. Unfortunately, many of the farmers are functionally illiterate.

Skilled manpower is needed in all phases of transformation from traditional to more advanced agriculture throughout the Eastern Province, and (1) expanding of the cultivatable land area, (2) increasing the supply of irrigation water, (3) expanding the work of agricultural experiment stations, (4) teaching new techniques to farmers, and (5) increasing effectiveness of workers are each necessary ingredients of the agricultural development process. To achieve a higher level of agricultural production, it is obvious that required is the securing of more skilled manpower. The major obstacle is how to best help the Ministry of Education and the Ministry of Agriculture to instill in Saudi youth a willingness to work in agriculture, and to bring their skills to it. Future manpower supply in agriculture is as necessary for an increase in the quality of production and marketing decisions as it is for discovery of new techniques in irrigation, or livestock feeding, or other technical areas (14).

Statement of the Problem

Rationale for the choice of this study recognizes the very urgent

need for developing and maintaining an adequate and competent supply of agricultural manpower, both professional and basic, for the Eastern Province of Saudi Arabia. It is assumed that even though the study is centered in the Eastern Province, findings should have strong implications for other provinces. A salient feature of the nation's need is to discover how best to promote an accelerated pace of application of technology to agricultural production in the country, and thus the study attempts to deal with an obvious need for future expansion in the number of professional agriculturalists as well as a possible need to eventually replace many of present foreign agriculturalist professionals with native scientists and educators.

This study is concerned with future manpower needs in agriculture in the Eastern Province of Saudi Arabia. These needs are largely for professional agriculturalists but do not exclude farm managers and farm laborers.

Purpose of the Study

The purpose of the study is to determine the present status of, and to suggest procedures for an improvement in meeting manpower needs in agriculture, both professional and basic.

Objectives of the Study

1. To identify the present status of manpower in agriculture in Eastern Province of Saudi Arabia.

2. To identify the educational and training programs now operating for the preparation of agriculturalists to supply Saudi's manpower needs in farming and in professional agriculture.

3. To identify concepts now held and practices now engaged in both in the United States and in Saudi Arabia regarding preparation and maintenance of training programs to meet manpower needs in agriculture.

4. To project and attempt to apply selected aspects of agricultural manpower training in the United States to present and future situations in Saudi Arabia.

5. To recommend procedures which may help insure an adequate and competent supply of agricultural manpower, both professional and basic, for the Eastern Province in Saudi Arabia.

Limitations of the Study

Limitations of this study are recognized as the following:

1) This study was geographically limited to the Eastern Province of Saudi Arabia.

2) In terms of formal procurement of data, this study was limited to the judgments of farmers, and to extension workers, experiment station workers, and administrators employed in the Ministry of Agriculture and Water.

3) This study was limited to a consideration of selected aspects regarding future manpower needs in agriculture, and was not designed to study agricultural production techniques or the marketing and distribution of agricultural products except as these might be directly related to the procurement and training of workers in agriculture.

Progressive Steps Involved in the Study

1. Review the nature, extent and distribution of agricultural production in the Eastern Province of Saudi Arabia.

2. Review methods and practices used in agricultural production in the Eastern Province of Saudi Arabia.

3. Review the past and present functions of agricultural workers in the Eastern Province of Saudi Arabia.

4. Review past and present programs for recruiting and training professional and basic agricultural workers both in the United States and in developing countries, including Saudi Arabia.

5. Develop an instrument for securing perceptions regarding present and future manpower needs in agriculture from present agricultural workers, both professional and basic in the Eastern Province of Saudi Arabia.

6. Secure a review and evaluation of the instrument by officials in the Ministry of Agriculture and Water in Riyadh and make appropriate modifications.

7. Administer the revised instrument to selected groups of agricultural workers in the Al-Hasa and Qatif areas of the Eastern Province of Saudi Arabia. Groups include: (a) farmers, (b) agricultural extension workers, (c) experiment station workers, and (d) administrators in the Ministry of Agriculture and Water.

8. Conduct personal non-structured interviews with (1) administrators and instructors at the Riyadh Training Center and Agriculture and Water Research Center for professional agricultural workers, (2) the Dean of the Agriculture College and staff members at Riyadh University, (3) the Dean of the Agriculture College and two instructors at King Fasial University at Al-Hasa, and the coordinator of the Agricultural Assistance Division, at American Arabian Oil Company at Daharan City.

9. Tabulate the results of the survey and interviews, and make an analysis of the findings.

10. Summarize and collate analyses of the findings and project recommendations for the implementation of procedures which may help insure an adequate and competent supply of agricultural manpower, both professional and basic, for the Eastern Province of Saudi Arabia.

Definition of Terms

The following terms will be used throughout this study.

Eastern Province--refers to a designated province containing the oasis of Al-Hasa with its capital Al-Hafuf, and Al-Qatif with its capital Qatif, and the cities of Dammam, Kobar, Daharan, Saihat and Al-Mubaraz.

Al-Hasa--refers to the area of Al-Hasa which contains an oasis of some fifty villages besides the cities of Hofuf and Al-Mubaraz.

Al-Qatif--refers to the area of Al-Qatif which contains an oasis of some thirty villages besides the city of Al-Qatif which is located along the coast of the Arabian Gulf at the Eastern Province.

H.A.W.R.C.--refers to Al-Hafuf Agricultural and Water Research Center, which is located in the Al-Hasa area.

Sand Dune Fixation--refers to the project that was established for resisting and fixing the sand and stopping its progress, this located at Al-Hasa area.

Aramco--refers to Arabian American Oil Company, which is located at Daharan City in the Eastern Province.

FAO--refers to the Food and Agriculture Organization of the United Nations.

King Faisal University--King Faisal University, Dammam, Saudi Arabia.

Manpower--for purposes of this study, manpower refers to the populace

engaged in farming or in professional agriculture.

Manpower Requirements--refers to present and future needs in terms of satisfying the demands of necessary personnel mandated for achievement of the higher level of agricultural production desired.

Elementary School--is used to designate the primary educational training provided children and includes the first six years of study.

Secondary School--refers to the educational program provided for children who have completed elementary school and three years in middle school.

Secondary Agricultural Schools--refers to an educational program of studies which places emphasis in their curriculum upon basic agriculture as contrasted to the comprehensive or regular secondary schools.

Agricultural Institutes--are educational programs organized for the purpose of training graduates of the secondary school for work in agriculture, specifically for employment with the Ministry of Agriculture and Water and the Ministry of Education.

Internship--refers to a program in which the prospective agricultural worker spends a period of on-the-job training under the close supervision and direction of a professional agricultural worker.

General Scientific Basis--refers to the study and/or acquiring of concepts about agriculture on the more general or traditional basis, this as contrasted to the more specific and functional basis.

Subject Matter--as used in this study, refers to that body of knowledge directly related to a division or subdivision of agriculture.

Research Techniques--as used in this study, refers to those procedures essential to good and reliable research. A knowledge of and competence in phases of design and statistical treatment is considered

essential.

Practical Application--refers to the ability to practice and apply techniques to develop competence in both the skills and knowledge of the occupation.

Communication and Teaching--refers to the ability to interpret and promote learning on the part of the student.

Organizing and Setting Objectives--refers to a practice in which the purpose and potential for achievement are carefully weighed and definite plans made in terms of time, extent, place and responsibility.

CHAPTER II

BACKGROUND INFORMATION

The Agricultural Situation in the Eastern Province in Saudi Arabia

Soils

The soils of the Al-Hasa and Qatif oases are for the most part sandy, with small percentages of loam and clay. Salinity is a problem in both Al-Hasa and Qatif areas. High salt content is the result of high concentration of soluble salts in the irrigation water, in addition to overwatering, high evaporation, the presence of nearly impervious layers at shallow depth, and poor drainage.

Water Sources

Water in Al-Hasa comes from local precipitation and rains which fall on the high regions of the Central Province. There are about 60 major water springs in Al-Hasa. Thirty-two of these are now being used to feed the irrigation project which was completed in 1971. Water discharge varies between summer and winter. It reaches its peak in winter when it reaches about 15 cubic meters per second (12).

The Al-Hasa Irrigation and Drainage Project

This project is the most significant agricultural development in the

Eastern Province. The irrigation part of the project consists of about 1500 kilometers of open canals, which are made of prefabricated concrete sections. Some of the sections are about 20 tons in weight.

These systems include 180 kilometers of main canals, 250 kilometers of subcanals, and about 1000 kilometers of lateral canals. The objective of the project is to establish a system of irrigation which pools water from 32 springs into a single system supplying the Al-Hasa agricultural area with irrigation water to bring under irrigation an additional 20,000 acres of land. Besides its agricultural benefits, the project has contributed substantially towards eliminating the swamps which used to be a breeding area for mosquitoes. Al-Hasa irrigation and drainage authority is in the process of preparing farmers to make proper use of the system. Extension agents from the Ministry of Agriculture and Water and research workers from Technical University of Brounschwerg, Germany, working under special contract with the Ministry of Agriculture and Water, are in the area trying to achieve an efficient use of the project (12).

Besides the irrigation project of Al-Hasa, irrigation is also made possible by use of nearly one thousand 300- to 600-foot-deep water wells, most of which need pumping, from seventy 18- to 100-foot-deep natural springs, and from about 250 hand-dug wells 17 to 35 feet in depth (12).

The drainage system was implemented along with the Al-Hasa irrigation system to reclaim about 30,000 acres of cultivable land. The project, which is considered as the most significant agricultural development in the area, was completed in 1971. The drainage part of the project consists now of 1,260 kilometers of drainage ditches averaging a depth of 1.8 meters for the main ditches and 1 meter for the lateral ones. It includes 120 kilometers of main drains, 150 kilometers of subdrains and

about 1000 kilometers of lateral drains. With the exception of concrete tunnels built where the drains cross sand dune areas, the system is all built in earthwork. It consists of three main sections which drain in three evaporation lakes (12).

Qatif Irrigation

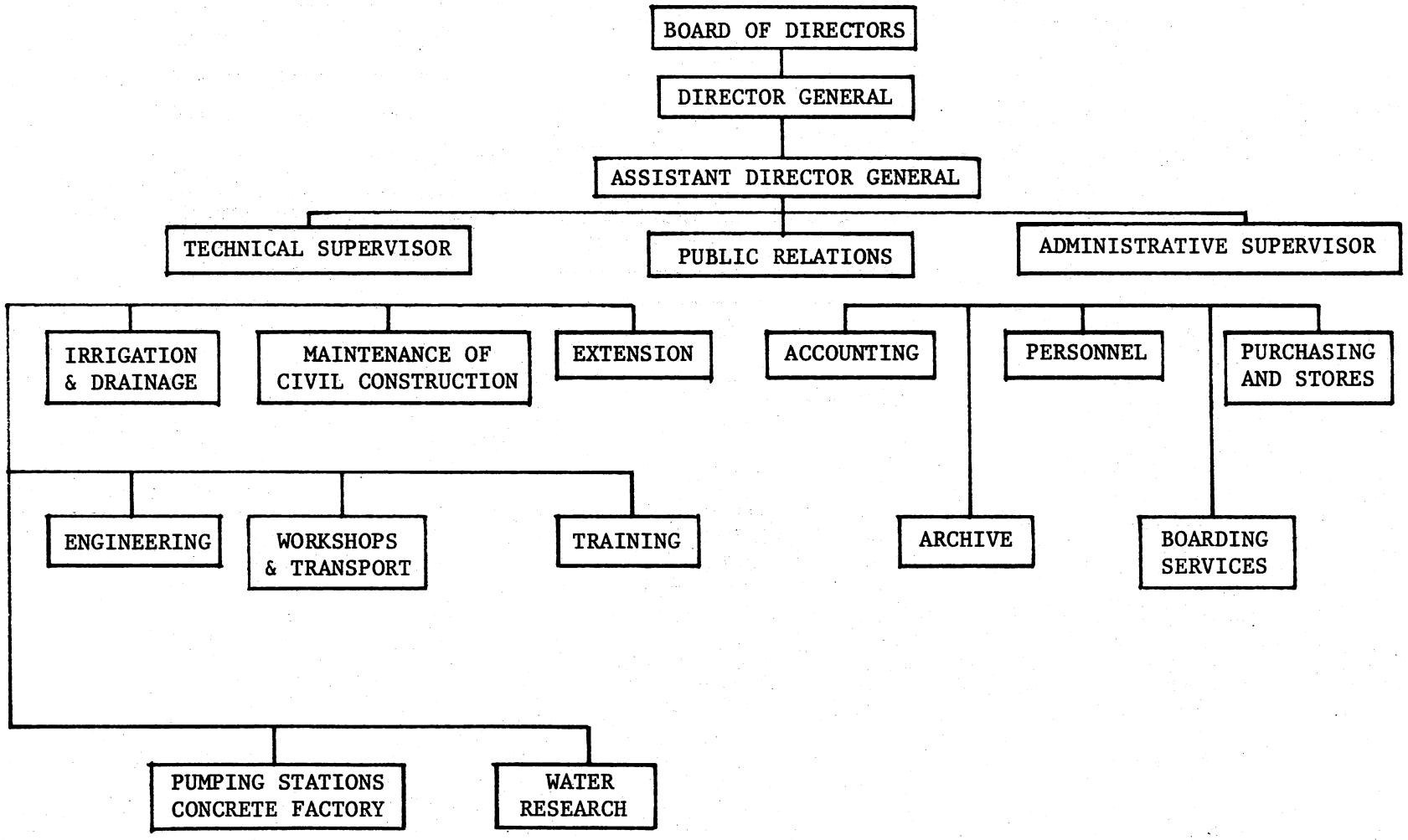
In Qatif, irrigation water is secured from three aquifers, namely, the Alat aquifer, which is 230 to 300 feet below the surface level, the Al Khobar aquifer, which is 300 to 430 feet below surface level, and the Ummer Radhuma aquifer, which is 660 to 810 feet below the ground surface.

In 1964, the Saudi government completed a drainage system for the 10,000 acres of the cultivable land of Qatif to control the high water table which resulted from the increase in the number of artesian wells and the continuous uncontrolled flow of water from these wells over 25 years. The system consists now of about 65 kilometers of ditches averaging two meters deep and one and a half meters wide at the bottom (9).

Organization of Al-Hasa Irrigation and Drainage Authority

An independent Board of Directors, headed by the Minister of Agriculture and Water, is responsible for setting general policy and plan of authority.

The execution of the daily works is managed by a director general, assisted by the personnel of two technical and administrative divisions. Independent financial and managerial systems were set out to manage and operate the daily works of the project. The diagram in Figure I shows the organization of Al-Hasa Irrigation and Drainage Authority and the



Source: Ministry of Agriculture and Water.

Figure 1. Organization of Al-Hasa Irrigation and Drainage Authority

various departments within it.

Production

Agricultural Production

Date Cultivation. The date palm which originated in the Gulf Area is still the leading crop grown in the oases of Al-Hasa and Qatif. Presently, date palms cover about 75 percent of the cultivated area in Qatif and over 68 percent of that of Al-Hasa. The average yield in the Al-Hasa oasis has been estimated to be 40 to 60 kilograms per tree while the average yield per tree in Qatif is estimated to be 30 to 35 kilograms (9).

Vegetable. The most significan development in the field of crop production in the oases of Al-Hasa and Qatif has been the progress in the field of vegetable crops. The most important of these crops are: onions, tomatoes, watermelon, squash, beans, okra, eggplants, lettuce, etc.

Fruit Trees. The fruit trees which are most common in the oases of the Al-Hasa and Qatif areas are: lime, orange, rough lemon, pomegranate, banana, grape, fig, papaya, and Indian almond.

Rice Production. The Hasawi rice is the only variety which, so far, has been popular with the rice growers in Al-Hasa. Experimentation over the last ten years has shown that improved cultural practices can increase the yield of the local Hasawi variety from the present 0.75 tons per acre and reduce the growing period by three to four weeks (9).

Forage Crops. The most important forage crop is the Hasawi alfalfa. It is grown by most of the farmers in the area, is considered to be one of the most high yielding varieties, and has a high nutritional content.

TABLE I

CROP PRODUCTION IN THE EASTERN PROVINCE IN 1972 - 73, PER OASIS;
TOTAL PRODUCTION, OFF-FARM PRICES AND GROSS
PRODUCTION VALUES (ROUNDED FIGURES)

	Total Production (Metric Tons)				Off-Farm Price			Gross Production Value			
	Coastal Belt Oases	Al-Hasa Oasis	Other Oases	Total ER	Coastal Belt Oases	Al-Hasa Oasis	Other Oases	Coastal Belt Oases	Al-Hasa Oasis	Other Oases	Total ER
Dates	13,200	21,560	1,600	36,360	140	470	240	3,168	10,133	384	13,685
Other fruits	360	800	40	1,200	885	910	900	319	727	36	1,082
Vegetables	17,000	43,200	800	61,000	650	600	550	11,050	25,920	440	37,410
Alfalfa	26,000	50,000	2,500	78,500	45	45	45	1,170	2,250	113	3,533
Other fodders	-	-	-	-	-	-	-	150	280	15	445
Rice	-	500	-	500	-	1,000	-	-	500	-	500
TOTAL	-	-	-					15,857	39,810	988	56,655

Source: Ministry of Planning $ = S.R. 3.5 ER = Eastern Region

Animal Production

Modern feedlots have not found their way to the farms in the oases of Al-Hasa and Qatif. Farm animals which are raised in the oases consist of sheep, cattle, goats, donkeys, and camels. They are usually raised in small units. Table II shows the population of farm animals in the Eastern Province.

TABLE II

POPULATION OF FARM ANIMALS IN THE EASTERN PROVINCE

Animal	Al-Hasa	Qatif
Sheep	7,000 - 9,000	4,000 - 5,000
Cattle	10,000 - 12,000	4,000 - 5,000
Goats	10,000 - 12,000	5,000 - 6,000
Donkeys	2,500 - 3,000	1,500 - 2,000
Camels	300 - 500	

Source: Agriculture Assistance Division, Arabian American Oil Company.

Agricultural Extension Services in the Eastern Province

The Agricultural Extension Service is a part of the Al-Hasa Agricultural Directorate. This part has the specific role and responsibility of

serving the farmers and ranchers in development and application of technical advice, in guidance and in demonstration functions. The new emphasis will comprehend new and improved crop production techniques and use of fertilizers, insecticides, and other materials; modern irrigation practices; scientific crop and animal disease prevention and control methods; livestock production techniques; use of new credit facilities for purchase of essential production machinery and materials; and making available other information useful to farmers.

To achieve strengthening of agricultural extension services in the Eastern Province, it is important to maintain a close working relationship with the Hofuf Agricultural and Water Research Center as well as the Al-Hasa Irrigation and Drainage Project. This close relationship is needed in order to give proper advice to farmers, this based on the results of the work carried out as well as to help them with problems that may arise in the field. The Research Center should likewise serve as a functioning unit of ready references.

Hofuf Agricultural and Water Research Center

The Agricultural and Water Research Center is an integral part of the total Ministry of Agriculture and Water research operation. Its mission is to conduct applied and adaptive research relating directly to recognized needs in agriculture and water as identified in the 5-year plan, thereby aiding in the application of modern technology to man's ancient problems of winning a livelihood from the land.

The Hofuf Research Center cooperates closely with other Ministry of Agriculture and Water departments such as training, water resources, etc. The work of the HAWRC is also coordinated with that of the Regional

Experiment Stations, Extension Service, and the Training Center. Collaborative efforts are conducted with the College of Agriculture of the King Faisal University and other educational institutions in the field of animal production. The Ministry of Agriculture and Water has a joint agricultural and development project with the University College of North Wales, Bangor, and with the University of Brounchwerg, Germany, for research work in soil and water use.

Research Sections of HAWRC

Crop Section

Crop production research includes: effects of soil, water, and environmental factors on crop productivity; evaluation of crop varieties; introduction of new species; improvement of important types of species through breeding, selection, and improved management; and studies of seed-related factors effecting crop production. Crop protection activities include research on the prevention and control of plant diseases, insect pests, nematodes, and noxious weeds.

Soil and Water Research

This section is responsible for research and diagnostic services on soil and water as they relate to both agricultural production and non-agricultural use. Research includes studies of soil and water chemistry and physical properties of soils as related to maintenance of soil productivity and salinity control.

Animal Production Research

Research work in animal production covers many fields including the raising, feeding, and care of animals. It also includes fodder production

and the effect of fodder components on the growth, production, and breeding of livestock. Such studies are being made on cattle and sheep.

The Hofuf Research Center is also conducting experiments in acclimating imported cattle and in cross-breeding with local cattle for increased milk production. Another experiment is comparing the productive efficiency of Najdi with Awassi sheep.

Qatif Experimental Farm

The Qatif Experimental Farm was established by the Ministry of Agriculture with assistance of the special fund and the food and agriculture organization of the United Nations. Preparation started in 1964, and demonstration and training started in 1967.

The purpose of the experimental farm is to find ways and means to improve the agricultural production of the area, to demonstrate these possibilities to the local farmers, and to train personnel of the Extension Service and the Agricultural Units of the Ministry of Agriculture. The information obtained is freely available to the farmers.

The following subjects are included in the research programs:

1) Reclamation of saline land;
2) Drainage and irrigation requirements when using saline irrigation water;
3) Date production, including varieties, sowing dates, fertilizers, manures, windbreaks, combination with dates, etc.;
4) Citrus cultivation, (non-tree fruit) including grapes, pomegranates, etc.
5) Fodder crops, including fertilizers, manure, sowing dates, etc.;
6) Poultry, including performance under controlled climatic conditions and required caloric level of feed;
7) Sheep, controlled breeding programs, milk production and effect

of local fodder;

8) Mechanization, evaluation of farm machinery suitable for local conditions (12).

Sand Dune Fixation Project

The sands have in the past buried many of the large cities in Al-Hasa. The geologists estimate the rate at which the sands attack the Al-Hasa oases reaches 230,000 square yards annually and about 20 acres of its fertile lands are destroyed each year. The Ministry of Agriculture and Water made detailed studies about the situation of the sand in the area and about the most successful methods of sand fixing and resisting.

Objectives of the Project

1) Resisting and fixing the sand and stopping its progress;
2) Protecting agricultural lands in Al-Hasa from the sand hazard;
3) Drying swamps formed of sand-covered springs and wells, consequently preventing the spread of diseases which might exist in swamp areas (12).

Agricultural Education in the Eastern Province of Saudi Arabia

In 1960, intermediate schools of agriculture with four year curriculums were established by the Ministry of Education in cooperation with the Ministry of Agriculture. In 1965, the status of intermediate level agricultural schools was reconsidered, and it was decided that the schools were to be replaced by secondary level agricultural schools. Curriculums

for these schools were planned to meet the agricultural needs of the local areas in which the schools are located.

In 1967, the Ministry of Education established the secondary vocational school at Al-Hofuf. This school is based on a broad range of technical and vocational sciences, education, and training, and will make it easier for students in the future to adapt themselves and to respond to the rapid development of technological sciences. The following specializations are available at Al-Hofuf Secondary Vocational School (13):

1) Mechanics Department
    a) Metal Mechanics
    b) Machine Tools Mechanics
2) Electricity Department
    a) Electric Installations
    b) Electro Mechanics
3) Automotive Department
    a) Automotive Mechanics
    b) Automotive Electricity

The development of higher education in agriculture started with the establishment of the College of Agriculture in Al-Hofuf in 1975. This college is under the University of King Faisal IBN Abdual AZIZ. This college has ten departments as follows (8):

1) Animal Production Department
2) Agricultural Engineering Department
3) Plant Protection Department
4) Food and Dairy Preservation Department
5) Soil Science and Land Reclamation Department
6) Home Economics Department

7) Agricultural Extension Department

8) Poultry and Animal Production Department

9) Horticulture Department

10) Crop and Forage Department

The facilities at the College of Agriculture are enough to provide for efficient instruction. A building and laboratories are provided for each department of the college. For experimental and instructional purposes at the present time, they grow such crops as wheat, fruits, vegetables, etc., and they do some research in cooperation with the Agriculture and Water Research Center (Ministry of Agriculture) in Al-Hofuf.

Agricultural education at the higher level is aimed at training personnel for agricultural research, extension work, and production. Those people trained at the higher level are also expected to be responsible for the management and design of agricultural programs in the Eastern Province of Saudi Arabia.

Animal Production Training Center in Al-Hasa

The government of Saudi Arabia, realizing the importance of trained animal production and health assistants in the development and improvement of animal production and health, requested F.A.O. to work out a project for training Saudi nationals to become animal health and production technical assistants.

Objectives of the Project

Long Range Objectives:

1) The project will assist in the development of animal industry in Saudi Arabia by establishing an institution for the training of

animal production and health assistants.

Short Term Objectives:

1) The physical establishment of a training center for animal production and health assistants.
2) The compilation of a syllabus for a combined course in animal production and health at a technical level.
3) The training of a total of 150 animal production and health assistants over a five-year period in the subjects of applied animal health and production (12).

Returns and Benefits

The project, being entirely training-oriented, has little "investment potential." Its benefits will be reflected in:

1) Providing government and private organizations engaged in modern animal projects which are now being developed with technical personnel required for manning and operating these projects.
2) Providing the government with animal health and animal production technical personnel who will help in educating livestock owners in better methods of animal husbandry and disease control (12).

CHAPTER III

REVIEW OF LITERATURE

The Meaning and Concepts of Manpower

The term total manpower is used to refer to a large portion of the country's total population. Although manpower is often used in a sense seemingly identical with working force, and more specifically with analyses of human resources available for economic purposes, it is also intended to include within its scope and concept all persons with an occupation.

Manpower, for instance, in a developing nation has to focus on the more dynamic agricultural sector where people possessing varying amounts of education and skills live and are employed, for in developing nations a larger proportion of the total population lives on the land.

