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CENTO CONFERENCE ON AGRICULTURAL EXTENSION  
HELD IN ANKARA-DENIZLI-IZMIR, TURKEY

APRIL 12 TO 22, 1967

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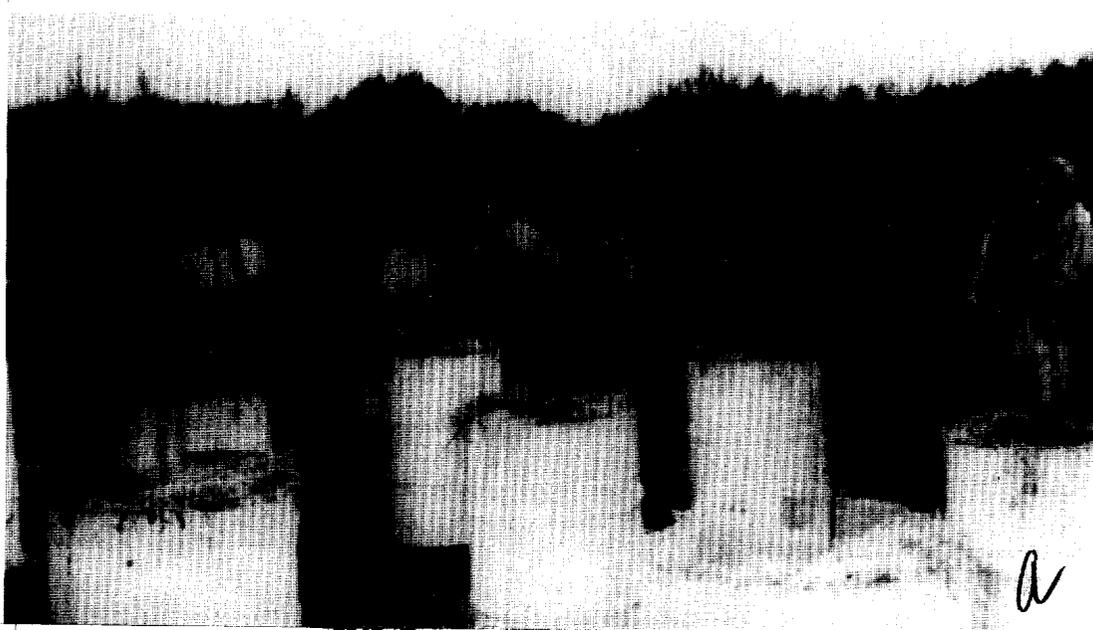
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CENTO TREATY ORGANIZATION  
(CENTO)

İZMİR  
OLIVE RESEARCH STATION



The delegates  
were briefed  
on the İzmir  
Olive Research  
Station's  
operation  
and spent  
several hours  
visiting  
the installations.





PAMUKKALE

Excursions to the famous ruins at Pamukkale and Ephesus were included in the conference program.

EPHESUS



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## FOREWORD

This conference on Agricultural Extension was held as the result of a recommendation by the CENTO Sub-Committee on Agriculture at its meeting in Tehran in January 1966. The Government of Turkey offered to host the conference and the United States agreed to provide organizational and financial support as part of its technical assistance program through CENTO, administered by the Office of the U. S. Economic Coordinator.

This publication contains many of the papers which were presented by experts from Iran, Pakistan, Turkey, the United Kingdom and the United States. The CENTO Secretariat's report of the conference and the official recommendations and conclusions prepared by the delegates are also reproduced. Space limitations have made it necessary to edit and in some cases delete repetitious material from some of the many excellent papers delivered at the conference.

The conference provided a valuable exchange of information among member country agriculturists on such important aspects of extension work as water resources, fertilizer, seeds, livestock, farm tools, marketing, and home economics. Practical problems of extension workers were stressed throughout.

Special thanks are due to the Government of Turkey, including provincial officials in Izmir and Denizli for the excellent conference arrangements, and to the participants from all countries who contributed their time, knowledge and experience to make the conference a success.

## MESSAGE OF THE SECRETARY GENERAL\*

Distinguished Delegates, Ladies and Gentlemen:

It gives me great pleasure to welcome you, and to open the first Conference on Agricultural Extension work which has been organized under the auspices of the Central Treaty Organization.

As I am sure many of you are aware, CENTO has long supported its Regional Members in their efforts to develop and improve agricultural techniques. In fact, during the past year CENTO placed great emphasis on this aspect of its economic activities and only last week a conference was held in Lahore to continue discussions, begun in 1966, regarding the marketing of agricultural produce.

Agricultural extension work involves the farmer and all his family, in addition to many others who are directly engaged in the campaign to grow more food, and food production is perhaps the greatest single economic problem facing the world in the second half of this twentieth century. In his speech opening the CENTO Economic Committee meeting in Washington a few weeks ago, Mr. William Gaud, Head of A. I. D., the United States Administration for International Development said,

"the first and foremost challenge, it seems to me, is that of increasing the production of food world-wide. It is not only a matter of producing more food, it is also a matter of distribution and teaching people to eat better food."

His words are most appropriate to your work.

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\* Read to the Conference by the Deputy Secretary General (Economic), Mr. J. E. Hartley, M. B. E.

CENTO meetings were held last year to discuss and find solutions to a great variety of agricultural problems - for example, the best use to be made of farm tools and implements, the scientific use and production of fertilizers, parasitic diseases in livestock, the improvement of ranges and pastures, the techniques of marketing fresh fruits and vegetables, as well as marketing problems in general. Agricultural extension is just as basic as all these subjects, but at the same time somewhat broader in scope: the demonstration of modern ideas and techniques must be conveyed to the farmer in the field in such a way as to make improved methods of farming acceptable by him. If this is achieved agricultural extension can lead to unlimited benefits to the countries of the region but we all know that farmers, as a whole, are a conservative breed of people.

This CENTO conference now being inaugurated has been primarily organized and financially assisted by the United States Government through the Office of the United States Economic Coordinator for CENTO Affairs. It has been under preparation for many months. On behalf of the Central Treaty Organization I wish to express appreciation for these efforts.

I wish also to thank the Minister of Agriculture of Turkey for his interest in the conference and for the assistance given by him and his colleagues in the Ministry in arranging it, and for the most generous hospitality extended to us by our Turkish hosts here in Ankara and subsequently in Denizli and Izmir. May I now invite Mr. Mustafa Durusoy, Assistant Under Secretary, Ministry of Agriculture, to address you.

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## SPEECH OF WELCOME

BY

ZEKERİYA ÇELİKBILEKLİ  
Deputy Governor of İzmir

Mr. Chairman, distinguished members of CENTO delegations, ladies and gentlemen:

I would like to express my deepest appreciation to CENTO for having decided, among this year's programs, to hold in our fair city this conference on agricultural extension. I greet all these distinguished delegates with all sincerity.

This meeting which will last six days in our city is certainly of great importance to all you distinguished delegates. It will give you a chance to get together and to participate in a study of extension at the level of the farmer.

During your stay in our region you will visit various local agricultural institutions and will be able to observe closely our activities in agriculture. You will observe samples of research, experiments and their application in this region within the frame of a polycultural system.

The goal of this conference, we believe, is to increase production and especially to increase the income of the farmer. More practical ways must be found at the farmer level, and the agricultural extension organization, through its activities, can be the most successful and useful.

We believe that the farmer has to be convinced to increase his productivity to match the decrease in production resulting from the

emigration from the villages to this cities. He should be convinced that he can increase his productivity through the use of new technical skills. Convincing and teaching the farmer of these needs is a "must."

I would like again to confirm my belief that this conference will be of great benefit for our countries and it will strengthen then our friendship. I wish to express my best wishes to you and as you leave Izmir, the third largest city in Turkey, I hope you depart with the very best memories after a most successful conference. Thank you.

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AGRICULTURAL DEVELOPMENT - EMPHASIS ON THE  
EXTENSION WORKER AND THE FARMER

Prepared by

RALPH GLEASON  
Chief, Agriculture Division  
USAID/Turkey

Delivered by

HARVEY JOHNSON  
Deputy Chief, Agriculture Division  
USAID/Turkey

IMPORTANCE OF AGRICULTURE

No doubt each of us can recall the first time some teacher, probably too many years ago for some of us to admit, taught us that the three basic necessities of mankind are food, shelter and clothing. Among these three items, all primary products of agriculture, we would all agree that food is by far the most essential. Without it mankind simply cannot exist.

The importance of shelter and clothing must, however, not be downgraded. Both are essential in protecting us from adverse climatic conditions and nature itself. Modern man also demands the privacy, and has need for displaying the pride of ownership and occupancy, which attaches to shelter and clothing. It has been said that man cannot live by bread alone.

Over the years the responsibility of agriculture regarding the provision of shelter and clothing has been lessened somewhat by advancements in the industrial sector, namely, the development of

nonagricultural products for use in building construction and of synthetic fibers for our clothing. Unfortunately, no means have been developed yet to relieve agriculture of its responsibility with respect to food production.

The economists and development planners will also remind us that the agricultural sector has other major responsibilities and contributions to make toward national development. In addition to the production of food and fiber for increasing populations, we are told that the agricultural sector must produce savings in sufficient amount not only to support its own expansion but an excess to spill over into and help develop the industrial sector. But this is not all. The agricultural sector is also expected to become the principal consumer of the products of industry, besides producing much of the raw materials which industry requires. In addition, the rural areas have traditionally been the principal source of manpower to support industrialization, and during periods of national conflict to man the weapons of destruction in defence of our nations.

#### WHY HAS AGRICULTURAL DEVELOPMENT LAGGED

At this point we might ask ourselves the question: Since agriculture is so obviously important to a nation's development and the general welfare of its people, why is it that the development of this sector has too often lagged behind?

I certainly do not profess to have a ready answer to this most formidable question. Probably no one does. In fact, I don't believe there is an easy, simple answer to be given. If there were, I feel confident the solution would have been applied throughout the world long ago and the present need for boosting agricultural productivity to prevent starvation among the ever-increasing masses of people would not be so urgent and critical.

Having no clear-cut, ready answer to the question posed, I would like to probe a bit into the nature of the problem we face as agriculturists in increasing agricultural productivity and making a greater contribution to national development. We should examine ourselves and our own shortcomings as agriculturists, but also we should examine the adequacy of support and assistance which must be provided by others.

The matter of national policy and attitude of a country's leadership toward rural people and development of the agricultural sector is very important. I would venture that today this poses no problem in our respective countries. Our national leaders have become acutely aware of the "food supply: population explosion" problem and want something done about it. I will quote a statement made by President Johnson in his message to Congress on the foreign aid program on February 1, 1966.

"The problem of hunger is a continuing crisis. In many parts of the world we witness both the ravages of famine borne of natural disaster and the failure of food production to keep pace with rising needs. This is a catastrophe for all of us. It must be dealt with by all who can help. In many other countries food output is also falling behind population growth. We cannot meet the world food needs of the future, however willing we are to share our abundance. Nor would it serve the common interest if we could."

"The solution is clear: an all-out effort to enable the developing countries to supply their own food needs, through their own production or through improved capacity to buy in the world market."

We should perhaps be more concerned with the interpretation of policy as exemplified by actual resource allocation to the agricultural sector. A favorable policy alone is only indicative of good intentions. Worthwhile agricultural projects and programs cannot be developed and implemented without adequate manpower and budgetary support. As agriculturists we can have influence over these matters but too often we have no actual control. Authority and responsibility should be commensurate. However, failure is failure regardless of the reason.

#### Support from Industry

Agricultural development, of course, requires support from other sectors of the economy. Production supplies and equipment must either be provided by domestic industry or adequate foreign exchange must be allocated for their import. Industry must also be developed to process agricultural produce. Too often industry is not sufficiently oriented to these needs.

### Support from Education

A nation's educators should give special attention to the rural sector. Illiteracy should be reduced or eliminated to the extent that its existence hampers agricultural development. Elementary school curricula--- too often urbanoriented ---- should draw heavily upon agricultural terms and cite favorable examples of rural living. Rural youth should be provided greater opportunities for entering the nation's institutions of higher learning in preparation for subsequent advancement to positions of leadership in directing the political, economic, and social affairs of the nation. A more sympathetic attitude toward and support for agricultural and rural development would in time emerge.

### Support from the Health Sector

Wider-scale application during recent years, particularly since World War II of the benefits of modern medicine and improved public health practices has increased the demand for food and, consequently, the burden on agriculture. On the other hand, agriculture stands to benefit greatly from improved health conditions; only a healthy rural people can shoulder the current food production challenge. Public health and other authorities are now promoting national programs of family planning in order to curtail the very alarming rate of population increase. To the extent these programs succeed the burden on agriculture to produce more food will be lessened. As agriculturists, we should welcome and support such effort on the part of others. If they succeed, we also have a better chance to succeed.

### Meaning of Term "Agriculturist"

Let's turn now to matters which are of more direct concern to us as agriculturists. Let's examine some of the aspects of agricultural development over which we have more direct control and, of course, about which we should be more knowledgeable and of which we should be more qualified to speak.

Perhaps I should elaborate a bit on my use of the term "agriculturists." To some it would mean, any person who earns his livelihood mainly from practicing some aspect of agricultural endeavor.

To others "agriculturist" would refer only to a person possessing a degree in agriculture. Some might consider that the term refers only to the "non-graduate" agricultural technician. While still others would consider it only a sophisticated term meaning the farmer or one who actually tills the land.

I hope you will permit me to use the term in a very broad sense. I like to consider anyone "who is himself a farmer or a friend of the farmer" as an agriculturist. On this basis, I believe that all of us here today would qualify to be called agriculturists. For anyone not qualifying we must say that his heart and his sympathies are not in the right place.

### Five Categories of Agriculturists

I believe we agriculturists - based on the specific nature of our respective jobs - can be conveniently placed in one of five major categories of agricultural workers. Some of us may qualify for more than one of the categories. To the extent that we can it is usually a very desirable arrangement. The five categories are: 1. Administrator/Policy Maker; 2. Researcher; 3. Resident Teacher or Instructor; 4. Extension Worker, and 5. Farmer.

The nature of the work of each of these categories of agriculturists is obvious and certainly needs no explanation to you. I would, however, like to comment on each, especially with reference to vulnerability of each group to political and other pressures and to public scrutiny. There are some interesting differences.

### Administrator/Policy Maker

First, let's consider the Administrator/Policy Maker group, which is no doubt the most vulnerable. One needs only to recall the relatively short tenures in office and the very rapid, sudden changes in assignment of those persons who have become Ministers, Secretaries, General Directors, and heads of various major organizational entities concerned with agricultural development. This fast turnover of high-level personnel quite often helps to explain the absence of sound national policy to guide the development of effective agricultural projects and programs.

Probably too much is expected of them too soon. The identification of problems and the formulation of sound policies to cope with them is a time-consuming and very difficult process, but once properly done should very seldom be subjected to or even require major change. Minor adjustments, however, are necessary and expected on a routine continuing basis in order to reflect access to better information and to keep abreast of recent and current in the situation. More stability and less uncertainty along this line, I am sure, would greatly facilitate our work and would therefore, be welcomed by all of us.

### Researcher

Now, let's turn to the Researcher category. I believe this to be the least vulnerable group, which is not necessarily a result of the researcher's own doing but rather the uniquely tolerant, patient attitude which administrators and the public in general display towards them. After all, only a small percentage of the research work undertaken is expected to bring forth actual benefits to society. We simply don't expect and indeed we should not expect every piece of research work to succeed, rather we expect there will be many failures. However, does this attitude toward research not provide an invisible wall behind which too many of our research workers can conveniently hide and, thus, avoid the sometimes rather ruthless scrutiny of their work as experienced by other agriculturists?

We often speak of the importance of first assigning priorities to the various jobs to be undertaken and then proceeding to allocate our time and resources accordingly, that is, to do first things first. We also stress the need to coordinate effort and to avoid needless duplication. It has been my observation over the years that among the five categories of agriculturists the Researcher group is most apt to have shortcomings along these lines. At the same time, the productiveness of research work and researchers would seem to benefit the greatest through assignment of realistic priorities and effective coordination of effort. The situation takes on added seriousness when we note that the most highly-trained agriculturists belong to the Researcher category; an exception could be the Resident Teacher or Instructor group.

Researchers face a real challenge to display their own initiative in becoming personally conversant with the practical problems of a nation's agriculture and to direct their individual and joint efforts on a priority basis accordingly. Only in this way can they make an even greater and more lasting contribution to the society in which they live. The administrators and policy makers also face the challenge of continually assessing the situation and assuring themselves and the public in general that such ideals are being effectively pursued.

### Resident Teacher or Instructor

Let's turn now to the Resident Teacher or Instructor category. Members of this group are also employed in a somewhat protected environment since their place of work is mainly in the classroom and in the campus enclosure. They are in a sense, however, more vulnerable than the Researchers since, practically on a daily basis year around the educator must face the scrutiny and the expectations of students and parents alike. They must also face the performance of their students after they graduate and assume their respective roles in society. Nevertheless, the "sacred halls" of many institutions are almost inviolable as far as the public generally is concerned.

Many institutions of higher learning are privately operated and even those which are state-operated are allowed to function rather independently and their "parent" government organization is more often the Ministry of Education rather than Agriculture. Under this atmosphere of organizational independence and the ever-present cry for "academic freedom" on the part of such institutions, it is understandable that the agricultural administrator and employing organizations have no real assurance of the timely availability of graduates to meet their needs; graduates who, in their opinion, are well equipped and fully prepared and qualified to fill vacant positions and to tackle immediately and effectively the urgent, practical problems retarding development of the nation's agriculture.

Of course, potential employers can and should bring pressure on the institutions to produce graduates more to their liking. The real challenge, however, would seem to rest primarily with the individual teachers, but also rests with their departments and institutions. On their own initiative they should cultivate and maintain effective contacts with agriculturists in the other four

categories, including especially the farmers. They should learn first hand and stay abreast of the country's agricultural situation and the types of trained manpower required on a priority over the years immediately ahead and then develop their teaching programs accordingly. The student must take what is offered and understandably so since he has neither the background maturity nor the experience to judge which courses and kind of training will best prepare him for his chosen field of work. This responsibility to the student, and to the nation in the development of its most important resource — manpower, rests primarily with the educator — the man on the spot — and must not be shunned by him.

I do not wish to infer that members of the Resident Teacher or Instructor group have failed in carrying out their part of the total agricultural job. Rather to the contrary, as can be exemplified by the very fine work you and your colleagues, who are products of their educational endeavors, are currently conducting and the great progress in your nation's agriculture which you will no doubt be reporting on and discussing during subsequent sessions of this seminar. I will contend, however, that there are major gaps in the availability of trained manpower to help you do an even better job. One which always comes to mind is the acute shortage, and in some instances the practical non-existence, of graduate agriculturists who are prepared to assist farmers to level their fields and improve on-farm irrigation practices. As long as such gaps exist, there is room for major improvement and responsible persons must note these gaps and take remedial action. Otherwise, improvement in the agricultural sector will unnecessarily continue to lag.

#### Extension Worker

Now let's turn to the fourth category of agriculturist, the Extension Worker. I would like to comment mainly on those in this category who serve in the countries and villages as the final — and sometimes the only — link which government bureaucracies have with the farmer and his family.

Drawing on military terminology, we would say, "He is the man on the agricultural firing line" — usually an unenviable position. Aside from the farmer himself, I have the greatest admiration, respect, and sympathy for this agriculturist. Next to the farmer, he comes closest to having a 24-hour per day job.



others to spend full time working with farmers. In other words, divide the group but not the individual.

The Extension Worker can also be more effective if the latest research recommendations in readily useful, simple, easy-to-understand form are regularly made available to him. The release of such information should not await the publication of formal research reports. The Extension Worker must be informed as quickly as possible so that farmers may in turn apply the recommendation in their current farming operations. Only in this manner can the results of research have fullest utility and the Researcher be rightly proud of his accomplishments.

### Farmer

Let's turn now to the fifth and last category of agriculturist, the Farmer. In the final analysis, the Farmer becomes the key person in agricultural development. He is a businessman, an investor, manager, and decision maker. In a democratic society, to which all of us here belong, it is not possible to increase a nation's agricultural productivity until the Farmer category makes the move. The other four categories of agriculturists, to which all of us belong, can only help and support the Farmer in this undertaking. We will not prepare the land, sow the seed, apply the fertilizer, manage the water, control the weeds, fight the pests, nor harvest and market the crop. The Farmer does these things.

Do we members of the other four categories, which actually places us solely in supporting roles, do all that we can and should to make the Farmer's job a little bit easier? Do we actually work with and for the farmer? We should, since the generally accepted measurement of increased agricultural productivity is more wheat, rice, cotton, corn or other crop per unit of land, more eggs per hen, more milk per cow, or more meat per head of animal. Are not these our ultimate aims as agriculturists and the real tests of progress? Regardless, I am afraid we have a tendency to ignore the farmer and to leave him outside of our deliberations and decision-making. We work over him, down to him, around and about him, but too seldom with and for him. In this seminar farmers are conspicuous by their absence. Would not a few

leading farmers from the participating countries have welcomed an opportunity to participate in discussions of such topics as appear on the Conference agenda. No doubt their views and opinions could have constituted a major contribution and besides may have livened up the discussions.

The Farmer can contribute toward development in many ways if only his capacity and ability to do so are recognized and he is given the opportunity. He should participate in the planning and formulation of national agricultural policy and in the projects and programs devised to carry it out. The Farmer is especially qualified to participate in the planning of activities which are to be implemented in his own area. I believe that this point will be verified by several of you when you report later in the Conference on various development programs and projects in your respective countries.

Many Farmers are qualified and willing to help train their neighbors, if given the opportunity. I am reminded of an experience in Taiwan (Formosa) in 1951. The Korean conflict was in process and desirable types of fertilizers were in short supply in the world market. In order to have sufficient nitrogen for the rice crop it became necessary to apply calcium cyanimide as a top-dressing. As some of you probably know, direct application would have damaged the rice plants and it was first necessary to age the calcium cyanimide for a few days in several parts soil to one of the fertilizer. Then the aged mixture could be applied directly to rice plants without harm. This problem was overcome in time by obtaining the cooperation of leading farmers throughout the island. A basic group was first taught and then given appointments as "honorary fertilizer supervisors." Handout leaflets were provided. They in turn taught other selected farmers, who in turn still taught others. There was no cost to the government for the farmers' services. The effort was successful, and the ensuing rice harvest was good. Not a single report was received of misuse of the fertilizer and damage to the rice crop.

Farmers are essentially the same the world over. Many of them are public spirited and would welcome more opportunities to participate in educational programs aimed at themselves and their neighbors. The honor of being selected and a certificate of some kind evidencing the fact — something to frame, hang in the home and display to their neighbors and friends — is often the only payment they demand or expect.