According to Chirikos (4), manpower planning concepts should include the following:

1. Determine the required future productivity of the participating nations;
2. Determine the manpower needed to generate that level of productivity;
3. Determine the input into education needed to prepare the required manpower;
4. Determine the overall costs of this input to yield an estimate of financial resources required for educational structure during the period covered by the plan (p. 7).

Manpower Requirements and Training Needs for Persons Entering Agricultural Occupations

Manpower requirements and needs for agricultural occupations should include all aspects of manpower development programs.

Yesufu (23) states that this consideration should be based on special reference to the following:

1. The periodic appraisal of requirements for manpower in all occupations and in all productive activities through the Federation (in particular, assessments should be made of manpower requirements of all development projects);

2. The periodic analysis of costs of formal education and the determination of the order of priority in expenditure for education to promote the economy;

3. The development of measures for in-service training of employed manpower both in the government service, in private industry, and in educational institutions (p. 91-92).

There are many ways by which future manpower requirements in occupations can be estimated. Yesufu (23) further contends that manpower forecasting resolves into a series of statistical steps which he summarizes as follows:

> Step 1. Derive a rough first approximation of the future employment structure by economic activity, consistent with the anticipated increase in the labor force.
>
> Step 2. Make a detailed analysis of each important economic activity, taking into account anticipated changes in demand for its products or services and in hours worked and productivity; thus arriving at an estimate of future employment.
>
> Step 3. Derive an occupational breakdown of employment in each economic activity in the future period by applying the best available occupational composition patterns, with particular attention to all occupations requiring specialized training or education.
>
> Step 4. Estimate training requirements for each important occupation by analysis of the probable supply of qualified workers under existing training arrangements and facilities in comparison with requirements as indicated by occupational estimates for the future period (p. 107).

Many texts and references have somewhat specific suggestions as to the minimum amount of training or education needed for persons entering professional manpower agricultural positions. The minimum professional education for an agricultural engineer is a bachelor's degree which can be obtained from a four-year college or university. The Agricultural Engineer must have an interest in farm life and agricultural problems, and a preference for the experiments and practical aspects of engineering.

The agricultural extension worker requires personal and practical experience in the field of extension, in addition to agricultural college or university training.

The minimum educational background for the agronomist is a bachelor of science degree with a major in soils or agronomy. Trained agronomists find positions in business as consultants and field agents for processors, as well as contact men between a variety of business enterprises and the producer.

The educational background of a botanist, animal scientist, or soil scientist must include at least a bachelor's degree, in addition to about one year of training in the area of study.

The difficulties of making accurate estimates of long-term manpower requirements are many. However, in estimating manpower needs, one must consider not only the requirements for positions calling for a specific concentration of effort but also the need for provision and maintenance of government services less specifically oriented, but oriented to agriculture as a whole, together with the needs of private enterprise and commercial interests serving farmers (1).

Training of and Preparation of Agricultural Personnel

Many countries in the world are now faced with problem of shortages of trained staff in agricultural manpower. In all cases, in positions calling for the performance of certain technical operations in the field, at least some professional training is required.

According to Maunder (10), there are four broad categories of extension training generally recognized. These are: (1) pre-service, (2) induction, (3) in-service, and (4) graduate, sometimes called promotional, training.

Pre-Service Training

Maunder (10) states that:

> Pre-service training refers to the professional training received prior to appointment to the extension service. This includes a diploma in agriculture or a bachelor of science degree in agriculture or home economics in the more economically advanced countries. Graduates at this level are not available in sufficient numbers in most newly developing countries and extension services must employ graduates of secondary vocational schools. The latter cannot have the breadth or depth of training obtainable in college or university. But in any case, it is essential that the local extension worker be better trained than the farm or village people with whom he works (p. 281).

Induction Training

New extension workers generally are required to undergo induction training after being employed and before they get assignment to a particular area as an advisor or as an assistant agent. In a county where the extension service is firmly established, all extension personnel need special training in order that they might be well prepared in their area of assignment. In this training the new worker acquires the necessary

knowledge and skill which he will need to become an effective extension worker (10).

Maunder (10) further points out that induction training is frequently divided into three parts:

1. Classroom instruction regarding the organization structure of the extension service, operation procedures, and reports;

2. Observation of work in progress at government research stations and farms, the activities carried on by successful local farm and home advisors, demonstrations and field days;

3. Supervised field training in which each trainee is assigned for apprentice work with a successful advisor to work for six months to a year to learn the various extension activities and teaching methods by doing them under guidance and supervision (p. 278).

In-Service Training

A more specific definition provided by Rogers (19) is as follows:

> . . . process of determining, on a continuing basis, the training needs and problems of all extension personnel and providing the necessary instruction and learning experiences to fulfill those needs. In a word, it is on-the-job training that continues throughout the extension worker's career (p. 60).

There are fundamental principles which have been recommended for planning in-service training according to Williams (22).

> The training is passing along 'know-how' through carefully selected methods according to a well-conceived plan, by competent and well-prepared people, in a suitable learning climate to shorten learning time or experience. Training is telling, plus showing, plus supervised practice, until the desired change is achieved in the learner's skill, attitude, or behavior (p. 350).

In order to prepare a good agricultural personnel, education and training programs should be designed to serve a number of purposes including those discussed below.

Training Programs

According to a publication summarizing a recent FAO review, there are five rules that must be applied in establishing training programs (6):

1. Any training program must be based on an analysis of the tasks to be performed by the trainees.
2. Analysis of the tasks, determination of the aims of the training, and, finally, the program must be carried out by a joint commission which includes instructors and prospective employers.
3. The programs must be capable of adjustment rather than be hidebound. The joint commission must take care to keep them up-to-date with developments in the country's economy which may result in changes in the type of posts occupied by the leaders.
4. Free time must be allowed in the timetables and too much book-learning must be avoided. The program must be limited to what is necessary for the proper fulfillment of the tasks for which it is providing preparation.
5. There is an urgent need to increase the human aspects of agricultural instruction.

Training Center

In many countries, the Ministry of Agriculture depends upon the agricultural extension center for identifying and interpreting findings of research as well as for distribution of such information to farmers.

Sidky (3) wrote:

> The center is divided into sub-units: a general demonstration form, a food and vegetable nursery, a plant for agricultural industry, a stud farm, a veterinary clinic, and a slaughterhouse. An advisory council is connected with each of the centers; the council includes representatives of farmers and the

government agencies dealing with rural development (p. 113).

Such a training center often also operates for the more recently appointed extension workers. Such training as given at some centers may take from nine months to a full year, although some workshops may be provided of shorter duration, these of special value for in-service training and up-grading of extension workers. Supervisors and specialists may also be involved as both instructors and learners in such training experiences.

According to B. Przedpelski (18), the program of educational training centers should comprise:

1. The training of future instructors;
2. The retraining of already-employed personnel;
3. A school of instructors for the agricultural preparation of youth;
4. A school of instructor-specialists for gardening, animal husbandry, dairying, etc.;
5. A school of instructor-managers for county agricultural organizations;
6. The selection and training of the best students for future work as inspectors with the organization, or management of small farms (p. 68).

Summary of Agricultural Manpower Training in United States

Maunder (10) describes manpower training for positions in agricultural extension as follows:

> Extension services in the United States arrange and conduct in-service training courses according to the needs of their personnel. In New York State, for example, the extension service engages young men and women who have recently graduated from the college of agriculture and the college of home economics. After a brief period of two weeks of induction training dealing mainly with explanations regarding the organization and functioning of

> the extension service and how they are expected to work as assistant agents in training, they are sent to their posts for apprentice training for six months to a year. One of the requirements for new agricultural agents is that during each of the first three years on the extension service staff, they will spend three weeks each summer studying extension methods and the subject matter regarding farm production, farm management, and other subjects important in the area where they are serving. They learn to see clearly the connection between what they are learning in the classroom and the problems that farmers and homemakers have been bringing to them in their daily work. This makes them take more interest in the training (p. 283).

In many universities in the United States, courses are offered in summer schools to provide extension workers with an opportunity to study subjects of interest to them during vacation periods. Workshops are yet another method used for training county extension agents. These last generally for one to three weeks (3).

Brunner and Young (3) further state:

> There have been workshops for extension administrators, for state leaders, for supervisors, for specialists, for editors, for visual education workers, and for those engaged in extension research and evaluation . . . . The scope of these workshops is always determined in cooperation with the participants, whose actual operational problems figure prominently in the content. Opportunity is given for those attending to confer freely with the resident staff of the sponsoring institution, who are regularly concerned with the subject matter of the workshop (p. 101).

Training for Researchers in Agriculture

In many states, new employees in the agricultural research service immediately began an intensive course of training to prepare them for the work they are to do. This training is full-time, and in most of the divisions it runs for six months, although in some cases it may last longer. During this period, the new employee has an opportunity to become acquainted with several phases of work in a division, branch, or section of the Agricultural Research Service (15).

Training Teachers for Agriculture Secondary Schools

Vocational Education in agriculture in the United States is to train present and prospective farmers for proficiency in farming. Systematic instruction in agriculture of less than college grade is conducted in public schools for those persons fourteen years of age or over (17).

Phipps (17) states the following:

> To provide systematically for groups served by vocational agriculture, four kinds of classes have been developed as follows:
>
> 1. Adult farmer classes for farmers who are operating farms;
> 2. Young farmers classes for out-of-school farm youth who are becoming established in farming;
> 3. All-day classes for in-school farm youth who are enrolled in high schools and who meet daily during the school year;
> 4. Day unit classes for in-school farm youth who are enrolled in high school and who meet at least once a week for organized instruction as provided in the state plans (p. 20).

According to Phipps (16):

> The agricultural educational objectives of all types of education are the following:
>
> 1. Assist American citizens to develop the attitudes, understandings, and abilities regarding agriculture necessary for their future welfare;
> 2. Develop understanding of the influence of agricultural research on farming;
> 3. Develop understanding of the influence of public policy on agriculture;
> 4. Provide guidance regarding the occupational opportunities in farm and in non-farm occupations requiring knowledge and skill in agriculture;
> 5. Assist in improving the economic efficiency of agriculture and individuals in agriculture;
> 6. Assist present and prospective farmers to improve their efficiency in farming (p. 9).

Teachers are qualified to teach vocational agriculture after they have completed a curriculum designed specially for this purpose, and upon graduation from a college or university specially designated as a teacher-training institution by a State Board of Education. Each institution does require the student to complete a period of "student teaching" during which time the student lives in a local community and experiences all the responsibilities of a teacher of vocational agriculture.

Summary of Agricultural Manpower Training in Developing Nations

Manpower training in agriculture in many developing countries depends on the large numbers of agricultural extension workers and agricultural specialists who are the graduates of secondary agricultural schools, and training centers. The reason is that there are not enough agricultural extension workers with university-trained qualifications to fill the extension positions. Intermediate level agricultural training is the least developed in most developing countries.

According to an FAO report on training in Nigeria (5), most extension workers in that country get training from intermediate level training centers in the various regions such as the school of agriculture at Kabba. These extension workers are so trained to fill the immediate extension positions as assistant agricultural superintendents and agricultural assistants.

The training program at the junior intermediate level (for agricultural assistants) includes general agriculture (extension, field demonstration, government procedure, farm center or work station management, agricultural economics, and farm management, office routine, and records);

crops; soils; and animal husbandry (including elementary physiology, anatomy, nutrition, management breeding, and health) (3).

In Ethiopia, the extension service employs graduates of the Ambo and Jimma agricultural schools as local level extension agents. Men graduating from the Imperial Agricultural and Mechanical College at Alemaiya are engaged for the posts of extension specialists in the various lines of production such as field crops, animal production, poultry production, and as extension training specialists. The college graduates are given a period of induction experience as assistant agents with successful experienced agents to learn at the grass roots how extension work is done with farmers who mostly lack formal schooling. The specialists who demonstrate promise in their work for a few years are sent abroad for training at the master of science degree level to upgrade their knowledge and skills (10).

In Egypt, there are twelve secondary agricultural schools where most of the field extension workers are trained by the few university-educated instructors to work as field extension personnel.

According to L. M. Sasman (20), the aim of the secondary agricultural schools in Egypt includes the following points:

1. To train men to work with farmers in an advisory capacity (as agriculture extension agents, for example);
2. To train men with an agricultural background to work in agriculture and allied industries;
3. To give basic training in agriculture for becoming apprentice teachers for agricultural subjects in the preparatory schools and the primary and post-primary schools;
4. To train men as farm operators, or farmers, or as chief farmers on government farms or other farms (p. 158).

In Ghana, the Ministry of Agriculture's (11) manpower division is charged with the following functions:

1. Training of junior technicians for the Ministry of Agriculture;
2. Institutional training of practicing and prospective farmers;
3. Provision of guidance to the local universities for mounting courses for technicians of the ministry;
4. Advising the Ministry of Education on the agricultural content of their courses (p. 158).

To execute the above functions, the Division organized various courses at the three agricultural colleges and five farm institutes. Active liaison was also maintained between the Division and the universities and the ministry of education (11).

In Jordan, there are agricultural secondary schools which have partly become training centers for students who have successfully completed the ninth grade and students coming from the neighboring Arab countries. In 1967-68, they accepted 73 students from the Kingdom of Saudi Arabia, to train them in various fields of agriculture. The course of study was especially designed to suit the needs of students and the needs of their country (2).

Summary of Agricultural Manpower Training in Saudi Arabia

The Ministry of Agriculture and Water has been engaged in certain phases of manpower recruitment and training activities for some fifteen or more years, both inside and outside the country. Records show a total of 1,991 participants in various training activities during the period of 1970 to 1977. The Ministry planned to have 5,750 participants in its manpower and training activities during the period of 1975 to 1980 (12).

The Training Department in the Ministry of Agriculture and Water is

to carry out the following training programs:

1. Scholarship Programs

   The first objective of the scholarship program to meet identified needs for improvement in skills in handling the techniques in agriculture production and water uses is to prepare people at the bachelor's level, in disciplines not currently offered in the country. The second objective is to upgrade the professional level of present employees to the Master's or Doctor Degree level.

2. Technical Training Programs

   The objective of this program is to develop a new manpower for entry employment in the Ministry. The Department of Training has developed a technical training program to be conducted at the Training Center in Riyadh City and the Ministry's experiment stations. These technical training programs include some courses in maintenance and operation of farm machinery, irrigation and drainage, plant production and protection, hydrology, agricultural statistics, veterinary services, and agricultural extension.

3. Summer Work Programs

   The summer work program is designed for college students studying in the college of agriculture in Riyadh or related colleges. The objectives of the program are: (1) to provide on-the-job, practical work training in agriculture and water, (2) to reinforce the students' newly-acquired academic knowledge, and (3) to present an opportunity for the college students to explore a career in different phases of agriculture and water resource

development (12).

4. Workshops Programs

The workshop programs support the same general objective of technical training, but differ in these respects:

a) Workshops are those training activities that meet less than three weeks and may last from six to one hundred hours.

b) Workshops may focus on single problem or production procedure.

Agricultural Training Center

The Agricultural Training Center was established in 1969 to assist the Ministry of Agriculture and Water in training its own extension workers, technicians, and instructors in farm machinery operation and maintenance, and in modern irrigation practices.

Organization and Facilities of the Center

The center was divided into five main sections, each with the following facilities:

1. Irrigation and drainage section;
2. Farm machinery operations section;
3. Farm machinery maintenance and repair section;
4. Audiovisual aids section;
5. Agriculture extension section.

Training Courses

The program was designed to provide (a) basic courses, and (b) upgrading courses for operators and mechanics of the Ministry of Agriculture

and Water for students returning from study abroad and for students studying at agricultural and vocational training schools. Some courses were held in the Center as follows:

1. Training courses in irrigation and drainage practices;
2. Training courses in farm machinery operation and maintenance;
3. Training courses in workshop practices;
4. Short courses in welding;
5. Training courses in agricultural extension.

Requirements of Trainees

Admission to the Center is now open to all qualified technical employees of the Ministry of Agriculture and Water or graduates of the vocational training center of the Ministry of Labor and Social Affairs who wish to become specialized in maintenance and repair of agricultural machinery.

The bases for selecting and recruiting candidates given in the training manual include the following:

a. Candidates preferably have intermediate level education (general or agricultural education for training in agronomy, and vocational education for training as a farm machinery mechanic). If a candidate does not possess any of these qualifications, he should go through an entrance ability test to determine if he would be suitable for training.
b. Candidates preferably have a farming background.
c. Candidates are in good health.
d. Candidates are able to and interested in working in the field with rural people.

e. Candidates are willing to and capable of taking responsibility.

f. Candidates are prepared to declare willingness to obey and follow the instructions of the instructors, and carry out any field work assigned to them (7).

TABLE III

TRAINEE ENROLMENTS AT AGRICULTURAL TRAINING CENTER IN RIYADH, 1969-1974

	1969	1970	1971	1972	1973	1974	Totals
Operators:							
Basic courses	23	36	40	0	0	0	99
Short or special courses	0	25	13	20	16	23	97
Extra-mural training	0	0	0	0	8	50	58
Sub-total	23	61	53	20	24	73	254
Mechanics:							
Upgrading courses	0	0	26	8	0	0	34
Short courses	0	0	5	0	27	12	44
Sub-total	0	0	31	8	27	12	78
Irrigation:							
Basic courses	0	5	35	6	17	7	70
Upgrading courses	0	5	5	11	9	0	30
Short courses	0	25	0	0	9	16	50
Technical farmers	0	0	6	4	9	14	33
Extra-mural training	0	0	0	0	7	0	7
Sub-total	0	35	46	21	51	37	190
Total	23	96	130	49	102	122	522

Source: Food and Agriculture Organization of the United Nations, Rome, 1975.

CHAPTER IV

DESIGN AND METHODOLOGY

The purpose of this chapter is to describe the methods and procedures used in conducting the study.

The Study Population

The population, making up the respondents for this study, consisted of fifty-five farmers, thirty-one extension workers, twenty-nine experiment station workers and five administrators. The population was further stratified in the case of extension workers, experiment station workers, and administrators into two sub-groupings consisting of individuals of Saudi and non-Saudi origin. Responses were also separated in terms of the two provinces studied, the two areas of Al-Hasa and Qatif. The five administrators from whom responses were secured were serving in the Ministry of Agriculture and Water in Riyadh.

The Development of the Questionnaire

In developing the questionnaire, the researcher and his major advisor attempted to secure many suggestions from both agricultural personnel in Saudi Arabia and faculty serving in the College of Agriculture at Oklahoma State University. Consultation with Saudi students attending Oklahoma State University was also sought. These measures were taken in order to insure adequate communication between the researcher and the respondents.

The questionnaire was structured in three parts.

Part A dealt with the demographic data regarding farmers.

Part B dealt with the origin, experience status, and institutions for job preparation of the extension and experiment station workers among the respondents.

Part C dealt with the following:

(1) Judgments of extension and experiment station workers as to future manpower needs in their respective employment areas.

(2) Judgments of extension and experiment station workers and administrators in the Ministry of Agriculture and Water as to the relative importance of selected sources for recruitment, levels of training, and items most needed in the training curriculum for the preparation of workers.

Procedures of Survey

The investigator chose to attempt to administer the questionnaire personally to the farmers, extension workers, experiment station workers, and administrators in the Ministry of Agriculture and Water during the times they were at work. The investigator traveled with his major advisor to Saudi Arabia to administer the questionnaire. Prior arrangements were made with the Deputy Minister of Agriculture, the General Directors of the Extension Service Department, the Department of Research and Development and officials in the Training Department of the Ministry. Also included were the Al-Hasa Irrigation and Drainage Authority Director, the Al-Hasa Agricultural Directorate Director, the Hofuf Agricultural and Water Research Center Director, the Qatif Experimental Farm Director, and the official in charge of the Agricultural Assistance Division,

Arabian American Oil Company

Instructions to respondents were given orally by the researcher and his advisor. As farmers were interviewed, it was found expedient to interview many of them at the local village of their residence. The interviews were conducted in the late afternoon after the farmers had returned from work. Ten villages were selected from among the fifty in the Al-Hasa area. These villages were: (1) Al-hiolala, (2) Al-twaitheer, (3) Al-gerah, (4) Al-dalwah, (5) Al-shobah, (6) Al-gorain, (7) Al-klabia, (8) Al-migdam, (9) the north Omran, (10) Al-oyon. Five villages were then selected from among the thirty existing in the Qatif area. These villages were: (1) Amek, (2) Uimalhamam, (3) Dareen, (4) Al-awjam, (5) Al-jish. These were selected by "gridding" from maps of each of the two areas. Four responses were secured from farmer respondents in each of the selected villages in the Al-Hasa area and their responses were secured from farmer respondents in the Qatif area.

In the case of extension workers and experiment station workers, all workers present and on the job the day of the visit constituted the respondents in each of the two areas.

The five administrator respondents were also those present on the day of the visit to their respective offices. In addition to completing the interview scheduled, other pertinent matters were also discussed. Approximately one-half hour was required to explain instructions and secure responses from the four farmers in each village, including travel time to and from the village or farm. Explanation of the interview form to extension workers was made during a discussion session with each group. Interviewees were then asked to complete the form, with individual assistance requested and given many of the group assembled. The securing of

some experiment station worker responses was also facilitated by working with a small group. However, more than one-half of the responses were the result of individual interviews. In terms of time taken, interview sessions with a group required in excess of two hours while individual interviews consumed from 3/4ths to one hour each.

Treatment of Data

A decision was made to collate data largely according to the developed questionnaire or interview form. Identified groups and previously determined stratification made necessary the construction of some fifty-one tables. Percentages were calculated and were largely used to determine weight to be given respective findings. In most categories, the method by which responses were weighted and evaluated was:

Very important.....1

Important.....2

Some importance.....3

Little importance...4

Therefore, it should be pointed out that the lower the score determined, the higher the importance which the respondents placed on the item or practice.

Also included in the final determination and analysis were findings secured through personal unstructured interviews with certain individuals identified earlier. Findings from these interviews were closely related to, but went beyond, those limited to the schedule form. Also, data secured through the review of literature was considered somewhat in drawing conclusions and making recommendations.

CHAPTER V

PRESENTATION AND ANALYSIS OF DATA

This chapter concerns the presentation and analysis of data collected through use of an interview questionnaire. As presented, these data comprise responses made by selected farmers, extension workers, and experiment station workers, all located in the Eastern Province of Saudi Arabia. In addition, these data also include responses from selected available administrators in the Ministry of Agriculture and Water stationed at Riyadh. All responses were secured through personal interviews which were conducted during the month of July, 1977. For the purpose of presentation, data are classified as follows.

(1) Demographic data regarding respondents
   a. Status
   b. Educational level
   c. Family youth involvement and parental aspirations
(2) Origin, experience status, and institutions for job preparation of extension and experiment station worker respondents
(3) Judgments of two classified groups as to future manpower needs in their respective employment areas
   a. Judgments by extension workers
   b. Judgments by experiment station workers
(4) Judgments of three classified groups as to the relative importance of selected sources for recruitment in their respective

employment areas

a. Judgments by extension workers

b. Judgments by experiment station workers

c. Judgments by administrators in the Ministry of Agriculture and Water

(5) Judgments of three classified groups as to the relative importance of selected levels of training for preparation of workers in their respective employment areas

a. Judgments by extension workers

b. Judgments by experiment station workers

c. Judgments by administrators in the Ministry of Agriculture and Water

(6) Judgments of three classified groups as to the relative importance of selected items most needed in the training curriculum for the preparation of workers in the respective employment areas

a. Judgments by extension workers

b. Judgments by experiment station workers

c. Judgments by administrators in the Ministry of Agriculture and Water

(7) Pertinent statements from interviews with selected officials

Demographic Data Pertaining to Farmers

It would seem of note that 67.27 percent of the farmers interviewed in the Eastern Province of Saudi Arabia perceived themselves to be full-time farmers, this presented by data shown in Table IV. Full-time farmers of the Al-Hasa area were somewhat more numerous percentage-wise than

TABLE IV

STATUS OF FORTY FARMERS OF THE AL-HASA AREA AND FIFTEEN FARMERS OF QATIF AREA

Farming Status	Al-Hasa Area Responses		Qatif Area Responses		Total	
	No.	Percent	No.	Percent	No.	Percent
Full-time farmer	28	70.00	9	60.00	37	67.27
Part-time farmer	12	30.00	6	40.00	18	32.73
No response	--	-----	--	-----	--	-----
Total	40	100.00	15	100.00	55	100.00
Born on farm	36	90.00	15	100.00	51	92.73
Not born on farm	1	2.50	--	------	1	1.82
No response	3	7.50	--	------	3	5.45
Total	40	100.00	15	100.00	55	100.00
Farm owner	14	35.00	6	40.00	20	36.36
Non-farm owner	26	65.00	9	60.00	35	63.64
No response	--	------	--	------	--	------
Total	40	100.00	15	100.00	55	100.00
Operate the farm	37	92.50	12	80.00	49	89.09
Does not operate the farm	1	2.50	1	6.67	2	3.64
No response	2	5.00	2	13.33	4	7.27
Total	40	100.00	15	100.00	55	100.00
Tenure in farming						
More than forty years	10	25.00	--	------	10	18.18
From thirty to forty years	2	5.00	3	20.00	5	9.09
From twenty to thirty years	21	52.50	6	40.00	27	49.09
From ten to twenty years	5	12.50	3	20.00	8	14.55
Less than ten years	2	5.00	3	20.00	5	9.09
No response	--	------	--	------	--	------
Total	40	100.00	15	100.00	55	100.00

were farmers in the Qatif area. Further examination of findings as reported in Table IV would suggest that this may be associated with a longer tenure, and perhaps with farmers of more advanced age. An additional factor might be the proximity of the Aramco plant which may make possible some employment of farmers there, thus encouraging part-time farming. In both areas, Al-Hasa and Qatif, some part-time farmers are also engaged as laborers in the respective experiment stations, as well as the Al-Hasa Irrigation and Drainage Project.

It would further seem of note that 92.73 percent of the farmers interviewed in the Eastern Province reported that they were born on the farm, this finding presented in Table IV. Farmers born on farms of Qatif area were found to be somewhat more numerous percentage-wise than was true of farmers in the Al-Hasa area. In considering implications of data shown in Table IV, it should be pointed out that most of the villages where farmer respondents lived are close to the city of Qatif where facilities such as schools, markets, etc., for the farmer and his family, are more readily available.

It would further seem of note that findings as shown in Table IV reveal that 63.64 percent of farmers interviewed classified themselves as non-farm owners. Further consideration of these findings might suggest that this may be associated with the phenomenon of extensive division of properties into ever smaller units; this, in part, is brought about according to the Islamic system of inheritance. Perhaps this will account somewhat for data pertaining to farmers in the Al-Hasa area where the percentage of farmers living on a farm they operate was discovered to be 89.09 percent, as compared to farm owners, reported as only 36.36 percent.

It would seem that thus, as individual farm holdings become ever

smaller, all owners cannot operate only their own farms, but often are forced to rent to others who may combine rental portions held by relatives and others.

Data presented in Table IV reveal that 49.09 percent of farmers interviewed in both areas, Al-Hasa and Qatif, have been engaged in farming for twenty to thirty years. Further findings with regard to farmer characteristics as presented in Table V show that 96.36 percent of farmers acknowledged themselves to be without formal education. The extremely high figure of 80 percent disclosed that they could not read or write. This tends to establish the fact that the majority of farmers in the Eastern Province can be recognized as both older and as semi-illiterate, with a marked absence of young people presently involved in farming. An additional factor might be that farmers with a continued higher rate of illiteracy also continued use of the older, more traditional methods of farming.

When attention is focused on data presented in Table V, it is revealed that 43.64 percent of farmers interviewed in the Eastern Province did not acknowledge receiving assistance from the Agricultural Extension Service of the area. When responses as received in the two areas are compared, it is most striking to note that one-half of Al-Hasa respondents reported receiving no assistance compared to only approximately one-fourth in Qatif. Perhaps this somewhat salient finding may be associated with a number of extension workers inadequate to effectively reach all farmers.

It would seem of note that data presented in Table VI reveal 78.18 percent of the farmers in the Eastern Province reported that youth family members were not extensively involved in farming operations. A slightly

TABLE V

EDUCATIONAL STATUS AS REPORTED BY FORTY FARMERS IN THE AL-HASA AREA AND FIFTEEN FARMERS IN THE QATIF AREA

	Al-Hasa Area Responses		Qatif Area Responses		Total	
	No.	Percent	No.	Percent	No.	Percent
Formal Education						
With formal education	1	2.50	--	------	1	1.82
Without formal education	38	95.00	15	100.00	53	96.36
No response	1	2.50	--	------	1	1.82
Total	40	100.00	15	100.00	55	100.00
Education Level						
Cannot read or write	33	82.50	11	73.33	44	80.00
Can read or write only	3	7.50	3	20.00	6	10.91
Attended elementary school	3	7.50	--	------	3	5.45
Attended secondary school	--	------	--	------	--	------
No response	1	2.50	1	6.67	2	3.64
Total	40	100.00	15	100.00	55	100.00
Acknowledged Assistance From Extension Service						
Have received aid	17	42.50	11	73.33	28	50.91
Have not received aid	20	50.00	4	26.67	24	43.64
No response	3	7.50	--	------	3	5.45
Total	40	100.00	15	100.00	55	100.00

higher number of farmers in the Al-Hasa area, 80 percent, concurred in this response. Remarks by certain farmers interviewed would tend to establish that, in the farmers' minds, reasons for such a low involvement of family youth members in farming operations might be ascribed to (1) continued adherence to older traditional farming methods, and (2) the relatively low income received from farming.

In fact, when further findings of Table VI are reviewed, it is apparent that approximately three out of ten farmer respondents did not aspire for their own children to become farmers. After the business of farming, affirmed by seven out of ten as favored for their children, the next highest selected category of aspiration for their sons was that of becoming an experiment station worker. Of the total respondents in both provinces, 63.64 percent indicated high parental aspiration for experiment station employment by their children. One-half of parent respondents, 49.09 percent, indicated favorable aspiration for children to become extension workers, while a somewhat lower number, 43.64 percent, indicated aspirations for children to become successful agricultural businessmen; this compared to a percentage of 70.91 parental aspiration for farming.

It would seem of note that a finding as shown in Table VI reveals that 70.91 percent of farmer respondents in both provinces aspire for their own children to be involved in preparation for farming, this above other possible agricultural activities and careers. This finding is even more striking when we also note, returning to Table VI, that 78.18 percent of farmers indicated that these children were presently not substantially involved in the farming operation. If we accept the fact that these responses do, in fact, reflect the way farmers feel about their children's future, then this does present a challenge to provide incentive

TABLE VI

YOUTH FAMILY MEMBER INVOLVEMENT IN FARMING AND PARENTAL ASPIRATIONS FOR SON'S CAREER IN AGRICULTURE AS REPORTED BY FORTY FARMERS IN THE AL-HASA AREA AND FIFTEEN FARMERS IN THE QATIF AREA

Item	Al-Hasa Area Response		Qatif Area Response		Total	
	No.	Percent	No.	Percent	No.	Percent
A. Present Involvement						
Youth family members involved in farm operation	4	10.00	3	20.00	7	12.73
Youth family members not involved in farm operation	32	80.00	11	73.33	43	78.18
No response	4	10.00	1	6.67	5	9.09
Total	40	100.00	15	100.00	55	100.00

B. Parental Aspirations	Al-Hasa Area Response				Qatif Area Response				Total			
	Yes		No		Yes		No		Yes		No	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Train for extension	20	50.00	20	50.00	7	46.67	8	53.33	27	49.09	28	50.91
Train for experiment station	26	65.00	14	35.00	9	60.00	6	40.00	35	63.64	20	36.36
Train for agri-business	22	55.00	18	45.00	2	13.33	13	86.67	24	43.64	31	56.36
Train for farming	28	70.00	12	30.00	11	73.33	4	26.67	39	70.91	16	29.09
Responding in one or more categories	38	95.00	2	5.00	14	93.33	1	6.67	52	94.55	3	5.45

and motivation for children to plan for present as well as future involvement and careers in the agricultural sector. A number of farmer respondents did volunteer comment to the researcher that they doubted that young people would agree to become more involved in agriculture until (1) practical training in agriculture was provided in elementary and secondary schools, and (2) the income from farming became comparable to other areas of work. Apparently, farmers do not recognize farming and agricultural work as being very prestigious.

Origin and Experience Status of Extension and Experiment Station Workers

An attempt was made to determine certain selected characteristics of present employees in the extension and in the experiment station programs.

In terms of origin, data presented in Table VII, indicated only 26.9 percent of present workers in the Agricultural Extension Service in the Al-Hasa Area were native Saudis, as contrasted with 40.00 percent of extension personnel in the Qatif Area, while 73.1 percent and 60.0 percent respectively of Agricultural Extension personnel in Al-Hasa and in Qatif areas were from other nations than Saudi Arabia. Present workers in the Hafof Research Center were found to be 26.3 percent native Saudi, and 73.7 percent non-Saudi. At the Qatif Experimental Farm, workers were evenly divided between those of native origin and those of other nations, with data presented in Table VIII revealing 50.0 percent falling in each category.

It would seem of note that 34.6 percent of all extension workers reported an experience total of from 12 to 16 years, with a somewhat greater proportion, 60 percent, of extension workers in the Qatif area

TABLE VII

ORIGIN AND EXPERIENCE STATUS OF TWENTY-SIX EXTENSION WORKERS OF THE AL-HASA AREA AND FIVE EXTENSION WORKERS OF THE QATIF AREA

Positions Held	Total	Origin		Years of Experience					
		Saudi	Non-Saudi	1-4 Years	4-8 Years	8-12 Years	12-16 Years	16-20 Years	Over 20
Al-Hasa Area									
Administrator	2	0	2	1	0	0	0	1	0
General Ext. Worker	14	2	12	2	4	1	5	2	0
Specialist in:									
Water Resource	1	1	0	1	0	0	0	0	0
Entomology	5	3	2	1	2	0	2	0	0
Poultry	1	1	0	0	1	0	0	0	0
Fruit	1	0	1	0	0	0	1	0	0
Rice	1	0	1	0	0	1	0	0	0
Agronomy	1	0	1	0	0	0	1	0	0
Total	26	7	19	5	7	2	9	3	0
Percent	100.0	26.9	73.1	19.2	26.9	7.7	34.6	11.6	00.0
Qatif Area									
Extension Worker	2	1	1	1	0	0	1	0	0
Livestock	1	0	1	0	0	0	1	0	0
Plant Protection	2	1	1	0	1	0	1	0	0
Total	5	2	3	1	1	0	3	0	0
Percent	100.0	40.0	60.0	20.0	20.0	00.0	60.0	00.0	00.0

TABLE VIII

ORIGIN AND EXPERIENCE STATUS OF NINETEEN WORKERS AT THE HAFUF RESEARCH CENTER AND TEN WORKERS AT THE QATIF EXPERIMENT PLAN

Positions Held	Total	Origin		Years of Experience					
		Saudi	Non-Saudi	1-4 Years	4-8 Years	8-12 Years	12-16 Years	16-20 Years	Over 20
Al-Hasa Area									
Administrator	2	1	1	1	0	0	1	0	0
Specialist in:									
Agronomy	4	2	2	2	2	0	0	0	0
Rice	1	0	1	0	0	1	0	0	0
Livestock (Animal production)	7	2	5	4	2	1	0	0	0
Plant production	1	0	1	0	1	0	0	0	0
Weed research	1	0	1	1	0	0	0	0	0
Vegetable production	1	0	1	0	1	0	0	0	0
Civil engineering	1	0	1	1	0	0	0	0	0
Agri-statistics	1	0	1	0	0	0	0	1	0
Total	19	5	14	9	6	2	1	1	0
Percent	100.0	26.3	73.7	47.4	31.6	10.5	5.3	5.3	00.0
Qatif Area									
Administrator	1	1	0	0	0	1	0	0	0
Specialist in:									
Soil	1	0	1	0	1	0	0	0	0
Seed lab	1	1	0	0	1	0	0	0	0
Agricultural Mechanics	1	1	0	0	1	0	0	0	0
Not told about area of work	6	2	4	2	0	3	1	0	0
Total	10	5	5	2	3	4	1	0	0
Percent	100.0	50.0	50.0	20.0	30.0	40.0	10.0	00.0	00.0

reporting in the same experience category, 12 to 16 years. In the Hafof Research Center, 47.4 percent of all workers reported an experience of from only 1 to 4 years, as contrasted with 40 percent of all experiment station workers in the Qatif area reporting experience of from 8 to 12 years. While these data are for all extension and experiment station workers and do not reflect differences in experience as reported between Saudis and non-Saudis, observation would tend to reveal that non-Saudi workers have had a considerably greater amount of experience than have Saudis. Only in very recent years has such training been available in Saudi Arabia.

It would seem of note that findings as shown in Table IX reveal that 51.7 percent of all extension and experiment station workers rated the learning experiences which they had in preparation for their present job as "very good." An additional 31.7 percent responded that training in preparation was "good," with only a 3.3 percent rating such preparation as "fair." These responding, both Saudi and non-Saudi extension and experiment station workers, were graduated from many different universities and colleges in the world, as can be observed by a perusal of data in Table IX.

Judgments of Two Classified Groups as to Future Manpower Needs in Their Respective Employment Areas

Data presented in Tables X and XI consist of judgments made by extension and experiment station workers in the Qatif and Al-Hasa area with regard to future manpower needs for workers in selected agricultural and water resource areas. Responses were requested with regard to each

TABLE IX

RESPONSES AS TO SCHOOL ATTENDED AND ASSESSMENT OF VALUE OF TRAINING RECEIVED IN PREPARATION FOR PRESENT JOB AS GIVEN BY THIRTY-ONE EXTENSION WORKERS AND TWENTY-NINE EXPERIMENT STATION WORKERS IN TWO EASTERN AREAS

School Attended	Total	Origin		Response	Value of Training				
		Saudi	Non-Saudi		Very Good	Good	Fair	Some Value	Little Value
Riyadh (SA)	5	5	0	0	3	2	0	0	0
Cairo University (Egypt)	7	0	7	0	4	2	1	0	0
Alexandria University (Egypt)	6	1	5	0	4	1	1	0	0
Ain Shams University (Egypt)	2	0	2	0	2	0	0	0	0
Cornell University (USA)	1	0	1	0	1	0	0	0	0
University of North Wales	10	3	7	7	2	1	0	0	0
University of Missouri (USA)	1	0	1	0	1	0	0	0	0
Pakistan University	1	1	0	0	1	0	0	0	0
Xavier University (China)	1	0	1	0	1	0	0	0	0
National Chuny University (China)	1	0	1	0	1	0	0	0	0
Pinestling College of Agriculture (China)	1	0	1	0	1	0	0	0	0
Agricultural Institutes (Egypt and Jordan)	10	1	9	1	3	6	0	0	0
Secondary Agricultural Schools (SA)	7	7	0	0	3	4	0	0	0
Not identified	7	1	6	0	4	3	0	0	0
Total	60	19	41	8	31	19	2	0	0
Percent	100.00	31.7	68.3	13.3	51.7	31.7	3.3	0.00	0.00

TABLE X

FUTURE MANPOWER NEEDS IN SELECTED AGRICULTURAL AREAS AS PERCEIVED BY EXTENSION WORKERS OF THE QATIF AND THE AL-HASA AREAS

Agricultural Position	Present Number	Respondent No.	Respondent Origin	1980 % Range	1980 % Mean	1985 % Range	1985 % Mean	1990 % Range	1990 % Mean	1995 % Range	1995 % Mean	2000 % Range	2000 % Mean
		9	Saudi	(-20)-10	2.6	(-20)-22	5.6	(-20)-35	9.0	(-25)-23	4.7	(-30)-24	7.2
Farmers	10,961	20	Non-Saudi	(-20)-60	5.6	(-15)-50	8.0	(-40)-40	6.8	(-30)-50	10.9	(-40)-55	14.3
		29	Total	(-20)-60	4.7	(-20)-50	7.2	(-40)-40	5.0	(-30)-50	8.9	(-40)-55	12.1
	7 Saudi	9	Saudi	0-20	5.7	0-25	6.0	1-35	6.9	1-45	8.8	1-50	12.0
Administrators	1 Non-Saudi	22	Non-Saudi	1-25	5.7	0-30	8.7	0-35	9.6	0-40	12.5	0-50	13.4
	8 Total	31	Total	0-25	5.7	0-30	7.9	0-35	8.8	0-45	11.5	0-50	13.0
General Extension													
	3 Saudi	8	Saudi	1-20	6.9	1-30	8.4	2-30	10.3	3-30	11.6	2-30	9.8
Extension Workers	23 Non-Saudi	18	Non-Saudi	2-35	9.2	2-30	10.9	0-40	14.3	0-50	18.6	0-50	25.0
	26 Total	26	Total	1-35	8.5	1-30	10.2	0-40	13.1	0-50	16.5	0-50	20.3
Extension Specialists													
	0 Saudi	7	Saudi	1-20	4.7	1-30	6.6	1-30	7.3	2-30	8.1	0-30	7.2
Water Resources	4 Non-Saudi	4	Non-Saudi	2-15	8.0	2-20	11.8	0-15	6.8	3-20	10.3	0-20	10.8
	4 Total	11	Total	1-20	5.9	1-30	8.5	0-30	7.1	2-30	8.9	0-30	8.5
	1 Saudi	7	Saudi	1-20	4.6	1-30	6.4	1-30	7.1	2-30	8.0	1-30	8.6
Agronomy	3 Non-Saudi	4	Non-Saudi	1-30	8.5	1-10	4.0	2-15	6.0	3-20	8.5	3-20	10.8
	4 Total	11	Total	1-30	6.0	1-30	5.5	1-30	6.7	2-30	8.2	1-30	9.4
	0 Saudi	7	Saudi	1-20	4.9	1-30	7.4	2-30	8.7	3-30	7.7	3-30	9.3
Rice	1 Non-Saudi	4	Non-Saudi	1-5	2.3	1-7	3.2	2-10	4.8	3-15	7.2	3-25	12.0
	1 Total	11	Total	1-20	3.9	1-30	5.9	2-30	7.2	3-30	7.5	3-30	10.3
	0 Saudi	7	Saudi	1-20	5.3	1-30	8.1	2-30	8.0	3-30	9.0	3-30	9.9
Livestock	1 Non-Saudi	7	Non-Saudi	2-10	4.1	2-12	5.7	1-15	7.7	3-30	12.3	3-30	15.3
	1 Total	14	Total	1-20	4.7	1-30	6.9	1-30	7.9	3-30	10.6	3-30	12.6
	0 Saudi	7	Saudi	1-20	4.3	1-30	7.7	1-30	7.6	1-30	7.7	3-30	8.3
Agricultural Mechanics	1 Non-Saudi	4	Non-Saudi	0-2	1.3	0-3	2.0	0-5	4.0	3-10	6.8	3-15	8.5
	1 Total	11	Total	0-20	3.2	0-30	5.6	0-30	5.9	1-30	7.4	3-30	8.4
	4 Saudi	8	Saudi	1-20	6.8	1-30	10.0	2-30	11.1	3-30	11.1	2-30	11.6
Entomology	3 Non-Saudi	7	Non-Saudi	2-10	4.9	0-15	4.1	2-50	13.1	3-25	11.9	3-85	19.2
	7 Total	15	Total	1-20	5.9	0-30	7.3	2-50	12.1	3-30	11.5	2-85	15.2

TABLE X (CONTINUED)

Agricultural Position	Present Number	Respondent No.	Respondent Origin	1980 % Range	1980 % Mean	1985 % Range	1985 % Mean	1990 % Range	1990 % Mean	1995 % Range	1995 % Mean	2000 % Range	2000 % Mean
Experiment Station Personnel													
Water Resources	0 Saudi	7	Saudi	1-20	4.4	1-23	5.9	2-25	6.6	3-25	8.0	4-24	8.6
	4 Non-Saudi	14	Non-Saudi	1-10	4.6	2-15	6.3	1-20	10.1	3-30	13.4	0-45	17.4
	4 Total	21	Total	1-20	4.6	1-23	6.2	1-25	9.0	3-30	11.6	0-45	14.0
Agronomy	3 Saudi	4	Saudi	1-20	8.3	3-23	10.3	3-25	11.8	4-25	12.3	5-25	15.0
	4 Non-Saudi	11	Non-Saudi	2-10	4.7	2-12	5.7	1-20	10.5	5-30	13.5	0-50	21.2
	7 Total	15	Total	1-20	5.7	2-23	6.9	1-25	10.8	4-30	13.0	0-50	19.5
Rice	0 Saudi	5	Saudi	1-20	7.2	1-23	8.4	3-25	10.2	2-25	11.2	2-25	12.4
	5 Non-Saudi	11	Non-Saudi	2-10	4.6	2-12	6.1	1-20	10.4	5-30	13.2	0-50	15.6
	5 Total	16	Total	1-20	5.4	1-23	6.8	1-25	10.3	2-30	12.6	0-50	14.6
Livestock	3 Saudi	7	Saudi	1-20	5.9	3-23	7.1	3-25	9.1	4-25	10.0	5-25	11.3
	8 Non-Saudi	11	Non-Saudi	2-10	5.1	2-15	8.0	1-20	12.6	5-30	15.4	0-50	19.9
	11 Total	18	Total	1-20	5.9	2-23	7.7	1-25	11.3	4-30	13.3	0-50	16.6
Agricultural Mechanics	1 Saudi	5	Saudi	1-20	7.0	3-23	8.8	3-25	10.2	4-25	11.8	5-25	13.4
	0 Non-Saudi	10	Non-Saudi	2-10	5.5	2-15	7.3	1-20	12.4	5-30	16.4	0-50	20.4
	1 Total	15	Total	1-20	6.0	2-23	7.8	1-25	11.7	4-30	14.9	0-50	18.1
Entomology	0 Saudi	5	Saudi	1-20	7.0	2-23	8.6	3-25	10.0	4-25	11.6	5-25	13.8
	1 Non-Saudi	10	Non-Saudi	2-10	5.5	2-15	7.3	1-20	12.4	5-30	16.4	0-50	20.4
	1 Total	15	Total	1-20	6.0	2-23	7.7	1-25	11.6	4-30	14.8	0-50	18.2

TABLE XI

FUTURE MANPOWER NEEDS IN SELECTED AGRICULTURAL AREAS AS PERCEIVED BY WORKERS OF HOFUF RESEARCH CENTER AND QATIF EXPERIMENT FARM

Agricultural Position	Present Number	Respondent No.	Origin	1980 % Range	1980 % Mean	1985 % Range	1985 % Mean	1990 % Range	1990 % Mean	1995 % Range	1995 % Mean	2000 % Range	2000 % Mean
		10	Saudi	1-40	7.4	1-80	12.6	2-100	17.8	2-120	21.0	4-140	25.6
Farmers	10,961	10	Non-Saudi	3-40	12.3	3-50	13.3	2-30	11.7	2-26	11.4	2-50	12.8
		20	Total	1-40	8.9	1-80	13.0	2-100	14.8	2-120	16.2	2-140	19.8
	7 Saudi	9	Saudi	2-60	11.9	1-60	13.2	1-60	14.1	1-60	15.0	1-60	16.3
Administrators	1 Non-Saudi	11	Non-Saudi	3-30	8.9	3-20	8.0	2-25	8.9	2-22	8.3	2-22	7.7
	8 Total	20	Total	2-60	10.9	1-60	10.4	1-60	11.3	1-60	11.3	1-60	11.6
General Extension													
	3 Saudi	10	Saudi	1-60	13.0	2-60	14.6	1-60	16.2	1-60	16.8	1-60	19.4
Extension Workers	23 Non-Saudi	11	Non-Saudi	3-50	15.3	2-60	16.7	2-40	15.7	1-30	15.1	2-30	14.7
	26 Total	21	Total	1-60	14.2	2-60	15.7	1-60	15.9	1-60	15.9	1-60	16.9
Extension Specialists													
	0 Saudi	9	Saudi	1-60	13.3	1-60	13.2	2-60	14.9	2-60	17.1	2-60	19.8
Water Resources	4 Non-Saudi	11	Non-Saudi	3-50	13.8	4-60	15.0	2-40	13.2	2-30	12.4	4-30	12.5
	4 Total	20	Total	1-60	13.6	1-60	14.2	2-60	14.0	2-60	14.5	2-60	15.8
	1 Saudi	10	Saudi	2-60	12.9	1-60	13.3	2-60	15.4	2-60	17.0	2 60	19.7
Agronomy	3 Non-Saudi	11	Non-Saudi	3-50	16.5	4-60	18.9	4-40	17.9	4-30	17.9	4-30	17.8
	4 Total	21	Total	2-60	14.2	1-60	16.2	2-60	16.7	2-60	17.5	2-60	18.7
	0 Saudi	10	Saudi	1-60	13.7	1-60	14.4	1-60	17.3	1-60	18.6	1-60	21.4
Rice	1 Non-Saudi	11	Non-Saudi	3-50	15.3	3-60	15.8	3-40	14.6	3-30	14.3	3-30	13.8
	1 Total	21	Total	1-60	14.5	1-60	15.1	1-60	15.9	1-60	16.3	1-60	17.4
	0 Saudi	10	Saudi	2-60	14.1	2-60	16.2	3-60	18.5	3-60	20.9	3-60	23.7
Livestock	1 Non-Saudi	11	Non-Saudi	3-50	16.6	4-60	19.2	4-40	19.1	4-30	19.0	4-40	20.5
	1 Total	21	Total	2-60	15.4	2-60	17.8	3-60	18.8	3-60	19.9	3-60	22.0
	0 Saudi	10	Saudi	2-60	12.7	2-60	14.5	3-60	16.9	3-60	19.5	3-60	23.1
Agricultural Mechanics	1 Non-Saudi	11	Non-Saudi	3-50	18.0	4-60	21.5	4-40	20.9	4-35	21.7	4-35	21.8
	1 Total	21	Total	2-60	15.5	2-60	18.1	3-60	19.0	3-60	20.7	3-60	22.4
	4 Saudi	10	Saudi	1-60	11.8	2-60	12.3	2-60	13.8	2-60	16.6	2-60	19.3
Entomology	3 Non-Saudi	11	Non-Saudi	3-50	17.3	3-60	15.9	4-40	15.5	4-30	15.7	4-30	16.2
	7 Total	21	Total	1-60	14.7	2-60	14.2	2-60	14.7	2-60	16.1	2-60	17.7

TABLE XI (CONTINUED)

Agricultural Position	Present Number	Respondent No.	Respondent Origin	1980 % Range	1980 % Mean	1985 % Range	1985 % Mean	1990 % Range	1990 % Mean	1995 % Range	1995 % Mean	2000 % Range	2000 % Mean
Experiment Station Personnel													
Water Resources	0 Saudi	7	Saudi	1-10	3.9	2-20	7.0	2-30	10.0	2-40	13.9	2-50	17.9
	4 Non-Saudi	11	Non-Saudi	1-45	8.1	1-60	10.7	2-50	10.5	1-45	10.5	1-20	9.1
	4 Total	18	Total	1-45	5.2	1-60	9.2	2-50	10.3	1-45	11.8	1-50	12.5
Agronomy	3 Saudi	9	Saudi	1-20	7.3	1-40	11.4	1-60	16.4	1-80	21.2	1-5	2.8
	4 Non-Saudi	11	Non-Saudi	3-45	17.5	4-60	20.4	4-50	20.9	4-45	20.7	2-100	20.3
	7 Total	20	Total	1-45	14.3	1-60	18.0	1-60	18.9	1-80	20.5	1-100	12.5
Rice	0 Saudi	6	Saudi	1-3	1.7	1-10	3.5	1-20	5.8	1-35	8.7	1-50	11.3
	5 Non-Saudi	7	Non-Saudi	2-45	15.6	2-60	18.3	2-50	17.1	3-40	18.2	3-30	12.7
	5 Total	13	Total	1-45	9.2	1-60	11.5	1-50	11.9	1-40	12.4	1-50	12.1
Livestock	3 Saudi	7	Saudi	1-15	10.4	1-20	8.1	5-50	10.6	1-35	13.0	1-50	17.6
	8 Non-Saudi	7	Non-Saudi	5-50	23.6	5-60	27.9	1-20	27.9	5-75	28.6	5-100	32 1
	11 Total	14	Total	1-50	14.4	1-60	18.0	1-50	19.2	1-75	20.8	1-100	24.9
Agricultural Mechanics	1 Saudi	7	Saudi	1-10	5.4	4-12	8.3	6-20	11.4	7-35	15.1	7-50	18.0
	0 Non-Saudi	7	Non-Saudi	5-45	23.6	10-60	27.1	15-50	23.6	15-50	29.3	15-50	27.1
	1 Total	14	Total	1-45	14.5	4-60	17.7	6-50	17.5	7-50	22.2	7-50	22.6
Entomology	0 Saudi	8	Saudi	1-5	2.8	2-10	4.3	2-20	6.1	2-35	9.9	2-50	13.1
	1 Non-Saudi	10	Non-Saudi	2-100	20.3	2-100	23.7	2-100	22.3	2-150	29.1	1-150	27.6
	1 Total	18	Total	1-100	12.5	2-100	15.1	2-100	17.2	2-150	20.0	1-150	20.4

five-year period from 1980 to 2000. Respondents were again stratified into Saudi and non-Saudi groups.