I have great confidence in the farmer and his family, regardless of nationality. The farmer is usually a more ready and willing innovator than we give him credit for being. He must of course first be shown. It has been said, "The farmer hears through his eyes." We must be careful as to what we teach him. There are fallacies in demonstrations of practices and techniques which for some reason the farmer cannot subsequently adopt.

As guidance in working effectively with farmers, I believe it worthwhile to invite your attention to a listing of points given in the report of a conference on agriculture policy in 1964. This conference was held in the U.S. and included a large number of the leading world authorities on the subject. Fundamentals for an agricultural extension program are:

1. It must be conceived as a continuing educational function designed specifically to improve the ability of the rural population to solve its own problems on a sustained basis with an ever-increasing degree of efficiency.
2. It must be staffed with adequate numbers of professionally competent, dedicated educators who clearly conceive their role in these terms.
3. Its structure must include a system of rewards based on this same criterion of improving rural self-reliance.
4. It must be concerned with the real problems of agriculture and have the flexibility to adjust to the ever-changing set of problems with which agriculture is faced.
5. It must have direct access to a "research arm" that effectively provides the kinds of information needed in decision making at the production unit level in a form and at a time most appropriate to the existing set of problems.
6. It must have the ability to influence, directly or indirectly, the content of the research arm.
7. It must be able to influence, directly or indirectly, the policies and programs of educational institutions producing the manpower required for sustained development in agriculture.

8. It must have access to a training program that continuously upgrades its staff.

## CONCLUSION

There are really no secrets regarding the basic ingredients that are required to increase agricultural productivity. The problem of major concern to us here today is how to adapt what is already known to the respective country situations and make it work successfully. We are concerned with effectively reaching the farmer and involving him in the process of development. We are also concerned with the establishment of systems or approaches to agricultural development which are uniquely tailored to each country's need.

An examination of the conference agenda indicates there will be much opportunity to exchange views and to benefit from one another's experiences. Relating agricultural extension to action programs on seed, water, fertilizer and other inputs provides a very practical and realistic approach and helps to keep attention focused on the farmer and the essential role he plays. Organizational problems and relationships will no doubt be brought forth in every instance.

I am pleased to note that no special time is scheduled for discussion on the more theoretical aspects of extension and the underlying concepts and principles. I don't think such is necessary at this time. You have in your respective countries well established Extension Services and large numbers of extension workers with several years of experience. The concepts involved in extension would seem to be well understood by now, leaving as the major problem that of applying the extension approach more effectively in boosting agricultural productivity.

In closing, I would like to express appreciation for the opportunity to speak before this group of agriculturists on the opening day of the Conference. It has indeed been a great honor and one which I will long remember. I wish you much success in your deliberations over the next several days and in your respective activities of work over the years ahead.

I believe today more firmly than ever that agriculture provides a field of opportunity as well as one of challenge. It deals with honest products made by nature through the influence of the sun upon a growing plant. The products therefrom represent the honest toil of many people.

REPORT OF THE CENTO CONFERENCE ON AGRICULTURAL  
EXTENSION ANKARA-DENIZLI-IZMIR, TURKEY  
APRIL 12-22, 1967

INTRODUCTION

The first Conference on Agricultural Extension under the auspices of the Central Treaty Organization was held from April 12 to 22, 1967 in Turkey. The Conference was organizationally and financially assisted by the United States Economic Coordinator for CENTO Affairs; all arrangements were made by the Turkish Ministry of Agriculture, which served as host not only in Ankara but also during the sessions in Denizli and Izmir.

The inaugural session was opened on April 12 at the Agricultural Training Center in Yenimahalle, Ankara, by the Deputy Secretary General (Economic), Mr. James E. Hartley, who read a message from the Secretary General, His Excellency Dr. A. A. Khalatbary. This was followed by an address of welcome delivered by the Assistant Under Secretary of Agriculture, His Excellency Mustafa Durusoy. The leaders of each delegation then made brief remarks, after which the leaders of the Turkish delegation, Mr. Nejat Erkenci, was elected chairman of the conference and made a brief speech. The keynote address, written by Mr. Ralph N. Gleason, Chief of the Food and Agriculture Division of USAID/Ankara, was entitled "Emphasis on the Extension Worker and the Farmer." Unfortunately, Mr. Gleason who was on an official trip overseas was unable to be present; his address was read by Mr. Harvey Johnson, Deputy Chief.

After the first day in Ankara, the delegates traveled by chartered bus to Denizli where they held sessions on April 14 and 15. From Denizli they went to Izmir on April 16. The remainder of the sessions took place at Izmir in the main conference room of the Bütük Efes Hotel.

The five CENTO countries were represented at the conference. There were 36 delegates and 7 regular observers. Certain sessions, such as the one on Home Economics, attracted a large number of additional observers.

A total of 35 papers were prepared by the delegates and distributed to the Conference. As a result of the presentation of papers, and the discussions which grew out of them both in the form of question-and-answer periods and panel discussions, the delegates drafted and agreed upon a definition of the term "Agricultural Extension" and a series of recommendations.

#### Definition of Agricultural Extension

Agricultural extension is an educational process. It brings to agricultural communities the knowledge and skills developed by research institutions, and by making these known it seeks to improve the level of agricultural production. From this comes greater wealth and, in turn, greater well-being and happiness. In this process, help to the farmer cannot be dissociated from help to his family, and from these small social units the benefits accumulate and contribute to community and national prosperity. The methods used in agricultural extension are based on the principle of helping people to help themselves. The extension worker must gain acceptance by the farmers. Having their trust he helps them to solve their problems by communicating to them some of the vast store of information which human intellectual endeavour has built up. This knowledge is of little service or value to farming people until it is put to use. Once set free from the constraints of tradition, and given confidence to face the challenge of development, there is no limit to what rural people can achieve.

#### BACKGROUND

A conference on the subject of Agricultural Extension was recommended by the Sub-Committee on Agriculture, Animal Production and Animal Health at its annual meeting in January 1966 and approved by the Economic Committee soon afterwards. For the purpose of preparing a preliminary survey, the United States Economic Coordinator for CENTO Affairs engaged Dr. Homer V. Judge, who travelled through East and West Pakistan, Iran and Turkey from October 9 to November 6, 1965. Dr. Judge consulted

with appropriate government officials and other experts in the regional countries on the organization, timing and arrangements for such a conference. His report was circulated for suggestions and comment as a CENTO document, and Dr. Judge himself served as co-chairman of the United States delegation.

The chief objective of the Conference was to provide an opportunity for extension service officials to review practical approaches to successful extension work at the farmer level with the aim of increasing production, efficiency, and income. To accomplish this objective, the delegates were requested to draw on their actual experiences in furnishing practical examples of extension work in action, both through prepared papers and in discussions based in them.

## ORGANIZATION

A steering committee composed of the conference chairman, the leaders of the five delegations, the Economic Secretary of CENTO, and a representative of the United States Economic Coordinator met several times to review the daily program and make minor changes in the schedule when necessary. The steering committee also appointed the topic chairman and rapporteurs who were responsible for each of the substantive sessions. This arrangement lightened the burden on the conference chairman, and by rotating the session chairmen and notetakers a large number of the delegates were drawn into active participation in the administration of the meetings. Another group, representing each delegation, met to prepare the first draft of the recommendations.

The Ministry of Agriculture organized the program with admirable efficiency. This was particularly noteworthy because sessions were held successively in Ankara, Denizli and Izmir which are far apart. The principal official of the Ministry of Agriculture involved in the planning and organization was Mr. Nejat Erkenci, Deputy General Director, General Directorate of Plant Protection and Quarantine.

## SUMMARIES OF PAPERS AND DISCUSSIONS

### 1. Denizli Agricultural Development Project

Chairman: Mr. N. Erkenci    Rapporteur: Mr. B.R. Ferguson

The first session in Denizli, which (not counting the background session in Ankara where no notes were taken) was the first substantive meeting of the conference, consisted of a comprehensive review of this important pilot project. Dr. Karacahisarlı, Chief of the Planning and Economic Research Group, Ministry of Agriculture, read a detailed paper explaining the relevant social and economic factors in the Denizli area. He then related the work done since the project began in 1963 with an emphasis on agricultural credit, and afterwards when it was broadened by an agreement signed between the Ministry of Agriculture and USAID in 1964. The purpose of the project, on which work actually commenced in 1965, is to increase the income of farmers; increase their productivity; develop an integrated approach among government agencies involved; organize farmers associations and cooperatives; train field workers; and spread to other provinces the results and experiences gained in Denizli.

After his presentation, Dr. Karacahisarlı led the discussion and answered a wide range of questions. In response to questions by Eng. Esphahani (Iran) and Mr. Chaudhry (Pakistan), Dr. Karacahisarlı told about the youth services, health activities, and various methods of spreading new ideas both in Denizli and in other similar areas. He described the Denizli Project as being a mixture of extension work, education, and development. When Mr. Iftikharuddin Ahmad referred to the difficulty encountered by the Comilla Project in East Pakistan in achieving coordination between the numerous governmental agencies and departments concerned, Dr. Karacahisarlı explained the Denizli system, which is still under trial, of having an agricultural coordinator attached to the governor's office. Mrs. Aghevli (Iran) stated that the main object of raising the standard of income was to bring about an improvement in the standard of living of the whole family and she enquired about the women's activities which were being undertaken in Denizli. These were described briefly.

## 2. Supervised Agricultural Credit

Chairman: Dr. N. Karacahisarlı

Panel Discussion Chairman: Mr. W. Taylor

Rapporteurs: Mr. B.L. Ferguson and Mr. I. Ahmad

The session was begun by Mr. Doğan Yalım of the Agricultural Bank of Turkey who read a paper on the Role of Extension Workers in Credit. Agricultural credit proved to be one of the most eagerly discussed subjects of the whole conference and Mr. Yalım demonstrated a thorough knowledge of it during the question and answer period following his speech. He explained how the Bank's agriculturist works closely not only with the extension agent and the farmer in planning the loan but also with the credit officer to ensure that money is used for the purpose for which it was intended and in an efficient manner. Supervised credit is given only in five pilot project areas, whereas loans in other areas may be given by cooperatives or banks without supervision. Supervised loans are granted for production purposes only, never for consumption. The Agricultural Bank functions as a private institution but is, in fact, a loan-granting agency of the government. The small farmer who has no potential cannot obtain supervised credit but he can seek a loan from the Agricultural Bank under one of its other schemes. While the present system is an individual approach, the Government of Turkey has a program for meeting the credit requirements of a province. For this purpose, there is a branch of the Bank in each province, and there are also agricultural credit cooperatives. One of the delegates from Pakistan asked whether a farmer can get loans for many different purposes from a single agency and not, as in Pakistan, be obligated to go to a large number of separate agencies. To this, Mr. Yalım answered that in Denizli it is possible to deal with a single agency under the integrated program of supervised credit. A question regarding the training of Agricultural Bank agriculturists elicited the reply that they are recruited from graduates of the Agricultural University, either agricultural engineers or agricultural technicians and are then trained in banking and farm loan operations.

Following Mr. Yalım's presentation and the question period, discussion of agricultural credit and the role of the extension worker was continued in the form of a panel led by Mr. Ward Taylor, USAID Adviser to the Denizli Project. Participants on the panel were Eng. Esphahani and Eng. Maghsoodpour (Iran), Mr. S. A. A. I. Ahmad and Mr. A. M. Chowdhury (Pakistan), Dr. Karacahisarlı and Mr. Yalım (Turkey), Mr. Neville (U.K.), and Mr. Duke and Ferguson (U.S.).