Extension Workers' Judgments as to Increase Needed in Numbers of Farmers

The most extreme ranges found among all responses occurred in the perceptions of extension workers regarding future needs for farmers. Among Saudi extension workers, this range was from a minus (-) 20 to a plus (+) 10. These figures were responses to needs by 1980, but similar extremes in range can be found for other periods. The only perceptions of a possible needed reduction in agricultural manpower, as expressed by respondents, occurred among a number of extension workers and was expressed regarding a possible need for reduction in the number of farmers. However, among total respondents, enough judged the situation in terms of needed increase to bring the mean percentage to a plus quantity.

In general, for each of the five-year periods designated, a continuing greater increase in terms of farmers needed is to be observed, ranging from a projected 4.7 percent increase needed by 1980 to a 12.1 percent increase expressed as being needed during the period from 1995 to 2000. When responses received from native Saudi workers are compared to those received from their counterparts, it is to be observed that non-Saudi workers expressed a consistently higher estimate than did Saudis.

Judgment of Experiment Station Workers as to Future Needs for Farmers

Saudi and non-Saudi experiment station workers gave ranges for five-year periods from the year 1980 to 2000. Ranges expressed by the two

groups are equal in one period and quite different in others. They were recorded from plus (+) 1 to (+) 40 in 1980 for total respondents, but the extreme was found in the period 2000, of plus (+) 1 to (+) 140 increases. In general, the experiment station workers tend to view a much greater increase as needed in future farmers than do the extension workers.

Judgments as to Increase Needed in Extension and Experiment Station Administrators

By examining Tables X and XI, we find that both extension and experiment station workers shared perceptions favoring an increase in the number of future administrators needed through the five five-year periods. The total ranges of projected estimates of extension workers was found to be plus (+) 0-25 in 1980 to 0-50 in the year of 2000. However, the judgments of Saudi experiment station workers regarding the future needs for administrators can be viewed as somewhat extreme when compared with non-Saudis, this throughout the five five-year periods from 1980 to 2000. These Saudi experiment station workers expressed a greater need for an increased number of administrators. Their judgments were consistent throughout the period covered.

Judgments as to Increase Needed in General Extension Workers

The means for five five-year periods of future needs for general extension workers for Qatif and Al-Hasa areas as perceived by Saudi and non-Saudi present extension workers ranged from a total low of 8.5 in 1980 to a high of 20.3 in 2000. The judgment expressed as means of percentage in needed increase expressed by Saudi and non-Saudi experiment station

workers ranged from a total low of 14.2 in 1980 to a high of 16.9 in 2000. Observation would tend to reveal that non-Saudi extension workers estimated a much greater increase was needed than did Saudi extension workers. This difference in judgment was not so evident among Saudi and non-Saudi experiment station workers. This might be ascribed to the present comparative shortage of Saudis among general extension workers in the two areas surveyed.

Judgments as to Future Manpower Needs Among Extension Specialists

In general, both Saudi and non-Saudi extension workers shared rather consistently perceptions regarding future increases in needs for extension specialists, with percentage increases expressed in terms which may be hopefully attained in each of the six specific areas of (1) water resources, (2) agronomy, (3) rice, (4) livestock, (5) agricultural mechanics, and (6) entomology. Likewise, such perceptions were also true of experiment station workers who did express considerably higher estimates of numbers needed than did extension workers. Means of needed percentage increases received from Saudi and non-Saudi extension workers ranged from a total low of 3.9 for rice specialists in 1980 to a total high of 15.2 for entomology specialists in 2000. Means of needed percentage increases received from Saudi and non-Saudi experiment station workers ranged from a total low of 13.6 for water resources specialists in 1980 to a total high of 22.4 for agricultural mechanics in 2000.

The most extreme ranges expressed were found among extension specialists for (1) entomology specialists and (2) agricultural mechanics specialists.

Judgments as to Increase Needed in
Experiment Station Personnel

Data presented in Tables X and XI show that Saudi and non-Saudi extension workers gave their opinion about future manpower needs for experiment staion personnel for each five-year period from 1980 to 2000. The means of needed percentage increases for specific personnel areas ranged from a total low of 4.5 in 1980 for water resource personnel to a total high of 19.5 for agronomy personnel. The means received from responses by present Saudi and non-Saudi experiment station workers ranged from a total low of 5.2 for water resource personnel and a total high of 24.9 for livestock personnel.

Judgments of Classified Groups as to the Relative
Importance of Selected Sources of Recruitment
for Respective Employment Areas

Findings as presented in Table XII indicate a rating of selected sources of recruitment for Saudi farmers as made by extension workers in two Eastern Areas. The extension workers were divided into groups, group A consisting of Saudi workers and group B non-Saudi workers.

A review of the method by which responses in this category were weighted and evaluated reflects the following:

Very important.....1

Important.....2

Some importance.....3

Little importance...4

Therefore, it should be pointed out that the lower was the score as

TABLE XII

RELATIVE IMPORTANCE OF SELECTED SOURCES FOR RECRUITMENT OF FARMERS AS PERCEIVED BY EXTENSION WORKERS IN TWO EASTERN AREAS

Sources	Group A Number of Saudi Workers = 9									Group B Number of Non Saudi Workers = 22									
	Very Important		Important		Some Importance		Little Importance		Group Rating	Very Important		Important		Some Importance		Little Importance		Group Rating	Total Rating
	N	%	N	%	N	%	N	%		N	%	N	%	N	%	N	%		
Sons of farmers	4	44.5	2	22.2	0	00.0	3	33.3	2.22	8	36.4	5	22.7	5	22.7	4	18.2	2.23	2.23
Saudi graduates	2	22.2	2	22.2	1	11.1	4	44.5	2.78	4	18.2	6	27.3	1	4.5	11	50.0	2.86	2.84
Agriculture graduates of other countries	0	00.0	1	11.1	0	00.0	8	88.9	3.78	5	22.7	2	9.1	2	9.1	13	59.1	3.05	3.26
Workers with agricultural experience	5	55.6	2	22.2	1	11.1	1	11.1	1.78	8	36.4	5	22.7	3	13.6	6	27.3	2.32	2.16

determined, the higher was the importance which the respondents placed on the item or practice.

The rating given by respondents comprising a total of both A and B groups was 2.16; therefore, it must be recognized as important that farmers be recruited from "workers with agricultural experience." These data are shown in Table XII. The comparative rating of 2.23 can be interpreted as agreement with the concept that "sons of farmers" do constitute an important source for recruitment of farmers. Considered of little importance is the recruitment of farmers from the ranks of graduates of schools and colleges, with scores of 3.26, "of little importance," recognized for graduates of other nations and of 2.84, "of some importance," for graduates of Saudia institutions. When ratings given by group A, of Saudi origin, is compared to those given by group B, of non-Saudi origin, it was found that the non-Saudi group considered graduates from schools or colleges in Saudi Arabia of slightly less importance than did Saudi workers. The reverse was true when consideration was given for the value of recruiting farmers from among "graduates of other countries." Both groups were in agreement that "sons of farmers" and "workers with agricultural experience" were to be considered the more important sources for recruitment.

When data were collated with regard to a comparison of the same selected sources for recruitment of extension workers, as shown in Table XIII, the response pattern was very similar, with "sons of farmers" receiving a rating of 2.32, indicating this source as being the most important. In like manner, a combined group response rating of 2.45 for "workers with agricultural experience" was considered relatively important. Comparison of the responses of the two groups A and B reveal that the

TABLE XIII

RELATIVE IMPORTANCE OF SELECTED SOURCES FOR RECRUITMENT OF EXTENSION WORKERS AS PERCEIVED BY EXTENSION WORKERS IN TWO EASTERN AREAS

Sources	Group A Number of Saudi Workers = 9									Group B Number of Non Saudi Workers = 22									
	Very Important		Important		Some Importance		Little Importance		Group Rating	Very Important		Important		Some Importance		Little Importance		Group Rating	Total Rating
	N	%	N	%	N	%	N	%		N	%	N	%	N	%	N	%		
Sons of farmers	2	22.2	5	55.6	1	11.1	1	11.1	2.11	4	18.2	10	45.5	3	13.6	5	22.7	2.41	2.32
Saudi graduates	2	22.2	1	11.1	3	33.3	3	33.3	2.78	4	18.2	7	31.8	6	27.3	5	22.7	2.55	2.61
Agriculture graduates of other countries	1	11.1	1	11.1	5	55.6	2	22.2	2.89	7	31.8	5	22.7	5	22.7	5	22.7	2.36	2.52
Workers with agricultural experience	2	22.2	2	22.2	3	33.3	2	22.2	2.56	6	27.3	6	27.3	5	22.7	5	22.7	2.41	2.45

non-Saudi considered "agricultural graduates of other countries" to be equally as important as "workers with agricultural experience" for recruitment of extension workers.

An examination of data presented in Table XIV shows that when extension workers consider sources of recruitment for experiment station workers, the combined group ratings indicate the higher relative importance given to "graduates of schools and colleges" as sources of recruitment for experiment station workers. When responses of Group A , Saudi workers, is compared with Group B , non-Saudi workers, it is not surprising to find that Saudis consider Saudi graduates to be the more important while the non-Saudi tends to look with more favor upon "agricultural graduates of other countries." Another striking difference is to be observed in that Saudi workers expressed the feeling that "sons of farmers" was an important source of recruitment for experiment station workers as compared to non-Saudi workers' assessment that it was only of "some importance."

Responses as to the relative importance of the selected sources of recruitment for extension and experiment station administrators are collected in Table XV. Again, non-Saudi workers tended to favor "agricultural graduates of other countries" for serving as administrators as compared to Saudi workers, who held up the "sons of farmers" rating 2.33 as the most important group for recruitment, with a rating of 2.44 compared to a 3.00 rating for "agricultural graduates of other countries." Non-Saudi respondents with a rating of 2.64 definitely seemed to feel that the administrators of extension and experiment station should more often be recruited from among "agricultural graduates of other countries."

Findings as presented in Table XVI indicate the rating of sources of recruitment for Saudi farmers as made by workers in Hafof Research Center

TABLE XIV

RELATIVE IMPORTANCE OF SELECTED SOURCES FOR RECRUITMENT OF EXPERIMENT STATION WORKERS AS PERCEIVED BY EXTENSION WORKERS IN TWO EASTERN AREAS

Sources	Group A Number of Saudi Workers = 9									Group B Number of Non Saudi Workers = 22									
	Very Important		Important		Some Importance		Little Importance		Group Rating	Very Important		Important		Some Importance		Little Importance		Group Rating	Total Rating
	N	%	N	%	N	%	N	%		N	%	N	%	N	%	N	%		
Sons of farmers	4	44.5	1	11.1	2	22.2	2	22.2	2.22	3	13.6	3	13.6	5	22.7	11	50.0	3.09	2.84
Saudi graduates	2	22.2	2	22.2	1	11.1	4	44.4	2.78	3	13.6	6	27.3	8	36.4	5	22.7	2.68	2.71
Agriculture graduates of other countries	0	00.0	2	22.2	4	44.4	3	33.3	3.11	7	31.8	6	27.3	5	22.7	4	18.2	2.27	2.52
Workers with agricultural experience	1	11.1	1	11.1	2	22.2	5	55.6	3.22	4	18.2	4	18.2	5	22.7	9	40.9	2.86	2.97

TABLE XV

RELATIVE IMPORTANCE OF SELECTED SOURCES FOR RECRUITMENT OF EXTENSION ADMINISTRATORS AS PERCEIVED BY EXTENSION WORKERS IN TWO EASTERN AREAS

Sources	Group A Number of Saudi Workers = 9									Group B Number of Non Saudi Workers = 22									
	Very Important		Important		Some Importance		Little Importance		Group Rating	Very Important		Important		Some Importance		Little Importance		Group Rating	Total Rating
	N	%	N	%	N	%	N	%		N	%	N	%	N	%	N	%		
Sons of farmers	4	44.4	0	00.0	3	33.3	2	22.2	2.33	4	18.2	3	13.6	3	13.6	12	54.5	3.05	2.84
Saudi graduates	3	33.3	2	22.2	1	11.1	3	33.3	2.44	4	18.2	3	13.6	4	18.2	11	50.0	3.00	2.84
Agriculture graduates of other countries	1	11.1	2	22.2	2	22.2	4	44.4	3.00	4	18.2	6	27.3	6	27.3	6	27.3	2.64	2.74
Workers with agricultural experience	1	11.1	0	00.0	3	33.3	5	55.6	3.33	3	13.6	3	13.6	2	9.1	14	63.6	3.23	3.26

TABLE XVI

RELATIVE IMPORTANCE OF SELECTED SOURCES FOR RECRUITMENT OF FARMERS AS PERCEIVED BY WORKERS IN HAFUF RESEARCH CENTER AND QATIF EXPERIMENTAL FARM

Sources	Group A Number of Saudi Workers = 10									Group B Number of Non Saudi Workers = 19									
	Very Important		Important		Some Importance		Little Importance		Group Rating	Very Important		Important		Some Importance		Little Importance		Group Rating	Total Rating
	N	%	N	%	N	%	N	%		N	%	N	%	N	%	N	%		
Sons of farmers	4	40.0	1	10.0	3	30.0	2	20.0	2.30	14	73.7	3	15.8	1	5.3	1	5.3	1.42	1.72
Saudi graduates	2	20.0	0	00.0	1	10.0	7	70.0	3.30	4	21.1	4	21.1	8	42.1	3	15.8	2.53	2.79
Agriculture graduates of other countries	0	00.0	1	10.0	1	10.0	8	80.0	3.70	1	5.3	5	26.3	11	57.9	2	10.5	2.73	3.07
Workers with agricultural experience	5	50.0	1	10.0	3	30.0	1	10.0	2.00	16	84.2	1	5.3	2	10.5	0	00.0	1.26	1.52

and the Qatif Experimental Farm. The rating given for the potential source "sons of farmers" was determined to be respectively 2.3 from Group A which can be compared to the higher rating of 1.42 received from Group "B". This pointed out that the non-Saudi workers in Group "B" agreed that the recruitment from "sons of farmers" was very important in terms to be of manpower of future farmers. Returns received concerning the value of recruitment of "workers with agricultural experience" indicate that both groups felt this to be important with the relatively high rating of 2.0 and 1.26 from Group A and B respectively.

The total rating for "sons of farmers" as a source of recruitment of farmers in both groups was determined as 1.52. Of much less importance according to native Saudi workers is the recruitment of farmers from "graduates of Saudi Arabia schools and colleges," with the relatively low score of 3.3. Non-Saudi workers differed with Saudis in that they felt that recruitment from among graduates of Saudi schools and colleges was of "some importance." Non-Saudis also felt that recruiting farmers from among "graduates of schools of other countries" was of somewhat greater importance than did their Saudi counterparts.

For both groups, however, schools and colleges, whether in Saudi Arabia or elsewhere, were judged to be of least importance among the sources considered, this when recruiting farmers.

When attention was given to sources of recruitment for extension workers, data as presented in Table XVII show, in terms of combined group ratings, the higher relative importance of "workers with agricultural experience as sources of recruitment." Little difference is to be observed between responses of Saudi and non-Saudi workers, with non-Saudi workers giving one of the highest ratings, 1.68, which was to be observed

TABLE XVII

RELATIVE IMPORTANCE OF SELECTED SOURCES FOR RECRUITMENT OF EXTENSION WORKERS AS PERCEIVED BY WORKERS IN HAFUF RESEARCH CENTER AND QATIF EXPERIMENTAL FARM

Sources	Group A Number of Saudi Workers = 10									Group B Number of Non Saudi Workers = 19									
	Very Important		Important		Some Importance		Little Importance		Group Rating	Very Important		Important		Some Importance		Little Importance		Group Rating	Total Rating
	N	%	N	%	N	%	N	%		N	%	N	%	N	%	N	%		
Sons of farmers	2	20.0	5	50.0	0	00.0	3	30.0	2.40	2	10.5	14	73.7	3	15.8	0	00.0	2.05	2.17
Saudi graduates	2	20.0	1	10.0	6	60.0	1	10.0	2.60	11	57.9	2	10.5	5	26.3	1	5.3	1.79	2.07
Agriculture graduates of other countries	2	20.0	2	20.0	4	40.0	2	20.0	2.60	0	00.0	8	42.1	10	52.6	1	5.3	2.63	2.62
Workers with agricultural experience	3	30.0	2	20.0	3	30.0	2	20.0	2.40	10	52.6	6	31.6	2	10.5	1	5.3	1.68	1.93

in the entire study.

Survey data collected and presented in Table XVIII reveal that the rating of 1.74 received from Group B, non-Saudi workers, for a judgment as to the importance of recruiting experiment station workers from graduates of schools and colleges to be the highest rating given in terms of experiment station workers recruitment. This is largely in agreement with the relatively high rating of 1.90 received from Group A, Saudi workers. "Sons of farmers," "agricultural graduates of schools of other nations," and "workers with agricultural experience" received ratings indicating they gave "some importance" to these sources.

In an examination of data collated in Table XIX, it is to be observed that both Groups A, Saudi workers, and B, non-Saudi workers, hold the same judgments concerning the value of graduates from Saudi colleges and schools to be recruited as future extension and experiment station administrators. Group A gave a rating of 2.2 compared to Group B while a rating of 2.53 of other sources yielded scores in the ranges of little importance, with scores of rating total 3.31 for "graduates of schools from other nations" and 2.76, of some importance for "workers with agricultural experience."

As can be discovered through an examination of data presented in Table XX, five administrators from the Ministry of Agriculture and Water in Riyadh participated as respondents, comprising an additional group included in the study. In keeping with the structure and stratification used throughout the study, administrators were further divided into sub-groups, Group A, Saudi administrators, and Group B, non-Saudi administrators. Included in both sub-groups were administrators of both Extension Training and Research departments. The rating of 1.33, given by

TABLE XVIII

RELATIVE IMPORTANCE OF SELECTED SOURCES FOR RECRUITMENT OF EXPERIMENT STATION WORKERS AS PERCEIVED BY WORKERS IN HAFOF RESEARCH CENTER AND QATIF EXPERIMENTAL FARM

Sources	Group A Number of Saudi Workers = 10									Group B Number of Non Saudi Workers = 19									
	Very Important		Important		Some Importance		Little Importance		Group Rating	Very Important		Important		Some Importance		Little Importance		Group Rating	Total Rating
	N	%	N	%	N	%	N	%		N	%	N	%	N	%	N	%		
Sons of farmers	3	30.0	1	10.0	3	30.0	3	30.0	2.60	3	15.8	4	21.1	3	15.8	9	47.4	2.95	2.83
Saudi graduates	5	50.0	2	20.0	2	20.0	1	10.0	1.90	11	57.9	4	21.1	2	10.5	2	10.5	1.74	1.79
Agriculture graduates of other countries	1	10.0	5	50.0	1	10.0	3	30.0	2.60	4	21.1	4	21.1	9	47.4	2	10.5	2.47	2.52
Workers with agricultural experience	3	30.0	2	20.0	2	20.0	3	30.0	2.50	2	10.5	4	21.1	10	52.6	3	15.8	2.74	2.66

TABLE XIX

RELATIVE IMPORTANCE OF SELECTED SOURCES FOR RECRUITMENT OF EXTENSION ADMINISTRATORS AS PERCEIVED BY WORKERS IN HAFOF RESEARCH CENTER AND QATIF EXPERIMENTAL FARM

Sources	Group A Number of Saudi Workers = 10									Group B Number of Non Saudi Workers = 19									
	Very Important		Important		Some Importance		Little Importance		Group Rating	Very Important		Important		Some Importance		Little Importance		Group Rating	Total Rating
	N	%	N	%	N	%	N	%		N	%	N	%	N	%	N	%		
Sons of farmers	1	10.0	3	30.0	2	20.0	4	40.0	2.90	2	10.5	0	00.0	15	78.9	2	10.5	2.89	2.90
Saudi graduates	2	20.0	5	50.0	2	20.0	1	10.0	2.20	3	15.8	4	21.1	11	57.9	1	5.3	2.53	2.41
Agriculture graduates of other countries	2	20.0	0	00.0	2	20.0	6	60.0	3.20	1	5.3	2	10.5	5	26.3	11	57.9	3.37	3.31
Workers with agricultural experience	2	20.0	3	30.0	1	10.0	4	40.0	2.70	2	10.5	4	21.1	9	47.4	4	21.1	2.79	2.76

TABLE XX

RELATIVE IMPORTANCE OF SELECTED SOURCES FOR RECRUITMENT OF FARMERS AS PERCEIVED BY ADMINISTRATORS IN THE MINISTRY OF AGRICULTURE AND WATER

Sources	Group A Number of Saudi Administrators = 3									Group B Number of Non Saudi Administrators = 2									
	Very Important		Important		Some Importance		Little Importance		Group Rating	Very Important		Important		Some Importance		Little Importance		Group Rating	Total Rating
	N	%	N	%	N	%	N	%		N	%	N	%	N	%	N	%		
Sons of farmers	2	66.7	1	33.3	0	00.0	0	00.0	1.33	2	100.0	0	00.0	0	00.0	0	00.0	1.00	1.20
Saudi graduates	2	66.7	1	33.3	0	00.0	0	00.0	1.33	0	00.0	0	00.0	0	00.0	2	100.0	4.00	2.40
Agriculture graduates of other countries	0	00.0	0	00.0	2	66.7	1	33.3	3.33	0	00.0	0	00.0	0	00.0	2	100.0	4.00	3.60
Workers with agricultural experience	2	66.7	1	33.3	0	00.0	0	00.0	1.33	1	50.0	0	00.0	0	00.0	1	50.0	2.50	1.80

respondents comprising Group "A" would signify that they felt a very important source for future Saudi farmers to be "sons of farmers." In like manner, they felt that "graduates of Saudi schools and colleges" and "workers with agricultural experience" were quite important for consideration as sources for recruitment, consequently, giving all three categories the same rating, 1.33. Group B, administrators of non-Saudi origin, gave the highest rating of the entire study, that of 1.00, asserting a very important recruitment source for future Saudi farmers to be "sons of farmers."

Findings shown in Table XXI indicate administrators deemed it very important in recruitment of extension workers to consider "Saudi graduates" in that ratings of 1.00 and 1.5 were given by Groups A and B respectively.

Data presented in Table XXII clearly show that when considering recruitment of agricultural experiment station workers, administrators feel that graduates of Saudi schools and colleges are very important and they are likewise concerned that those recruited for such work be individuals with agricultural experience. This was borne out in that ratings of 1.00 were given to the source of recruitment, "Saudi graduates," and 1.67 for recruitment of "workers with agricultural experience." Administrators comprising Group B were also of the opinion that recruitment of experiment station workers from the ranks of "graduates of Saudi schools and colleges" was of some importance, but did indicate that this practice was quite as desirable as recruitment of graduates of schools and colleges in other countries. Neither were they of the opinion that workers with agricultural experiences were at all important. This was also true of the feeling as to the desirability of recruitment from the ranks of "sons of farmers."