Mr. Taylor initiated the discussion by asking the Iranian representatives what they considered the primary responsibility of the extension worker in connection with agricultural credit. Eng. Esphahani stated that it is important for the extension worker to teach farmers the necessity of seeking legitimate credit and where to find it. Farmers and bankers should be assisted in organizing cooperatives which would lessen the suspicion which still exists between the two groups in many under-developed countries. Farmers should be aided in perceiving their actual need for credit and should be taught that they must utilize the loan for the specific purpose for which it was made. Eng. Esphahani observed that in the past Iranian credit sources usually gave cash instead of items in kind and this was often misused, and he cited as examples a man who used his agricultural loan to purchase a radio while another man used his to purchase a second wife. Cooperation must exist between farmers and their credit sources so that their programs can be regulated to finance their actual needs. Eng. Maghsoodpour supplemented these remarks by adding that the extension worker can help with supervised credit if he is given an opportunity. He also noted that the promotion of cooperation between various agencies, such as farmers and bankers, created a teaching job for the extension worker. At this point Mr. Yalim emphasized that raising living standards by teaching better consumption credit practices was the role of the extension worker. Mr. A.M. Chowdhury requested an explanation and Mr. Yalim replied that consumption credit was defined as credit supplied for the living and maintenance costs of a family and did not include the actual costs of production of a farming or business operation. Mr. Yalim said he did not believe that any one institution should take care of all credit needs of a farmer, and the agricultural bank itself should not supply consumption credit, but there should be other sources available for loans. In his opinion the extension worker should educate his farmers regarding the need for different sources of credit, where they can be found, and how they can be utilized.

The second question put forward by Mr. Taylor as leader of the panel was addressed to the Pakistani members both of whom came from East Pakistan. He invited Mr. Chowdhury to give his views on how an extension worker can improve his own conditions and those of his farmers. Mr. Chowdhury said that the extension worker in East Pakistan is very knowledgeable about credit and how to teach it to farmers, but he knows less about consumer loans and is now in the process of learning about them himself. Generally speaking, consumer loans come from other sources. He explained that a thorough

examination of each loan application by a farmer is made by the extension worker and then it is submitted to the credit agency. There are three main sources available for credit. The Agricultural Development Bank is an autonomous institution which makes short, medium and long term loans, but it is so understaffed and hampered by red tape that it is now lending to only three percent of the farmers who need credit financing and loans are often not received in time to be of use. Another source was the cooperatives department, known as the union multi-purpose societies, 4,600 of which were organized in 1965. Many are now defunct or inactive, though they could be rejuvenated easily and those which are currently functioning are effective. A third source is government loans, which are made for productive purposes on the recommendation of the extension worker.

Mr. Ahmad then described the efforts being made to establish a cooperative approach at the research project at Comilla, East Pakistan. He described how cooperatives were set up village-wide, whether there was a need for them or not, and this had the disadvantage that often the area was too small to justify such an organization. Periodically, one farmer who had leadership qualities was trained at headquarters in credit and improved farming practices, and he serves to teach his neighbours upon his return to the village.

The panel next discussed how the farmer can retain his resources and add to his income so that his standard of living may be raised. Among other views expressed was the belief that the extension worker should teach the farmer that he should seek loans only when he needs them, preferably on instalments. With regard to the question of what an extension worker should know in order to help a farmer with credit, Dr. Rassi of Iran replied that the most effective method is for the extension worker to deal directly with the farmer and know his needs.

Time, unfortunately, was running short and Mr. Taylor posed the following three questions which he requested Mr. Duke (U.S.) to consider: why should extension workers encourage farmers to obtain credit; what kinds of agricultural credit have been most effective and have resulted in continued success; and how can extension workers promote improved practices by cooperating with agricultural credit agencies? Briefly, Mr. Duke outlined various credit difficulties which were corrected in the United States by effective action by the farmers themselves. The extension worker must establish a firm understanding and he must always be positive rather than negative

in his approach. The entire family, including the wife and older children, should sit in on discussions with the credit official and the extension worker because the family is the institution which would be affected by the decisions taken.

### 3. Extension Programs Underway in the Regional Countries

Chairman: Dr. S. Rassi      Rapporteur: Mr. M. J. Rolls

The summary of this session prepared by Mr. Rolls was based primarily on the presentation of papers by representatives of Iran, Pakistan and Turkey because there was only a limited discussion due to a shortage of time.

The regional countries have all developed Extension Services, consisting of structured organizations. These Services function by conducting programs of agricultural extension based on their study of problems at local level, which emphasize the involvement of local people. The process of program building requires the study of technical and socio-economic aspects of particular agricultural problems, and involves liaison with many services and agencies not directly connected with agriculture. There is, very largely, a common interpretation of the philosophy and objectives of agricultural extension in the regional countries, and it is on this that the actual programs are based.

The need for, and value of, agricultural extension is accepted by all delegates. However, no estimate is available (in financial terms) of the value of extension in raising production since the quoted increases in yields, fertilizer usage, and so on, were not related to the cost of the extension effort involved in these programs. Such estimates could be arrived at on the basis of cost-benefit analysis and would provide information on which the value of increased extension effort could be calculated.

This point may be of some importance, for several reasons. In the same way that the agricultural information to be communicated to farmers must be based on sound empirical research, it is vital to the efficient operation of an Extension Service that its in-puts of extension effort should be based on reliable research-based data, as far as this is possible. Hence basic studies of agricultural extension problems and investigations into the practices of extension workers together with the evaluative measurement of their success are important needs.

The second reason derives from the shortage of extension staff, pointed out by several delegates. In some cases this appears to influence the choice of demonstration techniques and other large group methods. There is considerable research evidence that personal contact by the extension worker with farmers is very important in the process of changing less-advanced, traditional, agricultural practices. How much improvement could be expected from increased extension staff? How would this compare with increased in-puts of other aspects of agricultural development; for example, more research into technical problems or further land reform or reclamation schemes? In situations of a shortage of trained manpower in many sectors of the economy, such questions need rational answers. If the needs are established, further questions arise regarding the requirements at field worker level and at policy-maker and program director level. How can staffing be increased? Iran is using military recruits in its extension effort. If the extension worker need only be a few steps ahead of the farmer in his knowledge, are there other sources which could be used, for example school leavers?

Reference was made to visits organized for farmers in some parts of Turkey to see what is going on in other provinces. How useful is this: are there other indirect methods available to motivate farmers and give them incentives to change their practices?

Extension work in home economics and with rural youth are important aspects of the total extension effort, and these must be effectively integrated with the other services. A number of questions about rural youth were raised in the paper from Iran. Perhaps this could be a future conference theme, namely, to examine the contribution of all aspects of rural youth work to the well-being of rural areas, and to economic development.

#### 4. Water Management

Chairman: Mr. J.H. Neville      Rapporteur: Mr. F.I. Chaudhry

The chairman, Mr. Neville of the United Kingdom, who is currently on the teaching staff of the CENTO Agricultural Machinery and Soil Conservation Training Center at Karaj, Iran, opened the session with a brief statement on the importance of water management. He pointed out that it is a vital subject for the regional countries since each of them has large areas where the natural precipitation is insufficient for crop growth. Fortunately, however, each has

various supplies of water available, although admittedly at some cost, from rivers or underground sources. Improved management of these resources is the key to increasing both the areas of productive land and also individual crop yields. In recent years, he said, the building of dams and barrages and the sinking of deep and shallow wells has increased the water supplies available to the cultivator, and it would appear that the extension worker has an important job in improving the methods by which the farmer utilizes water. Many of the traditional irrigation practices are wasteful, with excess run-off and adverse effects on soil structures. He added that in the United Kingdom it was found that a proper understanding of the water requirements of individual crops can lead to improved yield and quality with a reduction in the quantity of water applied.

Papers were read on water management by Eng. Daneshyar (Iran), Mr. Mohammad Hussain Vains (Pakistan), and Mr. Dinçer (Turkey). Each of these explained the situation in regard to water problems in their country and what was being done about it. It was evident that in each country the extension workers had a large responsibility since it is their job to get cultivators to accept improved practices. If the results of the research and demonstrations which are being conducted in each country are to increase agricultural production, they must be put into practice by the thousands of small farmers. The extension worker is in a key position to accomplish this.

In addition to these three papers, Mr. Ralph Lewis (United States) read a paper on water management, which had been written by Mr. L. R. Anderson (United States) who was unable to be present, and described the assistance rendered by United States AID to the irrigation program in Turkey. Mr. Glenn M. Horner (United States) presented a paper on the Irrigation of Pulse Crops in Iran.

After the discussion on water management had been concluded, Mr. Ben R. Ferguson (United States) presented a paper and conducted a lively discussion on the subject of Program Building in East Pakistan. Mr. Ferguson, who was co-chairman of the United States delegation, had prior commitments which made it necessary for him to return to East Pakistan before the conference ended, and so his presentation was included at this session in order to take advantage of the available time and not for reasons of substance.

## 5. Fertilizers and Their Use

Chairman: Mr. A. Ahmed      Rapporteur: Mr. J. Hill

Papers on this subject were presented by Eng. Faghieh (Iran), Mr. Mohammad Hussain Vains (Pakistan), and Dr. Kiroğlu (Turkey). In addition, Mr. A.M. Chowdhury (Pakistan) spoke extemporaneously on the use of fertilizers in East Pakistan. After these presentations, Mr. Ward (United States) gave a brief account of the CENTO Traveling Seminar on Fertilizers which was held in July and August, 1966 in the three regional countries. Copies of the CENTO Report on this Seminar were distributed to the delegates. The papers and discussion were summarized by the Rapporteur as follows:

The increased use of fertilizer demonstrations and related extension programs by CENTO countries have shown the value of chemical fertilizers to their farmers. In Turkey and West Pakistan the problem of overcoming the scepticism farmers have for chemical fertilizers is rapidly being solved. The major problem now lies in meeting the rising demand for plant food in an economic manner. In Iran the use of military personnel for fertilizer demonstrations and agriculture extension work has been effective in creating among farmers an interest in plant food. Iranian and East Pakistan farmers in general have been slow to accept chemical fertilizers, as indicated by the low usage of plant food per hectare of cultivated land. In all three regional countries the introduction of new high yielding wheat and rice varieties, which are bred for high levels of fertilizer, will give the extension workers a spectacular tool to demonstrate the value of plant food and related cultural practices. This is already underway in West Pakistan and Turkey and is being started in the other countries. Manure and organic plant matter is being demonstrated as an important plant food. Farmers who have access to other fuel sources are changing over and beginning to put their organic matter back into the soil. Fertilizers are subsidized directly or indirectly in each country. Turkey and Iran have one price system for each grade of product regardless of where it is sold within the countries. High and low analysis fertilizers are priced at near equal cost per unit of plant nutrient. The sale of plant food is handled by government agencies, or government corporations, cooperatives, and a few private companies. Each of the regional countries has plans underway to expand its own production of chemical fertilizer in order to meet the expanding farmer demand and to become self-sufficient. However, they will

be required to import phosphate and potash as raw materials until natural resources can be found and developed.

6. New and Improved Seeds and Cultural Practices

Chairman: Miss S. Kundak    Rapporteur: Mr. A.M. Chowdhury

Presentations were made on this subject by Eng. Faghieh in connection with Iran, by Mr. A. Khan and Mr. A.M. Chowdhury for West and East Pakistan respectively, and by Mr. Ecikoğlu for Turkey. Dr. Horner of the United States read a paper on a somewhat more specialized subject, the improvement of grain legumes.