TABLE XXI

RELATIVE IMPORTANCE OF SELECTED SOURCES FOR RECRUITMENT OF EXTENSION WORKERS AS PERCEIVED BY ADMINISTRATORS IN THE MINISTRY OF AGRICULTURE AND WATER

Sources	Group A Number of Saudi Administrators = 3									Group B Number of Non Saudi Administrators = 2									
	Very Important		Important		Some Importance		Little Importance		Group Rating	Very Important		Important		Some Importance		Little Importance		Group Rating	Total Rating
	N	%	N	%	N	%	N	%		N	%	N	%	N	%	N	%		
Sons of farmers	1	33.3	1	33.3	1	33.3	0	00.0	2.00	0	00.0	2	100.0	0	00.0	0	00.0	2.00	2.00
Saudi graduates	3	100.0	0	00.0	0	00.0	0	00.0	1.00	1	50.0	1	50.0	0	00.0	0	00.0	1.50	1.20
Agriculture graduates of other countries	0	00.0	1	33.3	2	66.7	0	00.0	2.67	0	00.0	1	50.0	0	00.0	0	00.0	1.00	2.00
Workers with agricultural experience	2	66.7	1	33.3	0	00.0	0	00.0	1.33	0	00.0	1	50.0	0	00.0	1	50.0	3.00	2.00

TABLE XXII

RELATIVE IMPORTANCE OF SELECTED SOURCES FOR RECRUITMENT OF EXPERIMENT STATION WORKERS AS PERCEIVED BY ADMINISTRATORS IN THE MINISTRY OF AGRICULTURE AND WATER

Sources	Group A Number of Saudi Administrators = 3									Group B Number of Non Saudi Administrators = 2									
	Very Important		Important		Some Importance		Little Importance		Group Rating	Very Important		Important		Some Importance		Little Importance		Group Rating	Total Rating
	N	%	N	%	N	%	N	%		N	%	N	%	N	%	N	%		
Sons of farmers	0	00.0	1	33.3	2	66.7	0	00.0	2.67	0	00.0	0	00.0	1	50.0	1	50.0	3.50	3.00
Saudi graduates	3	100.0	0	00.0	0	00.0	0	00.0	1.00	0	00.0	1	50.0	1	50.0	0	00.0	2.50	1.60
Agriculture graduates of other countries	0	00.0	1	33.3	2	66.7	0	00.0	2.67	1	50.0	0	00.0	1	50.0	0	00.0	2.00	2.40
Workers with agricultural experience	1	33.3	2	66.7	0	00.0	0	00.0	1.67	0	00.0	0	00.0	1	50.0	1	50.0	3.50	2.40

An examination of data presented in Table XXIII would seem to indicate that non-Saudi administrators tend to discount the value of administrators having experience in agriculture since the rating given constituted a low of 4.0. However, they did give a high rating for recruiting Extension administrators from among the ranks of "Saudi graduates," thus giving expression to the feeling that, in terms of recruitment, it is much more important for Extension administrators to be trained Saudis than would be true of administrators of experiment station and research centers. Particularly, as compared to agricultural graduates of other countries, responses of administrators comprising Group A were rather difficult to interpret, since none of them gave a score of any kind to the item regarding the desirability of recruitment from among Saudi graduates. A lower rating of 3.2 was given the item regarding recruitment of extension administrators from "sons of farmers." This low rating was determined as a total rating for Groups A and B combined.

Judgments of Classified Groups as to the Relative Importance of Selected Levels of Training for Preparation of Workers in Respective Employment Areas

Individuals comprising the respective groupings of the study were also asked to respond in making judgments as to the relative importance of selected levels of training needed for the preparation of prospective (1) farmers, (2) extension workers, (3) experiment station workers, and (4) administrators of extension and agricultural research centers. Present extension workers making up both Groups A and B, Saudi and non-Saudi extension workers, indicated that agricultural training in elementary

TABLE XXIII

RELATIVE IMPORTANCE OF SELECTED SOURCES FOR RECRUITMENT OF EXTENSION ADMINISTRATORS AS PERCEIVED BY ADMINISTRATORS IN THE MINISTRY OF AGRICULTURE AND WATER

Sources	Group A Number of Saudi Administrators = 3									Group B Number of Non Saudi Administrators = 2									
	Very Important		Important		Some Importance		Little Importance		Group Rating	Very Important		Important		Some Importance		Little Importance		Group Rating	Total Rating
	N	%	N	%	N	%	N	%		N	%	N	%	N	%	N	%		
Sons of farmers	0	00.0	1	33.3	1	33.3	1	33.4	3.00	0	00.0	0	00.0	1	50.0	1	50.0	3.50	3.20
Saudi graduates	0	00.0	0	00.0	0	00.0	0	00.0	0.00	1	50.0	1	50.0	0	50.0	0	00.0	1.50	0.60
Agriculture graduates of other countries	0	00.0	1	33.3	2	66.7	0	00.0	2.67	0	00.0	0	00.0	1	50.0	1	50.0	3.50	3.00
Workers with agricultural experience	1	33.3	0	00.0	2	66.7	0	00.0	2.33	0	00.0	0	00.0	0	00.0	2	100.0	4.00	3.00

schools was important for preparation of future farmers. The total rating of 1.35, as shown by data presented in Table XXIV, does signal importance in the judgment of present workers. Native Saudi extension workers indicated that training in secondary agricultural schools would be of some importance and likewise felt that institutes or informal adult education would be of some importance.

Extension workers of non-Saudi origin were also strongly supportive of agricultural programs in elementary schools, but did not share native Saudi workers' judgments as to the relative importance of secondary agricultural school training. None of the respondents in either group felt that education beyond the secondary level would be of benefit for future farmers.

Data as presented in Table XXV indicate that Group A, Saudi workers, were strong in their expressed judgment that completion of studies in a "secondary agricultural school" was very important in the preparation of future Saudi extension workers. This was expressed by a high rating of 1.56 for this item. They also felt that attainment of a B.S. in Agriculture was important. Group B, non-Saudi extension workers, felt that the B.S. in Agriculture was very important, giving it the very high rating of 1.41. They were also strong in the feeling that completion of the secondary school level, either secondary or secondary agriculture schools, was desirable. High ratings of 1.77 and 1.82, respectively, confirmed this finding.

In terms of the judgments of present extension workers in two eastern province areas, with regard to levels of training desirable for future experiment station workers, an examination of data presented in Table XXVI shows that Group A indicated that "internships on the job"

TABLE XXIV

RELATIVE IMPORTANCE OF SELECTED LEVELS OF TRAINING FOR PREPARATION OF FARMERS AS PERCEIVED BY EXTENSION WORKERS IN TWO EASTERN AREAS

Level of Training	Group A Number of Saudi Workers = 9									Group B Number of Non Saudi Workers = 22									
	Very Important		Important		Some Importance		Little Importance		Group Rating	Very Important		Important		Some Importance		Little Importance		Group Rating	Total Rating
	N	%	N	%	N	%	N	%		N	%	N	%	N	%	N	%		
Elementary	7	77.8	0	00.0	1	11.1	1	11.1	1.56	19	86.4	1	4.5	1	4.5	1	4.5	1.27	1.35
Secondary	1	11.1	0	00.0	3	33.3	5	55.6	3.33	2	9.1	6	27.3	2	9.1	12	54.5	3.09	3.16
Secondary agricultural schools	2	22.2	4	44.4	1	11.1	2	22.2	2.33	4	18.2	2	9.1	3	13.6	13	59.1	3.14	2.90
Institutes or informal adult education	4	44.4	1	11.1	0	00.0	4	44.4	2.44	2	9.1	3	13.6	0	00.0	17	77.3	3.45	3.16
B.S.	0	00.0	0	00.0	0	00.0	9	100.0	4.00	0	00.0	0	00.0	0	00.0	22	100.0	4.00	4.00
B.S. Agriculture	0	00.0	0	00.0	0	00.0	9	100.0	4.00	0	00.0	0	00.0	1	4.5	21	95.5	3.95	3.97
M.S.	0	00.0	0	00.0	0	00.0	9	100.0	4.00	0	00.0	0	00.0	0	00.0	22	100.0	4.00	4.00
M.S. Agriculture	0	00.0	0	00.0	0	00.0	9	100.0	4.00	0	00.0	0	00.0	0	00.0	22	100.0	4.00	4.00
Internships (on the job)	1	11.1	0	00.0	0	00.0	8	88.9	3.67	5	22.7	1	4.5	2	9.1	14	63.6	3.13	3.29
In-service training workshops, etc.	1	11.1	0	00.0	0	00.0	8	88.9	3.67	5	22.7	0	00.0	3	13.6	14	63.6	3.18	3.32

TABLE XXV

RELATIVE IMPORTANCE OF SELECTED LEVELS OF TRAINING FOR PREPARATION OF EXTENSION WORKERS AS PERCEIVED BY EXTENSION WORKERS IN TWO EASTERN AREAS

Level of Training	Group A Number of Saudi Workers = 9									Group B Number of Non Saudi Workers = 22									
	Very Important		Important		Some Importance		Little Importance		Group Rating	Very Important		Important		Some Importance		Little Importance		Group Rating	Total Rating
	N	%	N	%	N	%	N	%		N	%	N	%	N	%	N	%		
Elementary	4	44.4	1	11.1	3	33.3	1	11.1	2.11	6	27.3	3	13.6	3	13.6	10	45.5	2.77	2.58
Secondary	2	22.2	4	44.4	1	11.1	2	22.2	2.33	15	68.2	1	4.5	2	9.1	4	18.2	1.77	1.94
Secondary agricultural schools	4	44.4	5	55.6	0	00.0	0	00.0	1.56	11	50.0	6	27.3	3	13.6	2	9.1	1.82	1.74
Institutes or informal adult education	1	11.1	5	55.6	2	22.2	1	11.1	2.33	7	31.8	6	27.3	5	22.7	4	18.2	2.27	2.29
B.S.	3	33.3	1	11.1	5	55.6	0	00.0	2.22	11	50.0	1	4.5	4	18.2	6	27.3	2.23	2.23
B.S. Agriculture	2	22.2	4	44.4	3	33.3	0	00.0	2.11	17	77.3	2	9.1	2	9.1	1	4.5	1.41	1.61
M.S.	0	00.0	0	00.0	7	77.8	2	22.2	3.22	2	9.1	5	22.7	6	27.3	9	40.9	3.00	3.06
M.S. Agriculture	0	09.0	2	22.2	5	55.6	2	22.2	3.00	0	00.0	7	31.8	8	36.4	7	31.8	3.00	3.00
Internships (on the job)	2	22.2	1	11.1	6	66.7	0	00.0	2.44	11	50.0	4	18.2	5	22.7	2	9.1	1.91	2.06
In-service training workshops, etc.	3	33.3	0	00.0	6	66.7	0	00.0	2.33	11	50.0	2	9.1	5	22.7	4	18.2	2.09	2.16

was very important, with the high rating 1.33. They also indicated that obtaining the B.S. degree in agriculture was very important, with a rating given for this item of 1.56. They were also in agreement with respondents comprising Group B, extension workers of non-Saudi origin, in placing a very high value on the acquisition of the Masters Degree by future experiment station workers, Group A gave a rating of 1.56 for acquisition of the Bachelors Degree compared to 1.78 for the Masters Degree. Group B made ratings which were consistent with those given by Group A but were somewhat higher, 1.09 and 1.56, respectively. However, Group B valued the Masters Degree in agriculture higher than the Masters Degree, giving the higher score of 1.32 to acquisition of a Masters Degree in agriculture. Group A did not make such a difference, placing the Masters Degree higher than a Masters Degree in agriculture.

Data as presented in Table XXVII reveal that Group A, Saudi extension workers, felt that acquisition of the Bachelors Degree was very important, giving the high rating of 1.67 for this item acquired in preparation for the administrator of extension and experiment station centers. It is of interest to note that they scored the B.S. higher than the B.S. in agriculture. They also felt the M.S. Agriculture was important by rating it 1.78. This as compared to a somewhat lower rating of 2.00 for the M.S. Group B, non-Saudi workers, gave the very high comparative of 1.55 for the item "internships on the job" for preparation of administrators. They also indicated that the B.S. in agriculture and the B.S. were important with ratings of 1.64 and 1.91, respectively, bearing out this finding.

Data as presented in Table XXVIII indicate that when responses were asked of those in Group A, comprising present native Saudi experiment

TABLE XXVI

RELATIVE IMPORTANCE OF SELECTED LEVELS OF TRAINING FOR PREPARATION OF EXPERIMENT STATION WORKERS AS PERCEIVED BY EXTENSION WORKERS IN TWO EASTERN AREAS

Level of Training	Group A Number of Saudi Workers = 9									Group B Number of Non Saudi Workers = 22									
	Very Important		Important		Some Importance		Little Importance		Group Rating	Very Important		Important		Some Importance		Little Importance		Group Rating	Total Rating
	N	%	N	%	N	%	N	%		N	%	N	%	N	%	N	%		
Elementary	3	33.3	2	22.2	1	11.1	3	33.3	2.44	7	31.8	0	00.0	3	13.6	12	54.5	2.91	2.77
Secondary	4	44.4	1	11.1	2	22.2	2	22.2	2.22	13	59.1	2	9.1	3	13.6	4	18.2	1.91	2.00
Secondary agricultural schools	2	22.2	6	66.7	0	00.0	1	11.1	2.00	7	31.8	8	36.4	4	18.2	3	13.6	2.14	2.10
Institutes or informal adult education	2	22.2	3	33.3	1	11.1	3	33.3	2.56	3	13.6	9	40.9	5	22.7	5	22.7	2.55	2.55
B.S.	5	55.6	2	22.2	2	22.2	0	00.0	1.67	12	54.5	5	22.7	2	9.1	3	13.6	1.82	1.77
B.S. Agriculture	5	55.6	3	33.3	1	11.1	0	00.0	1.56	21	95.5	0	00.0	1	4.5	0	00.0	1.09	1.23
M.S.	4	44.4	3	33.3	2	22.2	0	00.0	1.78	16	72.7	1	4.5	4	18.2	1	4.5	1.55	1.61
M.S. Agriculture	3	33.3	2	22.2	4	44.4	0	00.0	2.11	19	86.4	0	00.0	2	9.1	1	4.5	1.32	1.55
Internships (on the job)	6	66.7	3	33.3	0	00.0	0	00.0	1.33	14	63.6	6	27.3	1	4.5	1	4.5	1.50	1.45
In-service training workshops, etc.	5	55.6	1	11.1	3	33.3	0	00.0	1.78	16	72.7	2	9.1	2	9.1	2	9.1	1.55	1.61

TABLE XXVII

RELATIVE IMPORTANCE OF SELECTED LEVELS OF TRAINING FOR PREPARATION OF ADMINISTRATORS AS PERCEIVED BY EXTENSION WORKERS IN TWO EASTERN AREAS

Level of Training	Group A Number of Saudi Workers = 9									Group B Number of Non Saudi Workers = 22									
	Very Important		Important		Some Importance		Little Importance		Group Rating	Very Important		Important		Some Importance		Little Importance		Group Rating	Total Rating
	N	%	N	%	N	%	N	%		N	%	N	%	N	%	N	%		
Elementary	3	33.3	1	11.1	0	00.0	5	55.6	2.78	7	31.8	0	00.0	0	00.0	15	68.2	3.05	2.92
Secondary	3	33.3	1	11.1	2	22.2	3	33.3	2.56	11	50.0	4	18.2	1	4.5	6	27.3	2.09	2.23
Secondary Agricultural schools	0	00.0	5	55.6	2	22.2	2	22.2	2.67	8	36.4	2	9.1	7	31.8	5	22.7	2.41	2.48
Institutes or informal adult education	2	22.2	1	11.1	3	33.3	3	33.3	2.78	5	22.7	6	27.3	3	13.6	8	36.4	2.64	2.68
B.S.	5	55.6	3	33.3	0	00.0	1	11.1	1.67	13	59.1	2	9.1	3	13.6	4	18.2	1.91	1.84
B.S. Agriculture	3	33.3	4	44.4	1	11.1	1	11.1	2.00	15	68.2	2	9.1	3	13.6	2	9.1	1.64	1.74
M.S.	4	44.4	3	33.3	0	00.0	2	22.2	2.00	10	45.5	4	18.2	3	13.6	5	22.7	2.14	2.10
M.S. Agriculture	5	55.6	2	22.2	1	11.1	1	11.1	1.78	13	59.1	2	9.1	3	13.6	4	18.2	1.91	1.87
Internships (on the job)	3	33.3	1	11.1	5	55.6	0	00.0	2.22	15	68.2	2	9.1	5	22.7	0	00.0	1.55	1.74
In-service training workshops, etc.	3	33.3	2	22.2	3	33.3	1	11.1	2.22	13	59.1	2	9.1	2	9.1	5	22.7	1.95	2.03

TABLE XXVIII

RELATIVE IMPORTANCE OF SELECTED LEVELS OF TRAINING FOR PREPARATION OF FARMERS AS PERCEIVED BY EXPERIMENT STATION WORKERS IN TWO EASTERN AREAS

Level of Training	Group A Number of Saudi Workers = 10									Group B Number of Non Saudi Workers = 19									
	Very Important		Important		Some Importance		Little Importance		Group Rating	Very Important		Important		Some Importance		Little Importance		Group Rating	Total Rating
	N	%	N	%	N	%	N	%		N	%	N	%	N	%	N	%		
Elementary	9	90.0	0	00.0	0	00.0	1	10.0	1.30	17	89.5	1	5.3	1	5.3	0	00.0	1.16	1.21
Secondary	3	30.0	3	30.0	0	00.0	4	40.0	2.50	7	36.8	5	26.3	4	21.1	3	15.8	2.16	2.28
Secondary agricultural schools	5	50.0	2	20.0	0	00.0	3	30.0	2.10	11	56.9	1	5.3	4	21.1	3	15.8	1.95	2.00
Institutes or informal adult education	1	10.0	3	30.0	1	10.0	5	50.0	3.00	10	52.6	2	10.5	3	15.8	4	21.1	2.05	2.38
B.S.	0	00.0	1	10.0	0	00.0	9	90.0	3.80	0	00.0	0	00.0	4	21.1	15	78.9	3.79	3.79
B.S. Agriculture	0	00.0	2	20.0	0	00.0	8	80.0	3.60	1	5.3	2	10.5	9	47.4	7	36.8	3.16	3.31
M.S.	0	00.0	0	00.0	1	10.0	9	90.0	3.90	0	00.0	0	00.0	1	5.3	18	94.7	3.95	3.93
M.S. Agriculture	0	00.0	1	10.0	0	00.0	9	90.0	3.80	1	5.3	0	00.0	2	10.5	16	84.2	3.74	3.76
Internships (on the job)	1	10.0	2	20.0	2	20.0	5	50.0	3.10	10	52.6	2	10.5	2	10.5	5	26.3	2.11	2.45
In-service training workshops, etc.	3	30.0	0	00.0	2	20.0	5	50.0	2.90	12	63.2	2	10.5	0	00.0	5	26.3	1.89	2.24

station workers, as to which levels of training should be considered important in preparing future Saudi farmers, they were strong in responses, giving very much emphasis to the completion of elementary school, with a rating of 1.3 given this category level. Likewise, they felt that it would be of importance for future farmers to attend secondary agricultural schools, with a rating of 2.1 given to this category. Group B, non-Saudi experiment station workers, also felt that attendance at elementary schools was of very high importance, giving this item an even higher rating of 1.16. They also indicated that "in-service training workshops" were of considerable importance, giving this practice a rating of 1.89 in terms of possible effectiveness in the preparations of future Saudi farmers.

Table XXIX contains collated data depicting the judgments of present experiment station workers regarding selected levels of training which might best be considered effective for the preparation of Saudi extension workers. Group A were strong in indicating that the training provided by secondary agricultural schools would be important for extension workers. They emphasized this with the high rating of 1.9. They also felt that the "in-service workshops" and the Bachelors Degree in agriculture were both very important, giving ratings of 1.4 and 1.5 respectively to these items. Group B gave the matter of acquisition of a Bachelors Degree in agriculture a higher rating than they did any other levels of training for preparation of extension workers, this with a rating of 1.42. They also gave the same relatively high rating of 1.53 to each of the item levels "internships on the job" and "in-service training workshops."

Findings as presented in Table XXX indicate the ratings given

TABLE XXIX

RELATIVE IMPORTANCE OF SELECTED LEVELS OF TRAINING FOR PREPARATION OF EXTENSION WORKERS AS PERCEIVED BY EXPERIMENT STATION WORKERS IN TWO EASTERN AREAS

Level of Training	Group A Number of Saudi Workers = 10									Group B Number of Non Saudi Workers = 19									
	Very Important		Important		Some Importance		Little Importance		Group Rating	Very Important		Important		Some Importance		Little Importance		Group Rating	Total Rating
	N	%	N	%	N	%	N	%		N	%	N	%	N	%	N	%		
Elementary	2	20.0	1	10.0	0	00.0	7	70.0	3.20	10	52.6	0	00.0	2	10.5	7	36.8	2.32	2.62
Secondary	3	30.0	2	20.0	0	00.0	5	50.0	2.70	9	47.4	1	5.3	4	21.1	5	26.3	2.26	2.41
Secondary agricultural schools	3	30.0	5	50.0	2	20.0	0	00.0	1.90	11	57.9	5	26.3	2	10.5	1	5.3	1.63	1.72
Institutes or informal adult education	2	20.0	4	40.0	3	30.0	1	10.0	2.30	11	57.9	2	10.5	4	21.1	2	10.5	1.84	2.00
B.S.	4	40.0	1	10.0	0	00.0	5	50.0	2.60	1	5.3	4	21.1	2	10.5	12	63.2	3.32	3.07
B.S. Agriculture	7	70.0	2	20.0	0	00.0	1	10.0	1.50	14	73.7	2	10.5	3	15.8	0	00.0	1.42	1.44
M.S.	3	30.0	1	10.0	0	00.0	6	60.0	2.90	0	00.0	1	5.3	7	36.8	11	57.9	3.53	3.31
M.S. Agriculture	2	20.0	4	40.0	2	20.0	2	20.0	2.40	3	15.8	4	21.1	12	63.2	0	00.0	2.47	2.45
Internships (on the job)	3	30.0	4	40.0	3	30.0	0	00.0	2.00	12	63.2	4	21.1	3	15.8	0	00.0	1.53	1.69
In-service training workshops, etc.	6	60.0	4	40.0	0	00.0	0	00.0	1.40	15	78.9	2	10.5	2	10.5	0	00.0	1.32	1.34

selected levels of training for preparation of future Saudi experiment station workers, these as made by present experiment station workers. Group A, native Saudi workers, selected two levels of training to indicate a very strong and higher importance, expressed in ratings of 1.00 and 1.1, for preparation of future experiment station workers. These levels given such high ratings, were (1) Bachelors Degree in agriculture, and (2) in-service training workshops. Group B, non-Saudi workers, differed somewhat with native Saudis in that they felt that the Masters Degree in agriculture was possibly the most important level of achievement for preparation of experiment station workers and they expressed this conviction with a rating of 1.21. They did agree with the native workers in Saudi that the "in-service training workshops" was deemed important but slightly less so than the M.S. in agriculture, while the Saudi workers responded in the same manner but in reverse order, giving slightly more emphasis upon the B.S. in agriculture.

In terms of the judgments of present experiment station workers, with regard to levels of training felt desirable for future extension and experiment station administrators, an examination of data presented in Table XXXI shows that Group A, Saudi workers, indicated that the "in-service training workshop" was very important, giving a high rating of 1.4. They also felt that the Bachelors Degree in agriculture and the Masters Degree in agriculture were very important for preparation of administrators with the relatively high ratings of 1.8 given each. Group B, non-Saudi workers, considered the "in-service training workshop" to be a very important level of preparation for administrators, with the rating given of 1.78. They also felt that completion of work at a secondary agriculture school was important for preparation of administrators, giving a total rating of 1.84.