One of the most significant subjects dealt with during the succeeding discussion period was the remarkable wheat known as Mex-Pak (Mexican-Pakistani) with its outstanding yield performance. This wheat, initiated in Mexico, is now being introduced at a rapid rate into West Pakistan and also into Turkey. Questions on the multiplication of seeds, use of fertilizers, and irrigation methods in regard to Mex-Pak wheat were answered mainly by Mr. F.I. Chaudhury (Pakistan) and Mr. C.C. Brookshier (United States). Other commodities on which interest centered were soybeans, sunflowers, cereals in general, sugar beets, and cotton.

7. Livestock Extension Work

Chairman: Mr. M.J. Rolls    Rapporteur: Dr. G.M. Horner

Papers were offered by Eng. Esphahani (Iran), Mr. S.M. Ali (Pakistan), and Dr. C. Togay and Professor R. Sönmez (Turkey). Following the presentations, there was a general discussion, the main points of which were summarized as follows by the rapporteur.

A Turkish delegate asked what was being done in the regional countries during university training to ensure that specialists in animal husbandry and veterinary medicine cooperate in extension programs. According to a Pakistani delegate, in his country all students in the agricultural universities take the same courses during the first two years before branching out into their major fields of study. The association of students together during these two years encourages cooperation later on. Furthermore, all students take the same courses of study in extension work. A delegate from Iran reported that a similar procedure is followed in that country.

In response to a question as to what are some of the objectives of the feeding program in Iran, Eng. S. Maghsoodpour replied that there is an agreement between the Extension Service and other agencies in Iran for the purpose of providing credit to farmers and training in better methods of caring for meat. It was pointed out that in Iran the livestock program should be more effectively combined with the rest of the agricultural program because in that country livestock development is behind as compared with crop production; quantity of livestock has been stressed instead of quality, and pasturage is not of a high quality.

Replying to a query as to what is the policy in Turkey for the distribution of different breeds of stock, a Turkish delegate stated that each breed is placed in the area where it is considered to be best suited.

#### 8. Farm Tools and Implements

Chairman: Dr. M. Kiroğlu      Rapporteur: Mr. J.H. Neville

After brief remarks by the chairman on the imperative need for equipment to enable people to work and produce, this session took the form of a panel discussion. As a basis for the discussion, copies of the Report of the CENTO Travelling Seminar on Farm Tools and Implements (EC/15/AG/D18) were distributed. This report is to be published shortly as a book by the United States Economic Coordinator for CENTO Affairs.

Mr. Neville (U.K.) opened the discussion by reporting on the CENTO Farm Machinery and Soil Conservation Training Center at Karaj, Iran, describing its aims, facilities, methods of teaching, and the applicability of the training to later responsibilities in the field of extension work.

The delegate of Iran commented on the difficulty of mechanizing agriculture with imported machinery. He said that 15,000 tractors had been imported from Rumania and schools had been established in various centers to train tractor drivers. Within four years Iran would manufacture tractors and there would be a need for trained personnel to absorb them efficiently. Mr. Sarıcalı (Turkey) stated that tractors are currently being assembled in Istanbul and he commented on the problems involved in introducing them to the farmers. Dr. Rassi (Iran) observed that a good deal of time had

been devoted in his country to improving animal-drawn equipment but without much success due to the lack of power. Emphasis had been shifted, therefore, to tractors. He then discussed the social changes which result from rural depopulation and the growth of cities as a result of farm mechanization and the need for extension programs to demonstrate techniques and to furnish vocational training.

The delegate of Pakistan stated that the South Indus Basin was a vast area suited to mechanized farming. He also spoke about problems connected with the purchase of machinery on credit and about the need for training at all levels. Mr. Neville suggested that farmers should attempt to enlist the help of manufacturers of farm equipment in introducing their own products. This has been done successfully in the United Kingdom and should be possible in the regional countries if the market is stable. Mr. Knierim (U.S.) pointed out that extension work involves more than the extension workers alone can do, and he gave as an example the need to call upon local manufacturers to modify tools that are imported from places where conditions are different from those existing where the tools are actually to be used.

#### 9. Home Economics

Chairman: Mrs. E. Aghevli      Rapporteur: Mr. E.C. Brookshier

This subject proved to be of such great interest that 40 observers attended the session. Presentations were made by Mrs. Aghevli of Iran, who also served as chairman of the panel discussion which followed; by Miss Kundak of Turkey; and by Miss Southerland of the United States who had first hand knowledge of the situation relating to home economics in Iran. Unfortunately there was no representative to report on the situation in Pakistan.

The ladies of the panel were not only leaders in their field and well qualified to discuss their subject but were able to communicate their enthusiasm to the other delegates. As a result, this was one of the liveliest sessions of the entire conference.

Initiating the panel, Mrs. Aghevli spoke on the objectives of the extension programs in Iran and the part which home economics can contribute.

Miss Kundak, with reference to the earlier session on water management for agricultural uses, pointed out the particular importance of water to households for purposes of health and sanitation. She also stressed the necessity of having the source of water close at hand to save labour and time so that women could devote more of their energies to other aspects of raising the family's standard of living.

Miss Southerland commented on the fact that during the session on livestock no mention had been made of women's part in the production of livestock and the family need for it in their diet. These were matters of real importance for the welfare and improvement of the family.

Mrs. Aghevli placed particular emphasis on the need to inform the wife and the older children of plans for using the family budget. If credit is to be sought, they also should share in the decision since they would, of course, share in the sacrifices and also the benefits. The care of the family is in the wife's hands and she should be trained in matters of finance, credit, and the production and marketing of farm goods. Mrs. Aghevli concluded by referring to a Persian saying that when you educate a man you have educated one man, but when you educate a woman you have educated a family.

A short documentary film entitled "The Work of an Extension Home Economist in Iranian Villages" was shown by Mrs. Aghevli.

Dr. Rassi, leader of the Iranian delegation, praised the work of home economists and expressed his appreciation for the excellent manner in which the subject had been presented by the three ladies. He went on to say that he had made a study of the different stages of education in many countries, both developed and underdeveloped, and he could state that a direct correlation could be drawn between the education of the women of a given country and the development of that country.

#### 10. Marketing and the Extension Worker

Chairman: Mr. M.F. Ward    Rapporteur: Mr. S. Maghsoodpour

Papers were presented by Eng. Esphahani (Iran), Mr. Ahmad (Pakistan) and Mr. Bedestenci of Turkey which described the prevailing problems, the current situation, projects now underway

and future plans, and the role of extension work in marketing. In the case of Turkey, which was representative of the regional countries, the main problems connected with marketing were a lack of trained personnel, a lack of appropriate laws, the fact that cooperatives have no marketing subject matter specialists, and the inadequacy of coordination among the existing marketing centers. Mr. Ward also presented a paper, and he emphasized the principles of planning production, grading and standardization, harvesting, handling, packing methods and materials, cold and dry storage, cost accounting, and transportation.

The panel discussion which followed these presentations elicited an exchange of views from many delegates. Among them, Mr. Rolls of the United Kingdom pointed out how the extension worker could be of assistance in marketing matters by giving as an example a personal experience. Mr. Duke explained the possibilities for training in marketing in his country and urged that participants be selected with great care. Above all, he felt that extension workers should be trained in marketing techniques since 60 percent of marketing procedure actually takes place at the farmer level. He also remarked on the role of the housewife and the retailer in the consumption of agricultural products and noted the surprising fact that in the United States 25 percent of all food is consumed in restaurants. Mr. Bedestenci explained the marketing system in Turkey and discussed the findings of a survey conducted there with regard to the number of middlemen involved in the marketing of crops and their effect on prices. Mr. Ahmad explained the method for selecting and training village leaders in marketing in Pakistan, which proved to be of more value than sending outsiders into the village for this purpose. Eng. Esphahani emphasized the role of the extension worker in marketing and the need for simple publications which the illiterate farmer could use. Other speakers brought out that the retailers' interest lay in merchandise in perfect condition and therefore scheduling and quality control were factors which should be added to those mentioned by Mr. Ward. Dr. Rassi of Iran stated that the subject of marketing was so complicated that there was no choice but to analyse it from the standpoint of the extension worker.

At the conclusion of the panel discussion, Mr. Ward showed slides on the marketing of oranges in southern Turkey and explained various techniques for improvement.

## RECOMMENDATIONS

A list of 14 Recommendations was drafted by a committee representing all delegations and the secretariat. This draft was considered in detail by the delegates at their final session, and after a few minor revisions were made the Recommendations were approved by the conference.

### It is recommended that:

1. Programs of agricultural extension, home economics and rural youth be developed and fully coordinated. In this connection the advantage to be gained from the coordination of these services within a single organization, preferably in the Ministry of Agriculture, should be considered.
2. An essential aspect of all Agricultural Extension services is an adequate provision for extension education courses for extension workers at university level, and these should be provided.
3. Studies into basic problems of agricultural extension, and evaluation studies into the work and achievements of extension programs, including special projects, are vital to the further development of this work. A team consisting of representatives of CENTO countries supported by other experts should be established to study the efficiency of the Extension Service and to stimulate these studies in the regional countries.
4. In view of the vital importance of agricultural extension in CENTO countries a conference on this subject should be held annually in the regional countries by rotation, with each year an emphasis on selected rural problems and on aspects of agricultural extension.
5. In view of the essential importance of adequate programs of Home Economics in the total agricultural extension programs in CENTO countries, the provision of training for home economics staff should be reviewed. This training must be related to needs and must be carried on at the appropriate level, including colleges and universities. An important part of this provision is for Rural Home Economics Training Centers to train staff who can pass on their expertise to field workers.

6. Increased emphasis must be given to rural youth programs.
7. There should be the fullest possible interchange of materials, information, and ideas regarding agricultural extension within the regional countries. CENTO should play an active part in this process.
8. Extension Services should promote and utilize the resources of commercial firms engaged in agriculture by suggesting and coordinating extension activities which can properly be carried out with the help of such firms as they increase their responsibilities for supplying agricultural materials.
9. Encouragement should be given to new commercial firms to render services to agriculture, when the appropriate stage of development has been reached.
10. Extension programs should take into account the interrelated nature of the aspects of agricultural development. Irrigation, seeds, fertilizer, machinery, cultural practices, credit, marketing, and other aspects of development cannot be considered independently when extension programs are prepared.
11. Interchange of seeds, nursery stock and other products produced by research should be facilitated among member countries.
12. Home Economics should preferably constitute a part of agricultural extension work in CENTO countries where it is not in existence.
13. Subject matter specialists working with the Research Stations should be included as part of the Extension Organization; they, among their other duties, would be responsible to take research recommendations and put them in a readily usable, simple, easy-to-understand form for use by field workers and farm families.
14. Extension Services should make use of agricultural economics, which can constitute important contributions to their work. These contributions are in marketing, management, credit and cooperatives, which can greatly improve agricultural production and distribution.

## ACKNOWLEDGEMENTS

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The Delegates also wished to place on the record their appreciation for the work of the Secretariat staff.

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ACTIVITIES UNDER THE PILOT AGRICULTURE DEVELOPMENT  
PROJECT IN DENİZLİ PROVINCE

BY

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Mr. Chairman, Honorable Governor, Distinguished Delegates,  
Ladies and Gentlemen. I will present my comments and information  
under four topics as indicated below:

- Brief Background Information About the Agriculture of Denizli
- Reason for Pilot Project
- Purpose and Objectives of the Project
- Courses of Action Taken Under the Project

BACKGROUND INFORMATION ABOUT AGRICULTURE OF DENİZLİ

The total area of Denizli province is 1,078,100 hectares. The  
distribution among different crops is shown in the following table.

<u>TYPE OF LAND USE</u>	<u>AREA HECTARES</u>	<u>PERCENT OF TOTAL</u>
Land under field crops	327,254	30.4
Fallow land	100,365	9.2
Vineyard	35,714	3.3
Orchard and vegetables	7,735	0.7
Pasture and meadows	96,160	9.0
Forests	329,712	30.6
Marshes, lakes, wasteland	181,160	16.8
TOTAL AREA	<u>1,078,100</u>	<u>100.0</u>

Total population of the province in 1965 was 465,082. Farm population is 79.4 percent or 352,201. The number of farm families is 66,463. The annual rainfall is between 500 to 550 mm. The temperature ranges between  $-10^{\circ}$  in winter and  $40^{\circ}$  C in summer. The average size of farm is 55 dekares. The major crops grown are cereal, cotton, tobacco, chick-peas, vetch, grapes and peaches. Livestock population was 900,000 head in 1963. Most are sheep, goats and cattle.

The provincial organization in agriculture is represented by different agencies of the Ministry of Agriculture. They are:

1. Technical Agricultural Directorate (Extension)
2. Veterinary Directorate
3. Plant Protection Directorate
4. Forestry Directorate
5. Directorate of Agricultural Supply
6. Directorate of Poultry and Agriculture Station
7. Directorate of Veterinary Laboratory
8. Directorate of State Farms in the Country
9. Meteorological Directorate

#### REASONS FOR A PILOT AGRICULTURAL DEVELOPMENT PROJECT

There are several reasons for this Project. I will touch upon some of the important ones.

Turkey is the largest country among the Western European countries although it is smaller than Iran and Pakistan. She has 67 provinces. The annual rate of growth of agricultural gross product fixed in the First Five Year Plan is 4.7 percent. The achievements since 1963 are variable. In the first year of the planning program the rate of growth in agriculture was 7.6 percent which is above the target. But in 1964 and 1965 it has been below the target, -0.6 percent in 1964 and -2.8 percent in 1965. Again in 1966 it reached 8.5 percent. As is seen there is no stable development pattern. At present the main factor determining the level of production is weather during the year. However our aim is to direct agricultural production toward our objectives, but this aim is not easy to reach in a short time. Agricultural development is a long term process especially on a country-wide basis. Production can be implemented in a small area more efficiently than in the whole country. The faults that occur during the

operation of the development program in a small area do not hurt the economy of the country and can be corrected easily. By trying different systems and methods it will be possible to find the most adaptable and workable model of development in a small pilot area. After having the right approach to development tested in a pilot area this model can be applied in other parts of the country without danger of failure. With such an approach, time, money and labor can be saved.

The present provincial organization of the Ministry of Agriculture is not qualified to accomplish the agricultural policy objectives determined in our First Five Year Plan. Therefore reorganization of the Ministry of Agriculture at the central and provincial levels is necessary. To change the present organization of the Ministry, before having any test or experiment, is a very difficult task. I think it would be wise to try the reorganization measures in a pilot area before they are put in operation in whole country.

To train and supply the number of technical personnel required for the development program is a big job to perform in a short time. It may be impossible to reach the target fixed in the plan regarding the personnel required in different fields of production, e. g. plant production, animal products and forestry. Many years are needed to train and supply the personnel to be employed in the different services. But in the case of a pilot area the problem is not so severe and can be well managed in a short time.

The costs of agricultural development programs are generally so high that they cannot be met with short term investment. The financial resources of the country cannot provide the funds required. Financing a pilot project can usually be done, but developing countries generally cannot afford sufficient funds from their own resources to provide for the investment, input, distribution and storage necessary for a country-wide project. The pilot project approach will help in estimating the total cost of agricultural development.

To demonstrate development in agriculture to politicians, administrators and people in the country can be possible in a short time under a pilot project approach. They can then understand and appreciate the work and its cost. In order to have similar achievements in agriculture outside of the pilot area, a pilot program for this purpose can be prepared and implemented successfully.

The government of Turkey and USAID decided first to take action at the provincial level to achieve the projected agricultural development in a very short time through integrated agricultural services. The project agreement was accepted between the U.S. and Turkey in 1964, but action began only in 1965 in Denizli.

Denizli was selected as a pilot project area in 1963 for the application of the supervised agricultural credit system. Considering this Denizli was also selected as the seat of the pilot agricultural development project since supervised credit is an essential factor of agricultural production. Then the two projects were combined in a single project.

Three government agencies are working together in this pilot agricultural development project. They are the Ministry of Agriculture, the Ministry of Village Affairs, and the Bank of Agriculture of Turkey. Integration of the services of these agencies is an essential factor in achieving the objectives of the project.

#### PURPOSE AND OBJECTIVES OF THE PROJECT

The main purpose of the project is to increase the income of farmers in order to improve their living conditions. This is the ultimate goal of all activities in the agricultural field.

The average annual gross income per family in Denizli is 5,345 TL which is low compared to the levels in other sectors of the economy.

4,441 TL	Gross farm income
410 TL	Wages earned in agriculture but outside of farm
494 TL	Non-farm income
<u>5,345 TL</u>	TOTAL

According to the preliminary figures, the Gross National Income per family in Turkey was 13,975 TL in 1965 which is twice as high as the gross income per family in the agricultural sector of Denizli. To increase family income and to raise agricultural production we must achieve the following objectives:

1. To increase the input is one of the objectives and the following items are of importance: (a) increase the use of commer-

cial fertilizers, (b) expand the use of improved seed, (c) develop the supervised agricultural credit system, (d) demonstrate better land and water use, (e) breed genetically improved livestock races, (f) demonstrate growing fruit and vegetables which are disease-proof and have market demand.

2. Another objective of the project is the development of an integrated approach regarding government services for farmers. These should be coordinated. This system will be developed at central headquarters and at the province, county and village level.
3. To develop farmers' associations for business is an important objective. Unless such an organization is developed the increase of farmers' income cannot be achieved on the desired level.
4. It is necessary to train field servicemen and technicians in-service and on the job to increase their ability and competence to deal with farmers.
5. The present agricultural extension organization at province, county and village levels must be reorganized and provided with the necessary equipment and vehicles.
6. The pilot project operation will be evaluated qualitatively at the end of each program year making clear the causes of success and failure.
7. The last objective is to publicize the methods and systems which gave successful results and were adapted easily by the farmers. Every action found useful should be taken into account at the end of each year and spread to other provinces.

#### COURSES OF ACTION TAKEN UNDER THE PROJECT

Action under the pilot project are supported financially from two sources: the general budget of the government and a special fund provided by USAID. The main source is the government source. The USAID fund is a complementary one in cases where there is shortage of funds or if there are expenditures for introduction of new ideas and demonstrations.

It is not possible to mention here all the actions taken in the pilot area. Therefore the main ones will be summarized.

A. Institutional changes made

1. At the Headquarters, Ankara level
  - a. Creation of the National Policy Committee
  - b. Interministerial Committee to deal with joint problems among the Ministries of Agriculture, Village Affairs and the Bank of Agriculture of Turkey and USAID.
  - c. A coordinating and follow-up group to check operations under the project, which is created as a special unit in the Directorate of Planning and Agricultural Economic Research of the Ministry of Agriculture.
  - d. Creation of a Supervised Agricultural Credit Policy.
2. At the Province level, in Denizli
  - a. Creation of the Provincial Agricultural Development Committee. It consists of the directors of the agencies related with agriculture that exist in the province.
  - b. Assignment of provincial coordinators from both the Ministry of Agriculture and USAID.
  - c. Creation of a combined Agricultural Information Service, instead of having one in each agency.
  - d. Creation of a Farmers Advisory Committee using the chambers of agriculture in each county.

B. Training of personnel in service and abroad

1. Since 1965, seminars have been organized every year for the provincial directorates and technicians.
2. To meet the requirements for qualified personnel, 26 trainees from the Ministry of Agriculture and the Bank of Agriculture are taking English courses in 1967 before they go to U.S. A.

for further training. The number of trainees will be 45 under the 1968 program.

3. Under this group of activities I should mention also six U.S. A. advisors working under the project in Denizli and in Ankara with the Ministry of Agriculture and the Bank of Agriculture.

### C. Increasing the input

The achievements regarding the input are shown below:

Fertilizer - The consumption of fertilizer has been increased from 3,066 tons in 1963 to 13,096 tons in 1966. Fertilizer demonstrations have been very effective. There were 231 fertilizer demonstrations in 1966. The demonstrations were made mostly to increase the yields of grain, cotton, and fruits and vegetables.

Improved seed distribution - The distribution of improved seed (certified) was 800 tons in 1963. It was raised to 2,240 tons in 1966, mostly wheat and cotton seed. To see the effect of certified seed on production, 70 variety demonstrations were completed in 1966. In order to increase fodder crop production e.g. alfalfa, sainfoin, sudan grass, demonstrations were given in 177 villages in 1966. Because of these demonstrations alfalfa growing has spread among many farmers. The problem is now to meet the shortage of alfalfa seed. In 1966, only one-fifth (one ton) of the demand for alfalfa seed has been met. The total demand was for five tons of seed.

Growing fruits and vegetables - The climate of Denizli is very suitable for growing fruit and vegetables. To encourage farmers in this field especially for certain varieties of apples, peaches and grapes, 80 tracts of demonstration were completed for fruits last year and 30 demonstrations for modern vineyard planting and growing methods.

Last year we started to demonstrate a new approach to increase crop yields. First we selected wheat and barley for this purpose. This action was financed by the special fund provided by USAID. In this demonstration we tried to use jointly all production factors namely seed bed preparation, certified seed, fertilizer, pesticides, grain drills, etc. on the same field. It is package deal and approach with 537 farmers taking part in the program. The area sown is 11,261 dekares. A similar program will be started for hybrid corn and cotton growing in the future.

D. To increase livestock products

We have two main activities for increasing livestock products.

1. To fatten cattle and sheep under the open lot feeding system.
2. To encourage the breeding of Brown Swiss.

Open lot feeding demonstrations started in 1965 and continued in 1966 with successful results. Three cattle fattening demonstrations and six sheep fattening demonstrations were given in 1965. In 1966 we made four demonstrations for cattle and three demonstrations for sheep. In 1966, 80 farmers followed the demonstrations and started to feed cattle and 40 farmers started sheep feeding. Cattle fattening under the open lot system has spread fast in the province, also in other neighboring provinces. Breeding of Brown Swiss was started in this province in 1952 under the natural insemination system. Progress was very slow. Last year we introduced the artificial insemination system in Çivril and Acipayam. This activity has been supported also by the special fund budget.

Another field of demonstration is to show farmers better use of land and water resources. The irrigation system used by farmers is mostly uncontrolled and causes soil fertility to be washed away. Therefore land leveling is an important subject in the area. Both from the general budget and special budget we demonstrate proper irrigation methods, land leveling and drainage practices. Farmers appreciated the demonstrations, but the problem is the insufficient equipment provided by the soil and water organization and the lack of private firms in this field. In order to meet this problem as well as shortage of grain drills and other farming equipment we developed a project under the 1967 special fund program which is the machinery park, which will include 6 grain drills, 15 pieces of land leveling equipment and other equipment. Farmers will be able to rent the machinery from this park when they need it.

This project will help in two ways:

- Farmers will find the machinery they need in the park.
- This experience will encourage private firms to go into business.

Another field of improvement is the marketing of agricultural products - We started to work in this field in 1966 and selected grapes and tomatoes to work with. The plan of the project was to grade the

products and package them properly in standard crates and to send to big consuming centers. Producers and farmers themselves have participated in this program.