TABLE XXX

RELATIVE IMPORTANCE OF SELECTED LEVELS OF TRAINING FOR PREPARATION OF EXPERIMENT STATION WORKERS AS PERCEIVED BY EXPERIMENT STATION WORKERS IN TWO EASTERN AREAS

Level of Training	Group A Number of Saudi Workers = 10									Group B Number of Non Saudi Workers = 19									
	Very Important		Important		Some Importance		Little Importance		Group Rating	Very Important		Important		Some Importance		Little Importance		Group Rating	Total Rating
	N	%	N	%	N	%	N	%		N	%	N	%	N	%	N	%		
Elementary	1	10.0	0	00.0	0	00.0	9	90.0	3.70	10	52.6	0	00.0	0	00.0	9	47.4	2.42	2.86
Secondary	2	20.0	2	20.0	1	10.0	5	50.0	2.90	9	47.4	1	5.3	2	10.5	7	36.8	2.37	2.55
Secondary agricultural schools	1	10.0	3	30.0	4	40.0	2	20.0	2.70	10	52.6	6	31.6	1	5.3	2	10.5	1.74	2.07
Institutes or informal adult education	1	10.0	3	30.0	1	10.0	5	50.0	3.00	9	47.4	2	10.5	3	15.8	5	26.3	2.21	2.48
B.S.	5	50.0	0	00.0	0	00.0	5	50.0	2.50	3	15.8	11	58.0	0	00.0	5	26.3	2.37	2.41
B.S. Agriculture	10	100.0	0	00.0	0	00.0	0	00.0	1.00	18	94.7	1	5.3	0	00.0	0	00.0	1.05	1.03
M.S.	3	30.0	1	10.0	1	10.0	5	50.0	2.80	3	15.8	9	47.4	2	10.5	5	26.3	2.47	2.59
M.S. Agriculture	7	70.0	2	20.0	1	10.0	0	00.0	1.40	17	89.5	0	00.0	2	10.5	0	00.0	1.21	1.28
Internships (on the job)	6	60.0	4	40.0	0	00.0	0	00.0	1.40	11	58.0	4	21.1	3	15.8	1	5.3	1.68	1.59
In-service training workshops, etc.	9	90.0	1	10.0	0	00.0	0	00.0	1.10	13	68.4	4	21.1	2	10.5	0	00.0	1.42	1.31

TABLE XXXI

RELATIVE IMPORTANCE OF SELECTED LEVELS OF TRAINING FOR PREPARATION OF EXTENSION ADMINISTRATORS AS PERCEIVED BY EXPERIMENT STATION WORKERS IN TWO EASTERN AREAS

Level of Training	Group A Number of Saudi Workers = 10									Group B Number of Non Saudi Workers = 19									
	Very Important		Important		Some Importance		Little Importance		Group Rating	Very Important		Important		Some Importance		Little Importance		Group Rating	Total Rating
	N	%	N	%	N	%	N	%		N	%	N	%	N	%	N	%		
Elementary	1	10.0	0	00.0	0	00.0	9	90.0	3.70	10	52.6	0	00.0	0	00.0	9	47.4	2.42	2.86
Secondary	3	30.0	0	00.0	1	10.0	6	60.0	3.00	10	52.6	1	5.3	4	21.1	4	21.1	2.11	2.41
Secondary agricultural schools	0	00.0	2	20.0	3	30.0	5	50.0	3.60	12	63.2	1	5.3	3	15.8	3	15.8	1.84	2.34
Institutes or informal adult education	1	10.0	1	10.0	1	10.0	7	70.0	3.40	10	52.6	1	5.3	3	15.8	5	26.3	2.16	2.59
B.S.	4	40.0	3	30.0	0	00.0	3	30.0	2.20	5	26.3	10	52.6	2	10.5	2	10.5	2.05	2.10
B.S. Agriculture	6	60.0	2	20.0	0	00.0	2	20.0	1.80	7	36.8	4	21.1	8	42.1	0	00.0	2.05	1.97
M.S.	5	50.0	1	10.0	2	20.0	2	20.0	2.10	2	10.5	1	5.3	13	68.4	3	15.8	2.89	2.62
M.S. Agriculture	4	40.0	5	50.0	0	00.0	1	10.0	1.80	6	31.6	1	5.3	12	63.2	0	00.0	2.32	2.14
Internships (on the job)	3	30.0	2	20.0	5	50.0	0	00.0	2.20	9	47.4	3	15.8	4	21.1	3	15.8	2.05	2.10
In-service training workshops, etc.	8	80.0	1	10.0	0	00.0	1	10.0	1.40	10	52.6	5	26.3	2	10.5	2	10.5	1.78	1.66

When responses from the total experiment station workers are considered, it is not only quite evident that at least the B.S. in agriculture is considered very important, but they also considered that participation in "in-service training workshops" would be of equal value.

In an examination of data presented in Table XXXII,it is to be observed that the Group A, Saudi administrators in the Ministry of Agriculture and Water, felt that completion of the elementary school was very important for preparation of future Saudi farmers, giving this item a very high rating of 1.00, and they also gave a relatively high rating of 1.33 to attendance at secondary agricultural schools. Group B, non-Saudi administrators, indicated that "elementary schools" and "in-service training workshops" were slightly important with the same rating of 2.5 for each item. They did not share the judgment of Saudi administrators that secondary agricultural schools were of importance for the preparation of future Saudi farmers.

Findings as shown in Table XXXIII indicate that Group A, Saudi administrators, and Group B, non-Saudi administrators, both gave strong emphasis to completion of training in secondary agricultural schools for prospective extension workers, with the high possible rating of 1.8 given by both groups. As additional recommended levels of training for preparation of extension workers, Group A considered "in-service training workshops" strongly important again with a rating of 1.00 while respondents of Group B felt that it would be slightly less important for future extension workers to take "in-service training workshops," giving a rating of 1.5. However, they did give "internships on the job" the very high rating of 1.00.

With regard to optimum levels of preparation for the preparation of

TABLE XXXII

RELATIVE IMPORTANCE OF SELECTED LEVELS OF TRAINING FOR PREPARATION OF FARMERS AS PERCEIVED BY ADMINISTRATORS IN THE MINISTRY OF AGRICULTURE AND WATER

Level of Training	Group A Number of Saudi Administrators = 3									Group B Number of Non Saudi Administrators = 2									
	Very Important		Important		Some Importance		Little Importance		Group Rating	Very Important		Important		Some Importance		Little Importance		Group Rating	Total Rating
	N	%	N	%	N	%	N	%		N	%	N	%	N	%	N	%		
Elementary	3	100.0	0	00.0	0	00.0	0	00.0	1.00	1	50.0	0	00.0	0	00.0	1	50.0	2.50	1.60
Secondary	0	00.0	0	00.0	0	00.0	3	100.0	4.00	0	00.0	0	00.0	0	00.0	2	100.0	4.00	4.00
Secondary agricultural schools	2	66.7	1	33.3	0	00.0	0	00.0	1.33	0	00.0	0	00.0	0	00.0	2	100.0	4.00	2.40
Institutes or informal adult education	2	66.7	0	00.0	0	00.0	1	33.3	2.00	0	00.0	0	00.0	0	00.0	2	100.0	4.00	2.80
B.S.	0	00.0	0	00.0	0	00.0	3	100.0	4.00	0	00.0	0	00.0	0	00.0	2	100.0	4.00	4.00
B.S. Agriculture	0	00.0	0	00.0	0	00.0	3	100.0	4.00	0	00.0	0	00.0	0	00.0	2	100.0	4.00	4.00
M.S.	0	00.0	0	00.0	0	00.0	3	100.0	4.00	0	00.0	0	00.0	0	00.0	2	100.0	4.00	4.00
M.S. Agriculture	0	00.0	0	00.0	0	00.0	3	100.0	4.00	0	00.0	0	00.0	0	00.0	2	100.0	4.00	4.00
Internships (on the job)	0	00.0	0	00.0	0	00.0	3	100.0	4.00	0	00.0	0	00.0	0	00.0	2	100.0	4.00	4.00
In-service training workshops, etc.	0	00.0	0	00.0	0	00.0	3	100.0	4.00	1	50.0	0	00.0	0	00.0	1	50.0	2.50	3.40

TABLE XXXIII

RELATIVE IMPORTANCE OF SELECTED LEVELS OF TRAINING FOR PREPARATION OF EXTENSION WORKERS AS PERCEIVED BY ADMINISTRATORS IN THE MINISTRY OF AGRICULTURE AND WATER

Level of Training	Group A Number of Saudi Administrators = 3									Group B Number of Non Saudi Administrators = 2									
	Very Important		Important		Some Importance		Little Importance		Group Rating	Very Important		Important		Some Importance		Little Importance		Group Rating	Total Rating
	N	%	N	%	N	%	N	%		N	%	N	%	N	%	N	%		
Elementary	0	00.0	0	00.0	1	33.3	2	66.7	3.67	0	00.0	1	50.0	0	00.0	1	50.0	3.00	3.40
Secondary	0	00.0	0	00.0	0	00.0	3	100.0	4.00	1	50.0	0	00.0	0	00.0	1	50.0	2.50	3.40
Secondary agricultural schools	1	33.3	1	33.3	0	00.0	1	33.3	2.33	2	100.0	0	00.0	0	00.0	0	00.0	1.00	1.80
Institutes or informal adult education	2	66.7	1	33.3	0	00.0	0	00.0	1.33	1	50.0	1	50.0	0	00.0	0	00.0	1.50	1.40
B.S.	0	00.0	0	00.0	0	00.0	3	100.0	4.00	0	00.0	0	00.0	1	50.0	1	50.0	3.50	3.80
B.S. Agriculture	2	66.7	0	00.0	0	00.0	1	33.3	2.00	0	00.0	2	100.0	0	00.0	0	00.0	2.00	2.00
M.S.	1	33.3	0	00.0	2	66.7	0	00.0	2.33	0	00.0	1	50.0	1	50.0	0	00.0	2.50	2.40
M.S. Agriculture	0	00.0	3	100.0	0	00.0	0	00.0	2.00	0	00.0	1	50.0	0	00.0	1	50.0	3.00	2.40
Internships (on the job)	1	33.3	2	66.7	0	00.0	0	00.0	1.67	2	100.0	0	00.0	0	00.0	0	00.0	1.00	1.40
In-service training workshops, etc.	3	100.0	0	00.0	0	00.0	0	00.0	1.00	1	50.0	1	50.0	0	00.0	0	00.0	1.50	1.20

experiment station workers, findings as presented in Table XXXIV indicate that Group A, Saudi administrators, considered the Bachelors Degree of very little importance, giving this the lowest rating possible of 4.00. They indicated a judgment that completion of studies in secondary agricultural schools and securing the Masters Degree in agriculture was relatively important, each item level receiving the same rating, that of 1.33. Group B, non-Saudi administrators, selected four item levels of training and by indicating for each the very strong and highly important rating of 1.00, emphasized their judgment that each was "very important" for preparation of future experiment station workers. These levels were, (1) Bachelors Degree in agriculture, (2) Masters Degree, (3) Masters Degree in agriculture, and (4) internships on the job.

It would seem of note that data presented in Table XXXV reveal that Group A, Saudi administrators, selected "in-service training workshops" as being of very strong importance for the preparation of extension and experiment station administrators, giving it the very high rating of 1.00. They also gave a relatively high rating of 1.33 to secondary schools, and a rating of 1.67 to the item level of preparation, "Bachelors Degree in agriculture." Group B, non-Saudi administrators, choosing among the item levels offered, only considered a "Bachelors Degree" as important, as indicated, with a rating of 1.5. All the other items offered received responses showing relatively lower ratings of 2.5 to 3.5.

TABLE XXXIV

RELATIVE IMPORTANCE OF SELECTED LEVELS OF TRAINING FOR PREPARATION OF EXPERIMENT STATION WORKERS AS PERCEIVED BY ADMINISTRATORS IN THE MINISTRY OF AGRICULTURE AND WATER

Level of Training	Group A Number of Saudi Administrators = 3									Group B Number of Non Saudi Administrators = 2									
	Very Important		Important		Some Importance		Little Importance		Group Rating	Very Important		Important		Some Importance		Little Importance		Group Rating	Total Rating
	N	%	N	%	N	%	N	%		N	%	N	%	N	%	N	%		
Elementary	0	00.0	0	00.0	0	00.0	3	100.0	4.00	0	00.0	0	00.0	0	00.0	2	100.0	4.00	4.00
Secondary	1	33.3	0	00.0	0	00.0	2	66.7	3.00	0	00.0	0	00.0	1	50.0	1	50.0	3.50	3.20
Secondary agricultural schools	2	66.7	1	33.3	0	00.0	0	00.0	1.33	0	00.0	2	100.0	0	00.0	0	00.0	2.00	1.60
Institutes or informal adult education	2	66.7	0	00.0	1	33.3	0	00.0	1.67	0	00.0	2	100.0	0	00.0	0	00.0	2.00	1.80
B.S.	0	00.0	0	00.0	0	00.0	3	100.0	4.00	0	00.0	1	50.0	0	00.0	1	50.0	3.00	3.60
B.S. Agriculture	1	33.3	1	33.3	0	00.0	1	33.3	2.33	2	100.0	0	00.0	0	00.0	0	00.0	1.00	1.80
M.S.	2	66.7	0	00.0	0	00.0	1	33.3	2.00	2	100.0	0	00.0	0	00.0	0	00.0	1.00	1.60
M.S. Agriculture	2	66.7	1	33.3	0	00.0	0	00.0	1.33	2	100.0	0	00.0	0	00.0	0	00.0	1.00	1.20
Internships (on the job)	0	00.0	2	66.7	1	33.3	0	00.0	2.33	2	100.0	0	00.0	0	00.0	0	00.0	1.00	1.80
In-service training workshops, etc.	1	33.3	2	66.7	0	00.0	0	00.0	1.67	0	00.0	1	50.0	1	50.0	0	00.0	2.50	2.00

TABLE XXXV

RELATIVE IMPORTANCE OF SELECTED LEVELS OF TRAINING FOR PREPARATION OF EXTENSION ADMINISTRATORS AS PERCEIVED BY ADMINISTRATORS IN THE MINISTRY OF AGRICULTURE AND WATER

Level of Training	Group A Number of Saudi Administrators = 3									Group B Number of Non Saudi Administrators = 2									
	Very Important		Important		Some Importance		Little Importance		Group Rating	Very Important		Important		Some Importance		Little Importance		Group Rating	Total Rating
	N	%	N	%	N	%	N	%		N	%	N	%	N	%	N	%		
Elementary	0	00.0	0	00.0	0	00.0	3	100.0	4.00	0	00.0	0	00.0	1	50.0	1	50.0	3.50	3.80
Secondary	2	66.7	1	33.3	0	00.0	0	00.0	1.33	0	00.0	1	50.0	0	00.0	1	50.0	3.00	2.00
Secondary agricultural schools	2	66.7	0	00.0	0	00.0	1	33.3	2.00	0	00.0	0	00.0	2	100.0	0	00.0	3.00	2.40
Institutes or informal adult education	2	66.7	0	00.0	0	00.0	1	33.3	2.00	0	00.0	1	50.0	1	50.0	0	00.0	2.50	2.20
B.S.	0	00.0	2	66.7	1	33.3	0	00.0	2.33	1	50.0	1	50.0	0	00.0	0	00.0	1.50	2.00
B.S. Agriculture	1	33.3	2	66.7	0	00.0	0	00.0	1.67	0	00.0	1	50.0	1	50.0	0	00.0	2.50	2.00
M.S.	1	33.3	1	33.3	0	00.0	1	33.3	2.33	1	50.0	0	00.0	1	50.0	0	00.0	2.00	2.20
M.S. Agriculture	1	33.3	0	00.0	1	33.3	1	33.3	2.67	1	50.0	0	00.0	1	50.0	0	00.0	2.00	2.40
Internships (on the job)	1	33.3	1	33.3	0	00.0	1	33.3	2.33	0	00.0	1	50.0	1	50.0	0	00.0	2.50	2.40
In-service training workshops, etc.	3	100.0	0	00.0	0	00.0	0	00.0	1.00	0	00.0	1	50.0	0	00.0	1	50.0	3.00	1.80

Judgment of Classified Groups as to the Relative Importance of Selected Items of the Training Curriculum for Preparation of Workers in the Respective Employment Areas

An attempt was made to secure judgments of persons comprising the professional agricultural staff regarding the relative importance of certain selected items which should receive emphasis in the curriculum for training farmers as well as future employees to be functioning in extension, experiment station, and as administrators of these program in the Eastern province areas. Data as presented in Table XXXVI indicate that Group A, present Saudi extension workers, considers the preparation of future Saudi farmers to be best served when emphasis is placed upon the following selected segments of the training curriculum, (1) "organizing goals and setting objectives," and (2) "internships and learning by doing," with each of these items receiving the "important" rating. In fact, the pattern of response from Saudi extension workers actually stress these two items with no other item receiving a score above "of some importance," expressed by a score of 1.89. Group B, non-Saudi workers, share with native Saudis in the judgment that "internships and learning by doing" was considered important, receiving a rating from this group of 1.91, but they did not share in the judgment that "organizing goals and setting objectives" was an important curricular item for training future Saudi farmers. However, they did consider that "practical application" was a more important curricular item to stress in the preparation of future Saudi farmers, this item receiving a rating of 1.68.

Examination of data presented in Table XXXVII show that Group A

TABLE XXXVI

RELATIVE IMPORTANCE OF SELECTED ITEMS OF THE TRAINING CURRICULUM FOR PREPARATION OF FARMERS AS PERCEIVED BY EXTENSION WORKERS IN TWO EASTERN AREAS

Items of Training Curriculum	Group A Number of Saudi Workers = 9									Group B Number of Non Saudi Workers = 22									
	Very Important		Important		Some Importance		Little Importance		Group Rating	Very Important		Important		Some Importance		Little Importance		Group Rating	Total Rating
	N	%	N	%	N	%	N	%		N	%	N	%	N	%	N	%		
General scientific basis	2	22.2	0	0.00	3	33.3	4	44.4	3.00	4	18.2	1	4.5	4	18.2	13	59.1	3.18	3.13
Subject matter	2	22.2	2	22.2	2	22.2	3	33.3	2.67	6	27.3	1	4.5	5	22.7	10	45.5	2.86	2.81
Research techniques	1	11.1	0	00.0	0	00.0	8	88.9	3.67	1	4.5	0	00.0	1	4.5	20	90.9	3.82	3.77
Practical application	3	33.3	1	11.1	2	22.2	3	33.3	2.56	13	59.1	3	13.6	6	27.3	0	00.0	1.68	1.94
Communications and teaching	3	33.3	0	00.0	1	11.1	5	55.6	2.89	5	22.7	5	22.7	0	00.0	12	54.5	2.86	2.87
Organizing goals and setting objectives	5	55.6	2	22.2	0	00.0	2	22.2	1.89	5	22.7	2	9.1	2	9.1	13	59.1	3.05	2.71
Internships and learning by doing	5	55.6	2	22.2	0	00.0	2	22.2	1.89	12	54.5	5	22.7	0	00.0	5	22.7	1.91	1.90

present Saudi extension workers, felt that future training curriculum needs for the preparation of extension workers should definitely emphasize the following specific items: (1) general scientific basis, (2) subject matter, (3) communications and teaching, and (4) organizing goals and setting objectives. All these items received the rating of 1.67, indicating judgments that they were of much importance. However, Group B, non-Saudi extension workers, while agreeing with their Saudi counterparts in judging of great importance, (1) general scientific basis, (2) subject matter, (3) communication and teaching, and (4) organizing goals and setting objectives; they also included (5) practical application as of equal importance. In fact, the scores given these items by the non-Saudi group were such as to indicate even stronger judgments in favor of these curricular items in the preparation of future extension workers, with ratings of 1.36, 1.22, 1.54 and 1.36 respectively for these items. A score of 1.45 was given for practical application.

Data presented in Table XXXVIII indicate that Group A, Saudi extension workers, felt that (1) general scientific basis and (2) organizing goals and setting objectives were very important for preparation of future Saudi experiment station workers, giving these items the same very high rating of 1.44. They also gave "subject matter" the relatively high rating of 1.67 and "internships and learning by doing" again a relatively high rating of 1.78. Group B, non-Saudi workers, indicated that "subject matter" was very important, with the highest rating given of 1.41. As would be expected, "general scientific basis" and "research techniques" rated 1.59 for each item. Additional items, "practical application" and "organizing goals and setting objectives," all received the same rating of 1.86 as needing emphasis in the preparation of experiment station workers.

TABLE XXXVII

RELATIVE IMPORTANCE OF SELECTED ITEMS OF THE TRAINING CURRICULUM FOR PREPARATION OF EXTENSION WORKERS AS PERCEIVED BY EXTENSION WORKERS IN TWO EASTERN AREAS

Items of Training Curriculum	Group A Number of Saudi Workers = 9									Group B Number of Non Saudi Workers = 22									
	Very Important		Important		Some Importance		Little Importance		Group Rating	Very Important		Important		Some Importance		Little Importance		Group Rating	Total Rating
	N	%	N	%	N	%	N	%		N	%	N	%	N	%	N	%		
General scientific Basis	5	55.6	2	22.2	2	22.2	0	00.0	1.67	17	77.3	3	13.6	1	4.5	1	4.5	1.36	1.45
Subject matter	5	55.6	2	22.2	2	22.2	0	00.0	1.67	17	77.3	5	22.7	0	00.0	0	00.0	1.22	1.35
Research techniques	2	22.2	3	33.3	2	22.2	2	22.2	2.44	4	18.2	8	36.4	3	13.6	7	31.8	2.59	2.54
Practical application	4	44.4	2	22.2	2	22.2	1	11.1	2.00	15	68.2	4	18.2	3	13.6	0	00.0	1.45	1.61
Communications and teaching	5	55.6	3	33.3	0	00.0	1	11.1	1.67	13	59.1	7	31.8	1	4.5	1	4.5	1.54	1.58
Organizing goals and setting objectives	5	55.6	2	22.2	2	22.2	0	00.0	1.67	9	40.9	8	36.4	5	22.7	0	00.0	1.36	1.45
Internships and learning by doing	5	55.6	2	22.2	1	11.1	1	11.1	1.77	11	50.0	6	27.3	5	22.7	0	00.0	1.72	1.74

TABLE XXXVIII

RELATIVE IMPORTANCE OF SELECTED ITEMS OF THE TRAINING CURRICULUM FOR PREPARATION OF EXPERIMENT STATION WORKERS AS PERCEIVED BY EXTENSION WORKERS IN TWO EASTERN AREAS

Items of Training Curriculum	Group A Number of Saudi Workers = 9									Group B Number of Non Saudi Workers = 22									
	Very Important		Important		Some Importance		Little Importance		Group Rating	Very Important		Important		Some Importance		Little Importance		Group Rating	Total Rating
	N	%	N	%	N	%	N	%		N	%	N	%	N	%	N	%		
General scientific basis	5	55.6	4	44.4	0	00.0	0	00.0	1.44	14	63.6	5	22.7	1	4.5	2	9.1	1.59	1.55
Subject matter	6	66.7	1	11.1	1	11.1	1	11.1	1.67	17	77.3	1	4.5	4	18.2	0	00.0	1.41	1.48
Research techniques	3	33.3	4	44.4	1	11.1	1	11.1	2.00	15	68.2	3	13.6	2	9.1	2	9.1	1.59	1.71
Practical application	4	44.4	3	33.3	1	11.1	1	11.1	1.89	10	45.6	7	31.8	3	13.6	2	9.1	1.86	1.87
Communications and teaching	5	55.6	3	33.3	1	11.1	0	00.0	2.00	7	31.8	5	22.7	8	36.4	2	9.1	2.23	2.03
Organizing goals and setting objectives	5	55.6	4	44.4	0	00.0	0	00.0	1.44	10	45.6	5	22.7	7	31.8	0	00.0	1.86	1.74
Internships and learning by doing	4	44.4	3	33.3	2	22.2	0	00.0	1.78	9	40.9	1	4.5	6	27.3	6	27.3	2.41	2.23

Findings as shown in Table XXXIX indicate that Group A, Saudi extension workers, selected "general scientific basis," "communications and teaching," and "organizing goals and setting objectives" as being of relatively higher importance for preparation of extension and experiment station administrators, with high ratings given of 1.56, 1.44 and 1.67, respectively. By comparison, Group B, non-Saudi workers, only selected two items to judge as being of relatively high importance, "subject matter" and "general scientific basis," giving them ratings of 1.5 and 1.77 respectively.

Data as presented in Table XL indicate that Group A, Saudi experiment station workers, consider the items of "practical application" and "interships and learning by doing" as important with a rating of 2.2 and 2.0 for these items as constituting items of importance in the preparation of future Saudi farmers. However, Group B, non-Saudi workers, while in agreement as to these two items, rated them even higher than Saudis, with ratings of 1.32 and 1.26 respectively.

In an examination of data collated in Table XLI, it is to be observed that both Groups A, Saudi experiment station workers, and B, non-Saudi workers, hold relatively the same judgments concerning the items of training needed in the curriculum for the preparation of future extension workers. All items presented on the response schedule were rated high or very high except "research techniques" as judged by both groups and "organizing goals and setting objectives" by the Saudi respondents. Highest ranking item in terms of score was "internships and learning by doing."

Data presented in Table XLII indicate that Group A, Saudi experiment station workers, and Group B, non-Saudi workers, both were strong in their expressed judgments in almost all selected items for inclusion

TABLE XXXIX

RELATIVE IMPORTANCE OF SELECTED ITEMS OF THE TRAINING CURRICULUM FOR PREPARATION OF ADMINISTRATORS AS PERCEIVED BY EXTENSION WORKERS IN TWO EASTERN AREAS

Items of Training Curriculum	Group A Number of Saudi Workers = 9									Group B Number of Non Saudi Workers = 22									
	Very Important		Important		Some Importance		Little Importance		Group Rating	Very Important		Important		Some Importance		Little Importance		Group Rating	Total Rating
	N	%	N	%	N	%	N	%		N	%	N	%	N	%	N	%		
General scientific basis	6	66.7	1	11.1	2	22.2	0	00.0	1.56	13	59.1	4	18.2	2	9.1	3	13.6	1.77	1.71
Subject matter	4	44.4	3	33.3	1	11.1	1	11.1	1.89	15	68.2	5	22.7	0	00.0	2	9.1	1.50	1.61
Research techniques	4	44.4	2	22.2	1	11.1	2	22.2	2.11	7	31.8	6	27.3	4	18.2	5	22.7	2.32	2.26
Practical application	4	44.4	3	33.3	1	11.1	1	11.1	1.89	7	31.8	4	18.2	6	27.3	5	22.7	2.41	2.26
Communications and teaching	5	55.6	4	44.4	0	00.0	0	00.0	1.44	5	22.7	5	22.7	5	22.7	7	31.8	2.64	2.29
Organizing goals and setting objectives	5	55.6	2	22.2	2	22.2	0	00.0	1.67	13	59.1	0	00.0	4	18.2	5	22.7	2.05	1.94
Internships and learning by doing	5	55.6	1	11.1	3	33.3	0	00.0	1.78	4	18.2	2	9.1	6	27.3	10	45.5	3.00	2.65

TABLE XL

RELATIVE IMPORTANCE OF SELECTED ITEMS OF THE TRAINING CURRICULUM FOR PREPARATION OF FARMERS AS PERCEIVED BY EXPERIMENT STATION WORKERS IN TWO EASTERN AREAS

Items of Training Curriculum	Group A Number of Saudi Workers = 10									Group B Number of Non Saudi Workers = 19									
	Very Important		Important		Some Importance		Little Importance		Group Rating	Very Important		Important		Some Importance		Little Importance		Group Rating	Total Rating
	N	%	N	%	N	%	N	%		N	%	N	%	N	%	N	%		
General scientific basis	3	30.0	1	10.0	0	00.0	6	60.0	2.90	3	15.8	0	00.0	11	57.9	5	26.3	2.95	2.93
Subject matter	3	30.0	0	00.0	1	10.0	6	60.0	3.00	8	42.1	3	15.8	2	10.5	6	31.6	2.32	2.55
Research techniques	1	10.0	0	00.0	0	00.0	9	90.0	3.70	1	5.3	2	10.5	2	10.5	14	73.7	3.53	3.59
Practical application	5	50.0	1	10.0	1	10.0	3	30.0	2.20	17	89.5	0	00.0	0	00.0	2	10.5	1.32	1.62
Communications and teaching	0	00.0	0	00.0	1	10.0	9	90.0	3.90	4	21.1	1	5.3	3	15.8	11	57.9	3.11	3.38
Organizing goals and setting objectives	0	00.0	1	10.0	0	00.0	9	90.0	3.80	9	47.4	1	5.3	2	10.5	7	36.8	2.37	2.86
Internships and learning by doing	6	60.0	1	10.0	0	00.0	3	30.0	2.00	15	78.9	3	15.8	1	5.3	0	00.0	1.26	1.52

TABLE XLI

RELATIVE IMPORTANCE OF SELECTED ITEMS OF THE TRAINING CURRICULUM FOR PREPARATION OF EXTENSION WORKERS AS PERCEIVED BY EXPERIMENT STATION WORKERS IN TWO EASTERN AREAS

Items of Training Curriculum	Group A Number of Saudi Workers = 10									Group B Number of Non Saudi Workers = 19									
	Very Important		Important		Some Importance		Little Importance		Group Rating	Very Important		Important		Some Importance		Little Importance		Group Rating	Total Rating
	N	%	N	%	N	%	N	%		N	%	N	%	N	%	N	%		
General scientific basis	2	20.0	8	80.0	0	00.0	0	00.0	1.80	6	31.6	10	52.6	3	15.8	0	00.0	1.84	1.83
Subject matter	3	30.0	7	70.0	0	00.0	0	00.0	1.70	12	63.2	3	15.8	2	10.5	2	10.5	1.68	1.69
Research techniques	2	20.0	3	30.0	4	40.0	1	10.0	2.40	3	15.8	12	63.2	3	15.8	1	5.3	2.11	2.21
Practical application	5	50.0	4	40.0	1	10.0	0	00.0	1.60	14	73.7	1	5.3	4	21.1	0	00.0	1.47	1.52
Communications and teaching	7	70.0	2	20.0	1	10.0	0	00.0	1.40	14	73.7	1	5.3	3	15.8	1	5.3	1.53	1.48
Organizing goals and setting objectives	2	20.0	5	50.0	2	20.0	1	10.0	2.20	13	68.4	4	21.1	2	10.5	0	00.0	1.42	1.69
Internships and learning by doing	8	80.0	0	00.0	2	20.0	0	00.0	1.40	15	78.9	2	10.5	2	10.5	0	00.0	1.32	1.34

TABLE XLII

RELATIVE IMPORTANCE OF SELECTED ITEMS OF THE TRAINING CURRICULUM FOR PREPARATION OF EXPERIMENT STATION WORKERS AS PERCEIVED BY EXPERIMENT STATION WORKERS IN TWO EASTERN AREAS

Items of Training Curriculum	Group A Number of Saudi Workers = 10									Group B Number of Non Saudi Workers = 19									
	Very Important		Important		Some Importance		Little Importance		Group Rating	Very Important		Important		Some Importance		Little Importance		Group Rating	Total Rating
	N	%	N	%	N	%	N	%		N	%	N	%	N	%	N	%		
General scientific basis	6	60.0	3	30.0	0	00.0	1	10.0	1.60	18	94.7	0	00.0	1	5.3	0	00.0	1.11	1.28
Subject matter	6	60.0	2	20.0	0	00.0	2	20.0	1.80	16	84.2	1	5.3	0	00.0	2	10.5	1.36	1.52
Research techniques	8	80.0	2	20.0	0	00.0	0	00.0	1.20	19	100.0	0	00.0	0	00.0	0	00.0	1.00	1.07
Practical application	6	60.0	1	10.0	3	30.0	0	00.0	1.70	14	73.7	5	26.3	0	00.0	0	00.0	1.26	1.41
Communications and teaching	3	30.0	5	50.0	2	20.0	0	00.0	1.90	5	26.3	11	57.7	2	10.5	1	5.3	1.95	1.93
Organizing goals and setting objectives	6	60.0	2	20.0	1	10.0	1	10.0	1.70	14	73.7	5	26.3	0	00.0	0	00.0	1.26	1.41
Internships and learning by doing	4	40.0	5	50.0	1	10.0	0	00.0	1.70	16	84.2	1	5.3	1	5.3	1	5.3	1.32	1.45

in the training curriculum for preparation of future experiment station workers. Among these items, "general scientific basis" and "research techniques" received the highest ranking score with each of these items receiving the "very important" rating of 1.6 and 1.2 from Group A and 1.11 and 1.00 from Group B. In fact, non-Saudi workers gave the "research techniques" item the very strong rating of 1.00, one of the highest given in the entire study.

In order to more precisely ascertain a proper basis for projecting needs, present experiment station workers in two eastern province areas were asked to respond with regard to their judgments of the relative importance of selected items of training most needed in a curriculum for preparation of future extension and experiment station administrators. An examination of data presented in Table XLIII show that Group A, Saudi workers indicated that "subject matter" and "organizing goals and setting objectives" were "important" with ratings of 1.9 and 1.8 for preparation of administrators. Group B, non-Saudi workers, shared with Saudis in an emphasis upon the same items, but gave somewhat higher ratings than those given by Saudis, 1.79 and 1.47 respectively.

Data as presented in Table XLIV reveal that Group A, Saudi administrators in the Ministry of Agriculture and Water felt that, in particular, three items projected for a training curriculum, for farmers, (1) subject matter, (2) internships and learning by doing, and (3) practical application, were to be recognized as "very important," giving the ratings of 1.33 for each of the first two items and 1.67 for the third one. For two of the specified items, Group B, non-Saudi administrators, gave the "very important" rating of 1.5 for each of the items "practical application" and "internships and learning by doing."

TABLE XLIII

RELATIVE IMPORTANCE OF SELECTED ITEMS OF THE TRAINING CURRICULUM FOR PREPARATION OF ADMINISTRATORS AS PERCEIVED BY EXPERIMENT STATION WORKERS IN TWO EASTERN AREAS

Items of Training Curriculum	Group A Number of Saudi Workers = 10									Group B Number of Non Saudi Workers = 19									
	Very Important		Important		Some Importance		Little Importance		Group Rating	Very Important		Important		Some Importance		Little Importance		Group Rating	Total Rating
	N	%	N	%	N	%	N	%		N	%	N	%	N	%	N	%		
General scientific basis	3	30.0	3	30.0	2	20.0	2	20.0	2.30	7	36.8	9	47.4	0	00.0	3	15.8	1.95	2.07
Subject matter	5	50.0	3	30.0	0	00.0	2	20.0	1.90	11	58.0	3	15.8	3	15.8	2	10.5	1.79	1.83
Research techniques	0	00.0	5	50.0	0	00.0	5	50.0	3.00	1	5.3	5	26.3	12	63.2	1	5.3	2.68	2.79
Practical application	1	10.0	3	30.0	1	10.0	5	50.0	3.00	9	47.4	3	15.8	6	31.6	1	5.3	1.95	2.31
Communications and teaching	2	20.0	5	50.0	0	00.0	3	30.0	2.40	3	15.8	14	73.7	2	10.5	0	00.0	1.95	2.10
Organizing goals and setting objectives	6	60.0	2	20.0	0	00.0	2	20.0	1.80	13	68.4	4	21.1	1	5.3	1	5.3	1.47	1.59
Internships and learning by doing	3	30.0	2	20.0	2	20.0	3	30.0	2.50	9	47.4	6	31.6	2	10.5	2	10.5	1.84	2.07

TABLE XLIV

RELATIVE IMPORTANCE OF SELECTED ITEMS OF THE TRAINING CURRICULUM FOR PREPARATION OF FARMERS AS PERCEIVED BY ADMINISTRATORS IN THE MINISTRY OF AGRICULTURE AND WATER

Items of Training Curriculum	Group A Number of Saudi Administrators = 3									Group B Number of Non Saudi Administrators = 2									
	Very Important		Important		Some Importance		Little Importance		Group Rating	Very Important		Important		Some Importance		Little Importance		Group Rating	Total Rating
	N	%	N	%	N	%	N	%		N	%	N	%	N	%	N	%		
General scientific basis	1	33.3	1	33.3	1	33.3	0	00.0	2.00	0	00.0	0	00.0	0	00.0	2	100.0	4.00	2.80
Subject matter	2	66.7	1	33.3	0	00.0	0	00.0	1.33	0	00.0	0	00.0	0	00.0	2	100.0	4.00	2.40
Research techniques	0	00.0	0	00.0	1	33.3	2	66.7	3.67	0	00.0	0	00.0	1	50.0	1	50.0	3.50	3.60
Practical application	2	66.7	0	00.0	1	33.3	0	00.0	1.67	1	50.0	1	50.0	0	00.0	0	00.0	1.50	1.60
Communications and teaching	0	00.0	0	00.0	0	00.0	3	100.0	4.00	0	00.0	0	00.0	1	50.0	1	50.0	3.50	3.80
Organizing goals and setting objectives	1	33.3	0	00.0	1	33.3	1	33.3	2.67	0	00.0	0	00.0	0	00.0	2	100.0	4.00	3.20
Internships and learning by doing	2	66.7	1	33.3	0	00.0	0	00.0	1.33	1	50.0	1	50.0	0	00.0	0	00.0	1.50	1.40

It would seem of note that data presented in Table XLV reveal that Group A, Saudi administrators, selected "practical application" as being of very great importance for stressing in the training curriculum for preparation of future extension workers, giving the very high rating of 1.00. They also gave "general scientific basis," "subject matter," "communication and teaching" and "internships and learning by doing" the relatively high rating of 1.33 for each of the four items. Group B, non-Saudi administrators, were in very close agreement with their Saudi counterparts, also giving the very high rating of 1.00 for each of the items (1) general scientific basis, (2) practical application, (3) communication and teaching, and (4) internships and learning by doing. It may be noted that here, as is the case elsewhere in the study, native Saudi personnel tend to not indicate feeling that curriculum emphasis upon "communication and teaching" is quite as important as do their non-Saudi counterparts. They do, however, give it a relatively higher rating of 1.33.

Findings as presented in Table XLVI indicate the comparative ratings given selected items for emphasis in the training curriculum for preparation of future experiment station workers, these made by administrators in the Ministry of Agriculture and Water. Both Group A, Saudis, and Group B, non-Saudis, gave a very strong emphasis with ratings of 1.00 for the two items "subject matter" and "research techniques" for preparation of future experiment station workers. However, they were also largely in agreement that the item "general scientific basis" is of considerable importance as well as "communication and teaching."

The examination of data as presented in Table XLVII reveal that Group A, Saudi administrators, felt that "subject matter" was a very

TABLE XLV

RELATIVE IMPORTANCE OF SELECTED ITEMS OF THE TRAINING CURRICULUM FOR PREPARATION OF EXTENSION WORKERS AS PERCEIVED BY ADMINISTRATORS IN THE MINISTRY OF AGRICULTURE AND WATER

Items of Training Curriculum	Group A Number of Saudi Administrators = 3									Group B Number of Non Saudi Administrators = 2									
	Very Important		Important		Some Importance		Little Importance		Group Rating	Very Important		Important		Some Importance		Little Importance		Group Rating	Total Rating
	N	%	N	%	N	%	N	%		N	%	N	%	N	%	N	%		
General scientific basis	2	66.7	1	33.3	0	00.0	0	00.0	1.33	2	100.0	0	00.0	0	00.0	0	00.0	1.00	1.20
Subject matter	2	66.7	1	33.3	0	00.0	0	00.0	1.33	0	00.0	1	50.0	1	50.0	0	00.0	2.50	1.80
Research techniques	2	66.7	0	00.0	1	33.3	0	00.0	1.67	0	00.0	1	50.0	1	50.0	0	00.0	2.50	2.00
Practical application	3	100.0	0	00.0	0	00.0	0	00.0	1.00	2	100.0	0	00.0	0	00.0	0	00.0	1.00	1.00
Communications and teaching	2	66.7	1	33.3	0	00.0	0	00.0	1.33	2	100.0	0	00.0	0	00.0	0	00.0	1.00	1.20
Organizing goals and setting objectives	1	33.3	2	66.7	0	00.0	0	00.0	1.67	0	00.0	2	100.0	0	00.0	0	00.0	2.00	1.80
Internships and learning by doing	2	66.7	1	33.3	0	00.0	0	00.0	1.33	2	100.0	0	00.0	0	00.0	0	00.0	1.00	1.20

TABLE XLVI

RELATIVE IMPORTANCE OF SELECTED ITEMS OF THE TRAINING CURRICULUM FOR PREPARATION OF EXPERIMENT STATION WORKERS AS PERCEIVED BY ADMINISTRATORS IN THE MINISTRY OF AGRICULTURE AND WATER

Items of Training Curriculum	Group A Number of Saudi Administrators = 3									Group B Number of Non Saudi Administrators = 2									
	Very Important		Important		Some Importance		Little Importance		Group Rating	Very Important		Important		Some Importance		Little Importance		Group Rating	Total Rating
	N	%	N	%	N	%	N	%		N	%	N	%	N	%	N	%		
General scientific basis	2	66.7	1	33.3	0	00.0	0	00.0	1.33	1	50.0	1	50.0	0	00.0	0	00.0	1.50	1.40
Subject matter	3	100.0	0	00.0	0	00.0	0	00.0	1.00	2	100.0	0	00.0	0	00.0	0	00.0	1.00	1.00
Research techniques	3	100.0	0	00.0	0	00.0	0	00.0	1.00	2	100.0	0	00.0	0	00.0	0	00.0	1.00	1.00
Practical application	2	66.7	1	33.3	0	00.0	0	00.0	1.33	0	00.0	0	00.0	2	100.0	0	00.0	3.00	2.00
Communications and teaching	2	66.7	1	33.3	0	00.0	0	00.0	1.33	0	00.0	2	100.0	0	00.0	0	00.0	2.00	1.60
Organizing goals and setting objectives	2	66.7	0	00.0	1	33.3	0	00.0	1.66	0	00.0	0	00.0	2	100.0	0	00.0	3.00	2.20
Internships and learning by doing	2	66.7	0	00.0	0	00.0	1	33.3	2.00	0	00.0	0	00.0	1	50.0	1	50.0	3.50	2.60

TABLE XLVII

RELATIVE IMPORTANCE OF SELECTED ITEMS OF THE TRAINING CURRICULUM FOR PREPARATION OF ADMINISTRATORS AS PERCEIVED BY ADMINISTRATORS IN THE MINISTRY OF AGRICULTURE AND WATER

Items of Training Curriculum	Group A Number of Saudi Administrators = 3									Group B Number of Non Saudi Administrators = 2									
	Very Important		Important		Some Importance		Little Importance		Group Rating	Very Important		Important		Some Importance		Little Importance		Group Rating	Total Rating
	N	%	N	%	N	%	N	%		N	%	N	%	N	%	N	%		
General scientific basis	2	66.7	1	33.3	0	00.0	0	00.0	1.33	0	00.0	0	00.0	1	50.0	1	50.0	3.50	2.20
Subject matter	3	100.0	0	00.0	0	00.0	0	00.0	1.00	0	00.0	1	50.0	0	00.0	1	50.0	3.00	1.80
Research techniques	2	66.7	0	00.0	1	33.3	0	00.0	1.67	0	00.0	0	00.0	0	00.0	2	100.0	4.00	2.60
Practical application	2	66.7	0	00.0	1	33.3	0	00.0	1.67	0	00.0	0	00.0	0	00.0	2	100.0	4.00	2.60
Communications and teaching	2	66.7	1	33.3	0	00.0	0	00.0	1.33	0	00.0	0	00.0	1	50.0	1	50.0	3.50	2.20
Organizing goals and setting objectives	2	66.7	1	33.3	0	00.0	0	00.0	1.33	1	50.0	1	50.0	0	00.0	0	00.0	1.50	1.40
Internships and learning by doing	1	33.3	0	00.0	1	33.3	1	33.3	2.67	0	00.0	0	00.0	0	00.0	2	100.0	4.00	3.20

important item of training curriculum for preparation of extension and experiment station administrators, with the very high rating of 1.00 given. They also gave "general scientific basis," "communication and teaching," and "organizing goals and setting objectives" a very important rating for these items of 1.33. Group B, non-Saudi administrators, only judged the item "organizing goals and setting objectives" as being of relatively high importance, rating it 1.5. These non-Saudi gave very low ratings to the two items "research techniques" and "practical application" and relatively low ratings to "general scientific basis" and "communication and teaching."

Pertinent Statements from Interviews with Selected Officials

A. During an interview with the Dean of the Agricultural College in Riyadh University on June 22, 1977, the following were indicated.

   1) The college plans to conduct a two-month training course for secondary level field technicians of the agricultural personnel.
   2) The college will try to extend its training capabilities outside the University campus, perhaps to Ministry of Agriculture and Water Training Center, Experiment Stations and Agricultural Extension personnel for an attempt to sponsor seminars and workshops.
   3) The college is planning for higher enrollments in agriculture and will continue the development of curricula, and review examination and promotion practices, as well as possible implementation of a more active staff development program.

B. During an interview with the Technical Director of the Agriculture

and Water Research Center in the Ministry of Agriculture and Water on June 23, 1977, the following were indicated.

1) The Mission of the Agriculture and Water Research Center is to conduct applied and adaptive research relating directly to recognized needs in the areas of agriculture production and water development.

2) The responsibility of the Center is to effectively train Saudis in order that, as soon as possible, they may assume management and operation of the laboratory and be responsible for conducting the research programs.

3) The Center will attempt to promote uniformity of laboratory research procedures at the various stations through providing direction in procurement of equipment and its use, this through conducting training sessions for both future and present workers.

4) The Center will have an impact on up-grading both at the general and at certain specific levels of technological personnel in agriculture and water, through their participation in programs planned and provided by the training center.

5) Cooperative efforts between the University of Riyadh College of Agriculture and other institutions of higher education in the kingdom of Saudi Arabia and the Center may in the future involve joint research projects, seminars, and visiting scientist programs.

C. The Dean of the Agricultural College in King Faisal University in Al-Hasa in an interview June 26, 1977, reported the following things.

1) While the College was newly founded, it has managed presently secure a major portion of the needed teaching staff and will have a full faculty as soon as possible.

2) The College has designed and implemented a plan to provide scholarships for future faculty, these for study in various fields in Europe and the United States of America.

3) At the present time, the college does have in operation some research efforts in cooperation with the Agriculture and Water Research Center in Al-Hafuf.

4) The College does plan to train personnel for agricultural research, extension work, and agricultural production. It is anticipated that upon completion of the training programs, these people are going to be responsible for the further design, planning, and management of agricultural programs in the Eastern province.

D. During an interview with the Coordinator of Agricultural Assistance Division, Arabian Oil Company, on June 27, 1977, the comments made pertinent to this study are here recorded. Certain problems exist which are delaying the introduction and particularly the more widespread use of mechanical technology and equipment in Eastern Province of Saudi Arabia, these problems include the following.

1) Over 90 percent of farms in the Eastern Province are too small to justify the ownership of larger tractors and farm equipment; with the limited size of operation, farmers cannot afford to own larger farm equipment.

2) Irrigation and drainage layouts, inside the farm, break the farm into many small individual fields for which the larger tractor is completely unsuited.

3) Most lands outside the date palm gardens are not laid out for efficient use of the larger mechanized equipment.

4) Technicians who can teach the farmers how to use, maintain, and service farm equipment are not available at present.

The Coordinator also reported that he felt these problems could be alleviated if the size and type of equipment was adjusted to suit the limited size of land ownership and field patterns prevalent on the small farms. This could likely be achieved by using the smaller size of "garden" tractors which are designed in such a manner that they could be adapted for use on a number of jobs about the farm. Attachments for these tractors allow the farmer to plow his land, prepare his fields, seed his crops, and control crop insects and diseases. Besides, with government subsidy and a loan from the agricultural bank, the cost of such tractor becomes in line with the small farmer's income. He also indicated that Aramco is in the process of introducing an agricultural system known as "hydroponics," the cultivation of plants without soil. Instead of in soil, the plants are grown in plastic tubes with running water in which plant food is dissolved. He further indicated that in Eastern province, Aramco has recently established a 300-acre mechanized demonstration farm on which it hopes to raise eight million pounds of fresh produce per year, and simultaneously train Saudi farmers in mechanized techniques.

CHAPTER VI

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

The primary purpose of the study was to determine the present status of and to suggest procedures for an improvement in meeting manpower needs in agriculture, both professional and basic.

Objectives of the Study

1. To identify the present status of manpower in agriculture in Eastern Province of Saudi Arabia.

2. To identify the educational and training programs now operating for the preparation of agriculturalists to supply Saudi's manpower needs in farming and in professional agriculture.

3. To identify concepts now held and practices now engaged in both in the United States and in Saudi Arabia regarding preparation and maintenance of training programs to meet manpower needs in agriculture.

4. To project and attempt to apply selected aspects of agricultural manpower training in the United States to present and future situations in Saudi Arabia.

5. To recommend procedures which may help insure an adequate and competent supply of agricultural manpower, both professional and basic for the Eastern Province in Saudi Arabia.

Summary of Findings

Demographic Data Regarding Respondents

It was determined that thirty-seven (67.27 percent) of farmers interviewed in the Eastern province of Saudi Arabia were full-time farmers, with fifty-one (92.73 percent) of farmers reporting that they were born on a farm. About thirty-five percent of farmers in Al-Hasa Area were farm owners. This was in contrast to Qatif farmers where forty percent were found to be farm owners. Forty-nine (89.09 percent) of the farmers in both areas indicated that they operated the farm. Ten (25 percent) of the farmers in Al-Hasa Area reported that they had more than forty years experience while engaged in farming operations, while non-respondents of the Qatif area reported this long an experience. Only five (9.09 percent) of farmers had less than ten years of being involved in farming in the two areas. Only 1.82 percent of the farmers in Al-Hasa area had completed a formal education, while none in the Qatif reported such an achievement. Thirty-three (82.50 percent) of the farmers in Al-Hasa area indicated that they cannot read or write, while a slightly smaller percentage, 73.33 percent of residents in the Qatif area, were illiterate. Only three (5.45 percent) of farmers out of the total fifty-five farmers included in the study in both areas reported that they had attended elementary school. Twenty-eight (50.91 percent) of farmers in two areas reported that they had received aid from the extension service. Only seven (12.73 percent) of the farmers in two areas reported that their family members were currently involved in farm operations. In terms of parental aspirations for their children to become involved in selected areas of agricultural work, twenty-seven (49.09 percent) of the farmers in two areas aspired for their own

children to be trained for extension, thirty-five (63.64 percent) for work in an experiment station, twenty-four (43.64 percent) for agri-business jobs, and thirty-nine (70.91 percent) for farming.

Origin and Experience Status of Extension and Experiment Station Workers

Seven (26.9 percent) of Saudi extension workers held various positions in the Al-Hasa area, while nineteen (73.1 percent) of the positions were held by non-Saudis. In contrast, investigation of the origin of extension workers in the Qatif area found two (40 percent) of native Saudi origin and three (60 percent) non-Saudi. Nine (34.5 percent) of all extension workers in Al-Hasa reported having an experience total of from twelve to sixteen years, with three (60 percent) of workers in the Qatif area reporting experience of approximately the same length. Investigation of the origin of experiment station workers holding various positions at the Hafof Research Center revealed five (26.3 percent) to be of Saudi origin, and fourteen (73.7 percent) as non-Saudis. By comparison, experiment station workers in Qatif were found to be evenly divided in terms of origin with five (50.0 percent) native Saudis and five (50.0 percent) coming from other nations. Nine (47.7 percent) of all workers in the Hafof Research Center reported having experience of from only one to four years as contrasted with four (40 percent) of all workers in the Qatif area who reported having had such experience for a period of from eight to twelve years.

Judgments of Two Classified Groups as to Future Manpower Needs in Their Respective Employment Areas

Data as summarized in Table XLVIII show in summary a comparison of responses as to projected future manpower by extension and experiment station workers. According to extension worker responses ghe projection of manpower needs for farmer increases for 1980 will be 4.7 percent, for 1990, 5.0 percent, and for the year 2000 the increase should be 12.1 percent. Experiment station workers projection for farmer increases is for 1980, 8.9 percent, for 1990, 13.0 percent, and for the year 2000, 19.8 percent. Present extension workers reveal that the general extension workers will need to be increased 8.5 percent in 1980, 13.1 percent in 1990 and 20.3 percent in the year 2000. The experiment station workers tended to judge larger increases for future general extension workers than did their counterparts, extension workers. The experiment station workers judged the need for increasing general extension workers at 14.2 percent for 1980, 15.9 percent for 1990 and 16.9 percent for the year 2000.