We sent two trucks to Ankara on November 2, 1966 with two varieties of grapes, seedless and razaki. The grapes were presented in two ways, one the old way as used by farmers and one graded and standardized. Razaki grapes prepared in the old manner were sold for 75 kuruş per kilogram, but in the demonstrated form they sold for 90 kuruş per kilogram, a difference of 15 kuruş. The same product sold for 50 kuruş per kilogram in the Denizli market. Producers have been very satisfied with the result of this demonstration. Seedless grapes from the demonstration farm sold for 170 kuruş and grapes packed the old way sold for 130 kuruş, a difference of 40 kuruş. The same product was sold for 70 kuruş in the Denizli wholesale market.

We encouraged farmers to grow W. C. -156 variety of tomatoes. Farmers in the Honaz area started to grow this new variety. We made a trial shipment last year on October 20, 1966 from Denizli to Izmir. We graded tomatoes with the grading machines provided for demonstration purposes, and packed them in standard crates. We demonstrated again on two farms showing the old system and new one. The product presented in the old way was not graded. It was mixed with local variety and W. C. -156. It sold for between 30 to 40 kuruş per kilogram at the wholesale market at Izmir. But the big tomatoes we demonstrated sold for 60 kuruş per kilogram and the small size for 45 kuruş. The producers recognized the difference and profit they got.

After these successful demonstrations, tomato growers in Honaz and grape producers in Çivril have organized a coop to continue similar activities on a large scale in 1967. These two demonstrations are supported by the special fund.

Lastly I should like to mention the poultry projects managed under the special fund, general budget and supervised credit systems. Broiler type chickens and laying hens were used.

## EVALUATION OF THE PROGRAM

Three main actions were taken. (1) At the end of every program since 1965 we studied the results obtained from each project. Such study helped us to prepare better projects and improve on implementation in the coming year. (2) At the beginning of 1965, we started to make a bench mark study with the Faculty of Agriculture of Ege University to observe the socioeconomic situation of farms in Denizli. After five or six years a similar study will be done in order to see the progress achieved under the program. (3) Lastly we have started to make cost studies for cattle in open lot feeding and cost studies for wheat and barley growing under the package program.

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## ROLE OF EXTENSION WORKERS IN CREDIT

BY

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It is a real honour for me to have this opportunity to say something on "Role of Extension Workers in Credit." Although I am not an extension specialist, I still would first like to say something in general about the relationship between extension and credit. Then I will try to explain briefly what kind of supervised credit program we are implementing in Turkey and how are we trying to combine credit with extension.

### EXTENSION AND CREDIT

No doubt you are all aware that extension, credit and other relevant services are all aimed at one particular purpose, to increase agricultural production and to improve living standards of farmers. Although this purpose is a major concern of developing countries, because of the challenge of feeding a rapidly increasing population and achieving economic development of the country it is hard to reach this goal due to socio-economic conditions of small farmers who constitute the majority of agricultural producers.

Since farming is not an economic concern only but a way of living for most farmers in developing countries, to get agriculture moving it is a must to change minds of people first. Indeed, strong, centuries-old, uninterrupted tradition prescribes the main norms for all human activities in rural communities of developing countries. Tradition determines not only the methods of production but what kinds of crops

have to be grown and how much of each kind of crop should be produced. Also how much of the crop should be sold and the quantities of each product to be consumed are all dictated by tradition. In surroundings where a powerful tradition lays down the norms of production as well as that of consumption serious difficulties are involved in developing agriculture.

Therefore, a cultural change is needed to introduce modern farming techniques such as better farm inputs and high yielding crop varieties.

Extension education or simply extension means the bringing of education to people who are not ordinarily in close contact with an educational institution and who are likely to remain without the education, training or information needed for improvement in their living conditions unless it is brought to them. It is the extension workers' job to promote this cultural change.

Production credit to small farmers is another essential of agricultural development. However, credit is not effective by itself because of the socio-economic conditions of nearly subsistence farming in developing countries. Credit can be useful when the conditions are such that proper use of it can be made. Extending credit before ensuring proper utilization of it often results in overindebtedness of the farmer and does more harm than good.

There is an interrelationship between these two essentials of agricultural development. The establishment of an efficient extension service, adapted to the social and economic conditions of a country is essential for agricultural development. Its effectiveness is often hindered by farmers' lack of capital to implement the recommendations of the extension workers.

Most developing countries have organized special agricultural credit institutions with the main purpose of helping the small farmers. In very many cases the results have been discouraging because of the lack of effective extension service.

The best approach for getting agriculture moving should be the integration of credit and extension and other services related to farming.

The relative importance of credit to extension under an integrated approach will vary depending upon the economic development stage of the country. In developed countries extension is a supporting service

to credit operations. In developing countries, according to the degree of development, credit is used to support extension, and in this case the whole program is called a supervised credit program.

Establishment of needed understanding and coordination between extension workers and credit institutions is a complex problem indeed, and because of the tendency of extension workers to participate or be responsible for the administration and control of loans it is difficult too. Even if this coordination cannot be well established in the beginning, the growing benefits of an integrated program to all parties, particularly higher productivity and better income for farmers, can make it possible to establish a definite coordination of extension services and credit agencies. This cooperation and coordination can be established through formal agreements as we made in Turkey or through some other means.

Some of the main concerns of extension workers in collaborating with credit programs are stated below:

1. Extension should induce credit institutions to take into account social factors when dealing with people who previously had no access to credit.
2. Extension, particularly at the local level, should provide the latter information on various lines of production which deserve special attention for the granting of loans.
3. Because of the lack of managerial ability of almost all farmers in developing countries, basic but simple information on farm management principles should be a main concern of an extension worker.
4. Extension workers should help prospective borrowers in the preparation of loan applications and farm and home plans.
5. Demonstrations on the best possible use of credit and farm resources should be conducted.
6. It should be kept in mind that the success or failure of a credit program, particularly of a supervised credit program, will be determined to a large extent by the success or failure of the improved farming practices recommended by the extension workers.

## SUPERVISED CREDIT PROGRAM OF TURKEY

### The Agricultural Bank of the Republic of Turkey

The primary source of institutional agricultural credit in Turkey is the Agricultural Bank of the Republic of Turkey. The Bank is an autonomous State Economic Enterprise, is a legal entity, and operates as a private institution. In addition to agricultural loans, it also grants commercial loans, receives deposits and does all kinds of banking transactions. It has about 690 branch banks spread throughout Turkey and about 2,000 Agricultural Credit Cooperatives which are financed and supervised by the Bank.

Although, there are many other small and local banks dealing with agricultural credit in Turkey, almost 90 percent of institutional agricultural credit is provided by the Bank. The Bank extends:

- Direct loans to individual farmers
- Loans to Agricultural Credit Cooperatives
- Loans to Agricultural Sales or Marketing Cooperatives
- Loans to the Government Farm Supply Agency
- In-kind loans to individual farmers for seed and fertilizer distribution.

At the end of the year 1964 the outstanding agricultural loans made by the Bank was about 3,244 billion TL. and at the end of 1967 it is planned to increase up to 5,161 billion TL.

### The Supervised Credit Program

In 1960 when the First Five Year Development Plan was in preparation, the necessity of having to step up agricultural production to be able to feed a rapidly growing population had to be faced. Since production credit is one essential of increased production, it was recognized that the Bank's agricultural credit programs needed to be improved. With this end in view an agreement entitled "Improvement of the Agricultural Credit System" was enacted with the U. S. Agency for International Development in 1960.

Joint studies made by the Government of Turkey and the U. S. Agency for International Development and the report of a three-month study by Agricultural Credit Specialist Mr. Ralph U. Battles led to the conclusion that the Bank would establish a system of supervised credit.

It was decided that the supervised credit program be fully coordinated with other government supported agricultural programs. Since the funds allocated for this program and the number of technically trained personnel to be assigned for its implementation were limited, it was further decided to apply the program in one or two pilot provinces at the beginning.

Subsequently, a Memorandum of Understanding, specifying authorization and project responsibilities of the various government agencies such as the Ministries of Agriculture, Commerce and Finance, the State Planning Office and the Bank was drawn up.

Then a supervised credit agreement was signed between the Government of Turkey and the U.S. Agency for International Development on May 23, 1963. Under the terms of this agreement, the U.S. Government was to provide a loan equivalent to 25 million TL. With another 25 million TL. allocated for this program by the Bank, the established fund amounted to 50 million TL.

A Policy Committee comprising representatives of the involved ministries and government agencies was established to help determine the principles and credit policy to be implemented. Principles launched by the Bank were submitted for pre-approval of the Policy Committee and the first supervised loan was made in Denizli Province in March 1964.

It is my pleasure to mention here that two years later this first borrower of the Supervised Credit Program was chosen as the most progressive farmer of Denizli Province by the Ministry of Agriculture. In August 1964, the first supervised credit was extended in Erzincan province which was selected as the second pilot province.

The number of pilot provinces was increased to five with inclusion of the provinces of Tokat, Elazığ and Eskişehir at the beginning of 1966 and five more provinces, Aydin, Isparta, Konya, Samsun and Muş are going to be covered very soon.

The original model for the Supervised Credit Program was the credit system of U.S. Farmers Home Administration. It has been modified to suit the requirements in Turkey. I will now explain the basic features of the Supervised Credit Program in effect in Turkey.

Organization - The highest decision making body of the program is the Policy Committee which includes the representatives of the Ministries of Agriculture, Commerce and Finance, The State Planning Office and the Bank. The U.S. Agency for International Development representative participates in its sessions in the capacity of observer.

The chief executive body of the program is the Agricultural Bank. The Bank has taken the following organizational measures to ensure more effective implementation of the program.

1. A new Supervised Credit Division was established responsible for the implementation of the program in the Headquarters Bank.
2. In each pilot province a special provincial supervised credit unit has been established responsible for the province-wide implementation of the program. These units consist of agriculturists, bankers and other assisting personnel.
3. In every county where the program is being applied, one or more agriculturists have been assigned to the local Bank to work directly with the borrowing farmers.
4. Coordinators at the national and provincial levels have been appointed to establish a better coordination and cooperation between the Ministry of Agriculture, The Agency for International Development Advisors and the Bank.
5. Finally Selection Committees have been established to help to select eligible borrowers under the supervised credit program.

Eligibility terms - The main objective of the Agricultural Bank is to assist small and medium size farmers. Accordingly only the medium size farmers who operate a farm large enough to help to build an economic unit are eligible.

Approval by the Selection Committee regarding farmers eligibility is required.

The applicant farmer whose eligibility is approved by the Selection Committee is expected to contact the Bank's agriculturist and to cooperate in the drawing-up of one Long-Term and one Annual Farm

Plan. The credit need is then determined upon the basis of these plans.

Credit terms - Two types of loans are made to eligible farmers under this program:

1. Supervised Operating Loans are made to cover the annual operating expenses such as the expenses of buying seed, fertilizer, spraying equipment and material etc. These loans are extended with a maximum term of one year at nine percent interest rate.
2. Supervised Investment Loans are extended to cover all kinds of investment expenses such as the expenses of purchasing livestock, of machinery and equipment, of applying soil and water conservation practices etc. These loans are made for a term of one to twenty years at seven percent interest.
3. All types of guarantees such as land mortgage, crop mortgage and joint guarantee of farmers are accepted as collateral.

Farmers' education - Problems encountered by farmers when beginning to use modern methods of farming and proper use of the extended credit are solved by frequent on-farm visits of the Bank's agriculturists. Thus farmers are given on-the-job training.

Farmers are also educated through demonstrations and other training programs arranged in cooperation with agencies of the Ministry of Agriculture.