In the area of judging future extension specialist needs, responses clearly indicated that the greatest percentage increase needed was in the livestock area. This projection seems to be true, when made by both responding groups, present extension and experiment station workers. In terms of "agricultural mechanics" and "entomology" experiment station workers in contrast with extension workers gave the highest percentage increases for both areas, extension specialists and experiment station personnel. For almost all of the positions of extension specialists,

TABLE XLVIII

SUMMARY AND COMPARISON OF RESPONSES AS TO PROJECTED MANPOWER NEEDS IN AGRICULTURE PROVIDED BY TWO PROFESSIONAL AGRICULTURAL GROUPS

Agricultural Position and Responding Group	Percent Increase By: 1980	1990	2000
1) Farmers:			
Extension workers response	4.7	5.0	12.1
Experiment station workers response	8.9	13.0	19.8
2) General Extension:			
Extension workers response	8.5	13.1	20.3
Experiment station workers response	14.2	15.9	16.9

Agricultural Position and Responding Group	Percent Increase in Extension Specialists By: 1980	1990	2000	Percent Increase in Experiment Sta. Personnel By: 1980	1990	2000
Water Resources:						
Extension workers response	5.9	7.1	8.5	4.5	9.0	14.0
Experiment sta. workers response	13.6	14.0	15.8	5.2	10.3	12.5
Agronomy:						
Extension workers response	6.0	6.7	9.4	5.7	10.8	19.5
Experiment sta. workers response	14.2	16.7	18.7	14.3	18.9	23.3
Rice:						
Extension workers response	3.9	7.2	10.3	5.4	10.3	14.6
Experiment sta. workers response	14.5	15.9	17.4	9.2	11.9	12.1
Livestock:						
Extension workers response	4.7	7.9	12.6	5.4	11.3	16.6
Experiment sta. workers response	15.4	18.8	22.0	14.4	19.2	24.9
Agricultural Mechanics:						
Extension workers response	3.2	5.9	8.4	6.0	11.7	18.1
Experiment sta. workers response	15.5	19.0	22.4	14.5	17.5	22.6
Entomology:						
Extension workers response	5.9	12.1	15.2	6.0	11.6	18.2
Experiment sta. workers response	14.7	14.7	17.7	12.5	17.2	20.4

experiment station worker respondents tended to view much greater increases needed than did extension worker respondents. In terms of additional experiment station personnel, the experiment station worker responses in general were only slightly higher than those of their counterpart respondents, extension workers. Therefore, it would seem quite evident that present experiment station workers tended to feel that an increase in future manpower in both extension and experiment station personnel is more strongly needed than did their counterpart extension workers. However, the difference expressed between the two groups are not as great in terms of future manpower needs for experiment station personnel as that expressed for extension.

Judgments of Three Classified Groups as to the Relative Importance of Selected Sources for Recruitment in Their Respective Employment Areas

Data collated in Table XLIX show summary and comparison of three respondents in professional agricultural groups as to the relative importance of selected sources for recruitment. All groups would appear to be in agreement with the concept that "sons of farmers" are an important source for recruitment of farmers, with a high average group rating score of 1.72. Likewise, "sons of farmers" as a source for extension workers was given a high "some importance" score when the average group rating was determined, with this score yielding a figure of 2.16. When respondent groups considered the advisability of "sons of farmers" as a recruitment source for experiment station workers and administrators, the responses score was quite lower, the "some importance" category yielding scores of 2.89 and 2.98

TABLE XLIX

SUMMARY AND COMPARISON OF THREE PROFESSIONAL AGRICULTURAL GROUPS AS TO RELATIVE IMPORTANCE OF SELECTED SOURCES FOR RECRUITMENT

Item and Responding Group	Relative Importance for Specified Group			
	Farmers	Extension Workers	Experiment Station Workers	Administrators
1) Sons of Farmers:				
Extension workers response	2.32	2.32	2.84	2.84
Experiment station workers response	1.72	2.17	2.83	2.90
Administrators response	1.20	2.00	3.00	3.20
Average groups rating	1.72	2.16	2.89	2.98
2) Saudi Graduates:				
Extension workers response	2.84	2.61	2.71	2.84
Experiment station workers response	2.79	2.07	1.79	2.41
Administrators response	2.40	1.20	1.60	0.60
Average groups rating	2.68	1.96	2.03	1.95
3) Agriculture Graduates of Other Countries:				
Extension workers response	3.26	2.52	2.52	2.74
Experiment station workers response	3.07	2.62	2.52	3.31
Administrators response	3.60	2.00	2.40	3.00
Average groups rating	3.31	2.38	2.48	3.02
4) Workers with Agricultural Experience:				
Extension workers response	2.16	2.45	2.97	3.26
Experiment station workers response	1.52	1.93	2.66	2.76
Administrators response	1.80	2.00	2.40	3.00
Average groups rating	1.83	2.13	2.68	3.01

respectively. Present extension workers, experiment station workers, and administrators indicated that they judged "Saudi graduates" as an "important" source of recruitment for extension workers with the average score yielding a figure of 1.96 and 1.95 for recruitment of extension and experiment station administrators. When responses of all groups are considered, it becomes apparent that in terms of "graduates of other countries" the recruitment of extension and experiment station workers was important, with an average group score of 2.38, 2.48 respectively. Responses from the three groups revealed that for the recruitment of farmers it was "strongly important" for recruitment to be from among "workers with agricultural experience," with an average group rating score of 1.83, and they considered this item as important for recruitment of extension workers, with a group rating score of 2.13.

Judgments of Classified Groups as to the Relative Importance of Selected Levels of Training for Preparation of Workers in Respective Employment Areas

Data collated and presented in Table L provide a summary and comparison of responses of three professional agriculture groups as to relative importance of selected levels of training for recruits entering agricultural jobs and positions. It would seem of note that among the selected levels of training for which responses were requested respondents placed "agricultural training in elementary schools" as "very important" for the preparation of future farmers, with an average group rating score of 1.39. All three groups' responses gave "secondary agriculture schools" a high average group rating score of 1.75 for preparation of extension

TABLE L

SUMMARY AND COMPARISON OF THREE PROFESSIONAL AGRICULTURAL GROUPS AS TO RELATIVE IMPORTANCE OF SELECTED LEVELS OF TRAINING

Item and Responding Group	Relative Importance for Specified Group			
	Farmers	Extension Workers	Experiment Station Workers	Adminis-strators
1) Elementary:				
Extension workers response	1.35	2.58	2.77	2.92
Experiment station workers response	1.21	2.62	2.86	2.86
Administrators response	1.60	3.40	4.00	3.80
Average groups rating	1.39	2.87	3.21	3.19
2) Secondary:				
Extension workers response	3.16	1.94	2.00	2.23
Experiment station workers response	2.28	2.41	2.55	2.41
Administrators response	4.00	3.40	3.20	2.00
Average groups rating	3.15	2.58	2.58	2.21
3) Secondary Agricultural Schools:				
Extension workers response	2.90	1.74	2.10	2.48
Experiment station workers response	2.00	1.72	2.07	2.34
Administrators response	2.40	1.80	1.60	2.40
Average groups rating	2.43	1.75	1.92	2.41
4) Institutes or Informal Adult Education:				
Extension workers response	3.16	2.29	2.55	2.68
Experiment station workers response	2.38	2.00	2.48	2.59
Administrators response	2.80	1.40	1.80	2.20
Average groups rating	2.78	1.90	2.28	2.49
5) Bachelor Degree:				
Extension workers response	4.00	2.23	1.77	1.84
Experiment station workers response	3.79	3.07	2.41	2.10
Administrators response	4.00	3.80	3.60	2.00
Average groups rating	3.93	3.03	2.59	1.98

TABLE L (CONT'D)

Item and Responding Group	Relative Importance for Specified Group			
	Farmers	Extension Workers	Experiment Station Workers	Adminis-strators
6) B.S. Agriculture:				
Extension workers response	3.79	1.61	1.23	1.74
Experiment station workers response	3.31	1.44	1.03	1.67
Administrators response	4.00	2.00	1.80	2.00
Average groups rating	3.70	1.68	1.35	1.80
7) Masters Degree:				
Extension workers response	4.00	3.06	1.61	2.10
Experiment station workers response	3.93	3.31	2.59	2.62
Administrators response	4.00	2.40	1.60	2.20
Average groups rating	3.98	2.92	1.93	2.31
8) M.S. Agriculture:				
Extension workers response	4.00	3.00	1.55	1.87
Experiment station workers response	3.76	2.45	1.28	2.14
Administrators response	4.00	2.40	1.20	2.40
Average groups rating	3.92	2.62	1.34	2.14
9) Internships (on the job):				
Extension workers response	3.29	2.06	1.45	1.74
Experiment station workers response	2.45	1.69	1.59	2.10
Administrators response	4.00	1.40	1.80	2.40
Average groups rating	3.25	1.72	1.61	2.08
10) In-Service Training, Workshops, Etc.:				
Extension workers response	3.32	2.16	1.61	2.03
Experiment station workers response	2.24	1.34	1.31	1.66
Administrators response	3.40	1.20	2.00	1.80
Average groups rating	2.99	1.57	1.64	1.83

workers and 1.92 for preparation of experiment station workers. Respondents considered that "institutes or formal adult education" was important

for the preparation of extension workers, with an average rating score of 1.90, and for experiment station workers, with a slightly lower average score of 2.28. In terms of further judgments of the three group respondents with regard to preparation of extension and experiment station administrators, they gave "attainment of a Bachelor degree" the high rating score of 1.98. All three groups seemed in relatively close agreement that the "B.S. in agriculture" was a rather highly important level of training for the preparation of future extension workers, experiment station workers, and administrators, with average rating scores of 1.68, 1.35 and 1.8 respectively. "Attainment of a Master Degree" was considered "important" for preparation of experiment station workers, with an average rating score of 1.93, and "slightly important" for administrators, with an average score of 2.31 as received from the three groups' responses.

All groups indicated that the "attainment of M.S. in agriculture" was very important for preparation of experiment station workers, with an average rating score given of 1.34, while it was also considered "important" for administrators, with an average rating score given of 2.14. Apparently, respondents felt it more important for experiment station workers to hold an M.S. in agriculture than for extension workers to hold the same. Present extension workers, experiment station workers, and administrators in the Ministry of Agriculture and Water reveal the judgment that "internships on the job" and "in-service training" were "very important" for the preparation of future extension workers, experiment station workers, and administrators, with average rating scores of 1.72, 1.62, and 2.08 respectively for the first item and 1.57, 1.64 and 1.83 respectively for the first item and 1.57, 1.64 and 1.83 respectively for the second item.

Judgments of Classified Groups as to the Relative Importance of Selected Items of the Training Curriculum for Preparation of Workers in the Respective Employment Areas

Findings categorized and listed in Table LI show a summary and provide for comparison of responses of three professional agricultural groups as to relative importance of selected items which might be emphasized in the training curriculum. Present extension workers, experiment station workers, and administrators in the Ministry of Agriculture and Water felt that "practical application" and "internships and learning-by-doing" were "very important" to emphasize in a training curriculum for preparation of future Saudi farmers, with an average rating score given as 1.72 for the first item and 1.60 for the second one. It was of note that all respondents seemed to feel that emphasis on (1) a general scientific basis, (2) stressing subject matter, (3) continuing to make "practical application," (4) "organizing goals and setting objectives," and (5) "communication and teaching" were all "very important" in a training curriculum for preparation of extension workers, experiment station workers, and administrators. Evidently, almost all respondents were quite concerned that the training curriculum be of a substantial nature with a comprehensive yet thorough emphasis.

Analysis and Conclusions

It would seem quite clear that a major difficulty in promoting the adoption of improved practices among the farmers in the Eastern Province is the high rate of illiteracy with as few as approximately 20.0 percent

TABLE LI

SUMMARY AND COMPARISON OF THREE PROFESSIONAL AGRICULTURAL GROUPS AS TO RELATIVE IMPORTANCE OF SELECTED ITEMS OF THE TRAINING CURRICULUM

Item and Responding Group	Relative Importance for Specified Group			
	Farmers Avg.Rating	Extension Workers Avg.Rating	Experiment Sta.Workers Avg.Rating	Administrators Avg.Rating
1) General scientific basis:				
Extension workers response	3.13	1.45	1.55	1.71
Experimentstation workers response	2.93	1.83	1.28	2.07
Administrators response	2.80	1.20	1.40	2.20
Average groups rating	2.95	1.49	1.41	1.99
2) Subject matter:				
Extension workers response	2.81	1.35	1.48	1.61
Experiment station workers response	2.55	1.69	1.52	1.83
Administrators response	2.40	1.80	1.00	1.80
Average groups rating	2.59	1.61	1.33	1.75
3) Research techniques:				
Extension workers response	3.77	2.54	1.71	2.26
Experiment station workers response	3.59	2.21	1.07	2.79
Administrators response	3.60	2.00	1.00	2.60
Average groups rating	3.65	2.25	1.26	2.55
4) Practical application:				
Extension workers response	1.94	1.61	1.87	2.26
Experiment station workers response	1.62	1.52	1.41	2.31
Administrators response	1.60	1.00	2.00	2.60
Average groups rating	1.72	1.37	1.76	2.39
5) Communications and teaching:				
Extension workers response	2.87	1.58	2.03	2.29
Experiment station workers response	3.38	1.48	1.93	2.10
Administrators response	3.80	1.20	1.60	2.20
Average groups rating	3.35	1.42	1.85	2.21

TABLE LI (CONT'D)

Item and Responding Group	Relative Importance for Specified Group			
	Farmers Avg.Rating	Extension Workers Avg.Rating	Experiment Sta.Workers Avg.Rating	Administrators Avg.Rating
6) Organizing goals and setting objectives:				
Extension workers response	2.71	1.45	1.74	1.94
Experiment station workers response	2.86	1.69	1.41	1.59
Administrators response	3.20	1.80	2.20	1.40
Average groups rating	2.92	1.64	1.78	1.64
7) Internships and learning by doing				
Extension workers response	1.90	1.74	2.23	2.65
Experiment station workers response	1.52	1.34	1.45	2.07
Administrators response	1.40	1.20	2.60	3.20
Average groups rating	1.60	1.43	2.09	2.64

of the farmers able to read or write. Training programs are to be seen as requiring a great deal of effort and initiative on the part of professional agricultural workers. The majority of farmers can be recognized as older, with a marked absence of young people presently involved in farming. The fact that only 50 percent of the farmers reported that they had received assistance from the extension service is somewhat disconcerting and unmistakably points toward a real need for efforts to enlarge and improve services rendered by agricultural extension workers. Perhaps the image of extension can well be improved. It was gratifying to discover that one-half of the farmers interviewed did feel favorable toward their children becoming future extension workers. Perhaps it is not surprising that the same number and percentage of responses were received for the

two items (1) having had assistance from extension workers and (2) willing for child to be trained as an extension worker. That emphasis upon agricultural research is a most important stance for a developing nation is no doubt readily accepted. Some conclusions with regard to research programs at Hafuf and Qatif stations can be drawn from data gathered in this investigation and the fact that at the Hafuf station, nearly half of the staff, 47.7 percent, reported experience of from only one to four years would indicate a need for providing optimum conditions for encouraging tenure. One explanation for the lack of longer periods of experience might be that of the policies of the University College of North Wales, which contracts to supply the animal researcher staff, and the University of Bronanshweig, which contracts for the soil and water use research staff, are to assign staff for only a short period of time. Thus it would seem most important that efforts be expended to encourage native Saudi workers to engage in training in their fields in order to eventually replace non-Saudi workers. It is expected that greater stability will accompany the employment of native Saudis who could be expected to have much longer tenure in the position. Finally, a conclusion which would appear appropriately drawn from findings of this study would be the unmistakable need for increase in both in the number of farmers and in the number of available extension workers and experiment station workers. This will have to be accomplished as rapidly as possible and it would seem most desirable for these positions to be filled with native Saudi workers. In order for this to occur, it is imperative that resources be made readily available for the expansion and improvement of agricultural schools and universities. Agricultural training centers should be increased in number and their programs of instruction be made available to

adult farmers and professional agricultural workers. Attention should be immediately given to providing in-service training courses for extension workers. However, we noted that most respondents said farmers and workers should be recruited from among the "sons of farmers." It would appear logical that emphasis should be placed upon implementing practices which may encourage the children of present farmers to receive agricultural training in the elementary school as well as at all other levels of formal education. Also, emphasis should be placed upon providing encouragement to "Saudi graduates from colleges of agriculture" to obtain a position in experiment stations and as administrators for experiment stations or extension programs.

It would seem further appropriate to conclude that when consideration is given to insuring the maintenance of a curriculum emphasis best suited to the rapid production of well-qualified farmers and professional agriculture workers, an internship program should be established. Care should be exercised that there is indeed a "practical application" brought about by carefully supervised "learning by doing" on the job.

Recommendations

The researcher makes the following recommendations based upon conclusions drawn from the findings of the study. First, to bring about a highly productive, functioning and adequate manpower supply of both basic and professional personnel in agricultural workers for the Eastern Province, the government should give attention to implementing and further developing the following:

Elementary and Secondary Education

1. It would appear logical that emphasis should be placed upon teaching agriculture in elementary and in middle schools.

2. The implementation of an emphasis upon agricultural training in the secondary schools should be made.

3. In addition to establishing programs of study in agriculture in the comprehensive secondary schools, at least two vocational agriculture schools should be established within the Eastern Province. With emphasis upon both the scientific and practical aspects of agriculture, these schools would also include instruction in the basic courses so that graduates would have free access to colleges and universities on the same basis as graduates of the comprehensive secondary schools.

Higher Education

1. Emphasis should be placed upon providing encouragement to Saudi graduates from colleges of agriculture to obtain positions in extension, experiment stations and as administrators for experiment stations or extension programs.

Adult and Extension Education

1. A program of adult education in agriculture in the villages, making use of the facilities of the elementary schools should be implemented. This program would make extensive use of visual aids and would make possible the participation of the farmer along with his children. For meeting immediate needs, extension and experiment station workers should be used to provide instruction. However, for the long range need teachers should

be prepared to share in this instruction.

2. Future implementation of a training program for adult farmers as a part of the program of the vocational agriculture schools referred to above is strongly recommended.

3. In order to maximize the effectiveness of adoption and use of approved practices and technologies in agriculture by farmers of the Eastern Province, it is recommended that the Ministry of Agriculture and Water should give immediate attention to a plan to increase the staff in Agricultural Extension. The present ratio of one extension worker to every 250 farmers should be narrowed to one extension worker to every 230 farmers, this to be accomplished by the year 1995, with this ratio maintained through the year 2000.

4. It is further recommended that the Agricultural Extension Division in the Al-Hasa Agricultural Directorate and the Qatif Agricultural Unit seek to involve "key farmers" in planning programs, thus obtaining knowledgable assistance from them in identifying problems of major concern.

Research and Experiment Station Programs

1. In order to maximize the effectiveness of adoption and use of approved practices and technologies in agriculture by farmers of the Eastern Province, it is recommended that the Ministry of Agriculture and Water give immediate attention to a plan to increase the staff in the Agricultural Experiment Stations. The present ratio of one experiment station worker for 380 farmers should be maintained. The continued increase projected in the number of farmers does in turn call for a corresponding increase in the number of Experiment Station workers in order to maintain

the ratio as presently constituted.

2. In order to assure that the experimental programs in agriculture are closely aligned to actual present problems of agriculture and farming, it is recommended that every year the officials and staff of the two Experiment Stations located in the Eastern Province convene a planning and review session with representatives from the Agricultural Extension Divisions and "key farmers" of the Eastern Province.

Preparation of Teachers and Professional Agriculturalists

1. In order to more adequately prepare teachers for the teaching of agriculture in elementary, middle and secondary schools, it is strongly recommended that Colleges of Education secure some faculty members who have had educational training in the field of agriculture. Such faculty would teach courses in general agriculture. These courses would then become a part of the curriculum for teacher preparation.

2. Prior to going on a job, both new Saudi and non-Saudi workers in Agricultural Extension and Experiment Station Centers should be given from one to two months of induction through on-the-job training, in which intensive study be given to programming, methods of instruction, and the process of adoption of new practices. These should all be so structured and carried out as to call for a maximum amount of time spent with farmers in the villages.

General

1. In order that both children and their parents be brought to a more favorable acceptance of careers in agriculture as equally prestigious

with other occupations it is strongly recommended that opportunities be provided within the villages for children to publicly display their accomplishments in agriculture, both in the growing of plants and raising of animals. Recognition in the form of awards would be provided.

2. In view of the need to make a comprehensive effort to further agricultural education, it is recommended that there be established as soon as possible a high level committee on Agriculture Education in the Eastern Province. Membership on this committee should include representatives from the Ministry of Agriculture and Water, the Ministry of Education, and King Faisal University, as well as a number of designated "key" farmers from both the Al-Hasa and Qatif areas.

3. Finally, it is recommended that the Director of the Agricultural Extension Division and his Assistant Administrator be provided the opportunity for periodic visits to other nations for the purpose of reviewing their Agricultural Extension program.

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APPENDIX

AN AGRICULTURAL SURVEY IN THE EASTERN PROVINCE
OF SAUDI ARABIA

The present status of manpower in agriculture and projected needs.

PART A - FARMERS

Name (optional)_____

Check where appropriate:

1. Full time farmer Yes _____ No _____

   Part time Yes _____ No _____

2. Were you born on a farm? Yes _____ No _____

3. How many years have you been associated with farming?

   More than 40 _____ 20 to 30 _____ Less than 10 _____

   30 to 40 _____ 10 to 20 _____

4. What is your level of education acquired?

   read and write only _____ some study beyond secondary school____

   elementary school _____ Bachelor of Science _____

   secondary school _____

5. Have you had any kind of formal agricultural education? Yes___No___

   If answer is yes, where_____what kind_____.

6. Are other members of your family involved in agriculture? Who_____

   _____How are they involved?_____

7. The farm where you live:

   Do you own it? Yes ____ No ____ Do you operatie it? Yes ____ No ____

8. What agricultural agencies have aided you?_____

   Extension? Yes ___ No ___ How_____

9. Should your sons or other children of the village be encouraged to train for work in extension? ____ Experiment station? ____ Ag Business? ____ Farming? ____If so, how can this be done?_____

PART B - EXTENSION WORKERS, EXPERIMENT STATION WORKERS AND SELECTED ADMINISTRATORS IN THE MINISTRY OF AGRICULTURE AND WATER IN RIYADH

Name_____ Area of Work_____

Years in this work_____ Years of other work experience (list kind):

(1)_____ (2)_____

(3)_____

The value of types of training received in preparation for your present job:

School Attended (List)	Very Good	Good	Fair	Some Value	Little Value
1._____					
2._____					
3._____					
Workshops or Institutes (List)					
1._____					
2._____					
3._____					

PART C - FUTURE MANPOWER NEEDS IN AGRICULTURE

What should be the percentage increase in numbers of:	Present Number	Percent Increase Needed By: 1980	1985	1990	1995	2000
Farmers	10,961	____	____	____	____	____
Administrators	8	____	____	____	____	____
Agricultural Extension Workers						
General	26	____	____	____	____	____
Water Resources	4	____	____	____	____	____
Agronomy	4	____	____	____	____	____
Rice	1	____	____	____	____	____
Livestock	1	____	____	____	____	____
Agricultural Mechanics	1	____	____	____	____	____
Entomology	7	____	____	____	____	____
Experiment Station Workers						
Water Resources	4	____	____	____	____	____
Agronomy	7	____	____	____	____	____
Rice	5	____	____	____	____	____
Livestock	11	____	____	____	____	____
Agricultural Mechanics	1	____	____	____	____	____
Entomology	1	____	____	____	____	____

PART C (CONT'D) - SOURCES FOR RECRUITMENT

Circle as your score: 1. Very important 3. Some importance
2. Important 4. Little or no importance

	Farmers	Extension Workers	Experiment Station Workers	Administrators
Sons of farmers	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
Saudi graduates	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
Agriculture graduates of other countries	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
Workers with agricultural experience	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4

LEVEL AND KINDS OF TRAINING NEEDED BY WORKERS

	Farmers	Extension Workers	Experiment Station Workers	Administrators
Elementary school	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
Secondary school (Comprehensive)	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
Secondary agricultural schools	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
Institutes or informal adult education	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
B.S. (general)	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
B.S. in Agriculture	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
M.S. (general)	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
M.S. in Agriculture	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
Internships (on the job)	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
In-service training workshops, etc.	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4

PART C (CONT'D) - EMPHASIS WITHIN TRAINING CURRICULUM

	Farmers	Extension Workers	Experiment Station Workers	Administrators
a. General scientific basis	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
b. Subject matter	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
c. Research techniques	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
d. Practical application	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
e. Communications and teaching	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
f. Organizing goals and setting objectives	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
g. Internships and learning by doing	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4

REMARKS:

VITA

Hameed Mohammad Abojoball

Candidate for the Degree of

Master of Science

Thesis: ANALYSIS OF FUTURE MANPOWER NEEDS IN AGRICULTURE AS PERCEIVED BY SELECTED GROUPS OF AGRICULTURALISTS IN THE EASTERN PROVINCE OF SAUDI ARABIA.

Major Field: Agricultural Education

Biographical:

Personal Data: Born in Rabigh, Saudi Arabia, January 20, 1943, the son of Mr. and Mrs. Abojoball.

Education: Graduated from Al-Yamama Secondary School, Riyadh, Saudi Arabia, in 1966; received the Bachelor of Arts degree in 1972 at the University of Riyadh, Riyadh, Saudi Arabia; completed requirements for the degree of Master of Science at Oklahoma State University, Stillwater, Oklahoma, in December, 1978.

Professional Experience: Secretary of Al-Hasa Sand Dune Fixation Project in the Ministry of Agriculture and Water, Riyadh, from May, 1964, through July, 1966; Office Manager of the Director General of the Agricultural Development and Research Department, in the Ministry of Agriculture and Water, from July, 1966, through June, 1968; Assistant to the Manager of the office of the Minister of Agriculture and Water for Technical Affairs, from June, 1968, through July, 1969; Office Manager of Director General of the Projects Department in the Ministry of Agriculture and Water from July, 1969, through January, 1970; Purchase Director in the Faisal Settlement Project, Haradh, from January, 1970, through October, 1973; appointed Office Manager of the Deputy Minister of Agriculture and Water in October, 1973, which is the position presently held.