Each borrower-farmer is expected to keep a Farm Record Book. These books are analyzed at the end of the crop year with the assistance of the Bank's agriculturist and the next years' annual farm plans are prepared by using the farmer's actual records for expense budget, farm income estimates and farm production.

Results of the program - The following table projects the amount of loans made to 1,768 farmers in the pilot provinces as of March 31, 1967.

LOAN PURPOSESAMOUNT (IN MILLION TL.)

Operating loans	11.2
Water and soil conservation	3.2
Buying tractors and equipment	17.3
Livestock-buying and breeding	18.0
Others	5.2
T O T A L	<u>54.9</u>

Although the number of borrowers and the total amount of loans are not large at the present time, the progress made and the experience gained are very significant. To illustrate the progress made and the experience gained I would like to make more detailed explanations.

1. Under the conventional credit system, average loans per borrower totalled approximately one thousand liras; under the supervised credit program the average amount of credit extended per borrower is 31,050 TL.
2. Under the conventional credit system, the great majority of loans consists of annual operational loans. Whereas under the supervised credit program 79.6 percent of loans consist of medium and long-term loans for insuring agricultural development.
3. Turkey's cultivated lands are fragmented. The Supervised Credits extended to 1,768 farmers includes the application of modern methods of farming on 19,846 parcels of land. The demonstrative value of applying modern methods on 19,846 parcels of land is self-evident.
4. Lack of coordination between agencies involved in agriculture and agricultural programs of these agencies was one of the problems of Turkey. Under the Supervised Credit Program improved coordination has been accomplished. Accomplishment in this field has been so encouraging that a new program, called Integrated Agricultural Services now is being implemented in Denizli Province.
5. Since the use of modern farming practices and of new inputs are encouraged in this program, the efficiency of loans made to the farmers have been increased. Indeed, a study made on the farms of the first thousand borrowers showed that

the total value of production of these farmers increased approximately 25 million TL.

6. This program has helped to motivate Turkish farmers within the pilot provinces to desire to improve their production and raise their living standards.
7. Although you are going to see some of the improvements made in Denizli Province this afternoon I would still like to give you some examples of capital improvements made with supervised loans:
  - a. Two hundred fifty-five new tractors with necessary equipment have been purchased. Almost all of the farmers who operate these tractors are well trained in operation and maintenance.
  - b. Approximately 21,795 decares of farm land that previously was summer fallowed is now producing a crop every year.
  - c. Significant yield increase on cash crops like cotton and industrial crops have been achieved by borrower-farmers. The average cotton yield, for example, increased from 145 kilogram to 196 kilogram per decare and tobacco yield per decare increased from 77 kilogram to 106 kilogram.
  - d. One thousand two hundred and six good breeding cattle and 31,253 better quality breeding sheep have been purchased.

I hope my explanations in this paper will help you to get a better understanding of the importance of a program that combines credit with extension education in getting agriculture moving in our countries. I furthermore hope that the farm visits you made yesterday and are going to make this afternoon will support my statement.

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ORGANIZATION AND ADMINISTRATION  
OF EXTENSION IN IRAN

BY

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Iran is predominantly an agricultural country with about 70 per- cent of its population dependent on land. Though the governments' main source of income comes from the oil fields, agricultural pro- duction contributes the second largest portion of the national revenue. Due to various problems mainly the feudal land ownership system and old methods of farming, the level of agricultural production was low until 1961 when His Imperial Majesty presented six bills, one of which was the abolishment of the old feudal system of ownership and second (1964) the establishment of an "Extension and Development Corps." Both of these bills had a tremendous effect on extension. I should add that all other revolutionary bills such as the Literacy Corps helped pave the road for extension. It became quite obvious that the new landlord farmers needed training more than anything else, since until then most of the agents were but instruments in the hands of big landlords. To fill the need for sufficient extension workers to cover almost all of the agriculture sectors, the Extension and Develop- ment Corps was organized.

The extension service during its thirteen years has demonstrated the important role it played in increasing farm production and raising of the rural standard of living and unmeasurable educational values which are the primary needs in every progressing country.

The total geographical area of the country is 1,625,000 square kilometers with 50,000 villages and a rural population of 17,000,000 out of a total population of 25,500,000. If one extension agent is to be assigned to serve 15 villages we need nearly 8,000 extension and home agents to cover all rural sectors. When this figure is compared with the present number of 3,023 workers, it becomes evident that we still have a long way to go. Thus our main objective is to fill the gap and train sufficient qualified extension workers in the future.

History - In 1953 the present foundation and philosophy of extension work was laid and introduced to Iran through the U.S. Point 4 program. Before that time, there were no connecting channels between the few existing experiment stations and the farmers. For instance, the Shahpasand irrigated variety of wheat was developed in 1930 but did not reach the farmers until 1954 when the extension agents actually demonstrated the high yield quality of the wheat. Prior to this year, farmers had rarely used any chemical fertilizers or had their soil tested. In 1965, 90,000 tons of fertilizer were used throughout the country and the applications for soil tests are increasing every year. The use of sugar beet pulp and molasses as animal feed was similarly introduced to livestock owners by the extension agents.

Present Situation - Agricultural extension work in Iran is based on the social life and needs of the family unit. Thus the organization is divided into three main activities; Agriculture Extension, Home Economics and Rural Youth. The program areas or extension objectives can be defined as follows:

1. Efficiency in agricultural production
2. Marketing, distribution and utilization of farm products
3. Conservation, wise use and development of natural resources
4. Management on the farm and in the home
5. Family living
6. Leadership development
7. Youth development
8. Community improvement and resources development
9. Public affairs.

The establishment of four extension training centers in various regions of the country is planned. Construction will be completed within the current year. Extension agent training, in-service training and short courses will be part of the program in these centers.

FUTURE EXTENSION PERSONNEL RECRUITMENT

No.	Personnel Required	First Year	Second Year	Third Year	Fourth Year	Fifth Year	Remarks
1.	Central Headquarters Extension Specialists	7	-	-	-	-	1. Training and recruiting agricultural Extension Agents and Home Economists shall be regularly continued within the next five years until a total of 4,793 is attained.
2.	Provincial and General Governorate Extension Specialists	188	-	-	-	-	
3.	Assistant Specialists	20	20	20	20	20	2. Some of the Assistant Specialists and county supervisors shall be selected annually from among distinguished Extension Agents, and an equal number of new Extension Agents shall be added to those previously scheduled for training to fill the gap thus created.
4.	District or County Extension Supervisors	50	50	50	50	50	
5.	Provincial and General Governorate Extension Supervisors	4	-	-	-	-	3. Should training and the selection of the number of specialists already scheduled for the provinces and Governorates General fall short the first year, for any reason, only half of the number shall be included in the following year.
6.	Agricultural and Home Economics Extension Agents	479	479	479	479	479	

The main characteristics of extension in Iran can be defined as follows:

- Emphasis on local leadership development
- Close cooperation with credit resources for implementing extension programs
- Extension and Development Corps operating on short term extension projects in areas not covered by extension agents.

Future Needs - Economic and technical changes in the past few years have affected not only the urban life but rural families as well. These changes have been challenging to the extension program since it has to determine certain objectives and activities to meet the ever-increasing guidance demands. This means that extension will have to strive for highly trained personnel and at the same time expand its operational and educational activities so as to be able to accomplish the objectives.

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## IRAN'S EXTENSION AND DEVELOPMENT CORPS

BY

POUHOLAH JAFFARI

Head, Extension and Development Corps, Tehran, Iran

Upon celebrating the anniversary of the Land Reforms Movement, inaugurated in Iran on the first of Mehr, 1343 (September 1964), when more than 5,000 delegates, representing the rural and urban sectors of the country participated, His Imperial Majesty, the Shahanshah Arya Mehr, openly declared the fruition of the unusually wonderful idea involved in the formation of a special Army, or indeed a "Legion d'Honneur," named Extension and Development Corps. He stated:

"To raise the living standards of the rural population and promote their welfare, by teaching them modern principles of agriculture and better methods of increasing farm and livestock production, as well as leading the way for the locals to develop, improve and expand rural industries, and actually reconstruct and modernize the rural areas, a special Army, or Corps, to be named the Extension and Development Corps, shall soon be created."

### Organization of the Corps

To execute the Royal Farman, the Ministries of Agriculture, Development and Housing and National Economy, set out to outline and design the pertinent chapters and articles or clauses and sections of the statutory bill, covering the specific functions and responsibilities of the Extension and Development Corpsmen, and later duly presented the full bill to the Council of Ministers, and subsequently to the Houses of Legislature for sanction. Having passed the various legislative stages and channels, the Ministry of Agriculture was assigned by His Imperial Majesty to execute the Act. The latter in turn, assigned the

Extension Organization of the Ministry, to conduct adequate surveys and studies on the:

1. Size of the personnel and number of Extension and Development Corpsmen required to carry out this highly vital and heavy duty.
2. The right kind of practical and technical agricultural extension plans, projects and programs required to develop modern farms, poultry, livestock and veterinary practices, as well as to introduce and increase use of fertilizers and improved seeds and seedlings, on the farms, and eventually develop the rural areas, by such standards, functions and duties, devised for the Corpsmen to follow, at the village level.
3. The special kits and equipment that every individual Corpsman would have to be provided with before assuming duty to enable him to fulfill assignments given him within his zone or area of operation and prepare himself for any action required, but subject to the advice and recommendations offered by the respective field experts.

The preparatory work took just over four months to be completed. The first term of the Extension and Development Corps' four months training course was officially started April 1, 1964, at the Academy of Military Sciences, Tehran. Military courses were taught by the faculty of Military Sciences and courses dealing with agriculture, development, and economics were taught by instructors assigned by the Ministries concerned.

All the necessary equipment, including vehicles, technical kits and outfits, supplies of fertilizers, improved varieties of seeds and seedlings, sprayers, spraying materials and chemicals, as well as extension pamphlets, brochures and publications, that would have to accompany every individual Corpsman to his post, were gradually provided and made ready for shipment. Parallel to this measure certain other steps were taken in the districts and provinces of the country. Local extension services marked all specific rural farms and areas where individual Corpsmen would have to serve. These were supposed to have a total minimum population of 300 inhabitants. Each area had to be able to be adapted to farming, livestock and horticultural practices. All the province submitted their lists of

requirements to the Central Headquarters, and applied for the right number of drafted Corpsmen required locally.

It is worthwhile to note here that the Extension and Development Corps is composed of various categories of high school and university graduates, including agriculture, architecture, economics, poly-technical arts, mechanical, electrical and civil engineering, physics, civics, and social sciences as well as veterinary sciences. The entire period of service served by each Corpman is 18 months, covering a 4 month training course and 14 months of service in the rural districts.

The university graduates drafted into the Extension and Development Corps usually serve the organization and the nation with the rank of a second lieutenant. The high school graduates serve their military service as sergeants in the army.

The organizational set-up of the Extension and Development Corps consists of:

- A Central Supervisory Office, located in the Central Extension Organization of Tehran
- Provincial Supervisory Offices
- Supervisory Links or Teams, and
- General Project Operation Teams, functioning at the village level.

The drafted Extension and Development Corpsmen with a full high school diploma, frequently referred to as "technicians" usually serve the rural areas under the direct supervision of a university graduate in agriculture. The total number of such technicians may occasionally exceed or be under ten, depending on the distance to be traveled by the technician within his area of operation. One Vanet Car has been assigned to each Supervisory Team.

The drafted university graduates in mechanics, civil engineering and economics, who join the Extension and Development Corps actually serve the provincial rural areas in their specific fields of training. They are directed by guidelines and instructions given them and also assisted by the spirit of self help cultivated among the rural inhabitants.

The conscript university graduates in agriculture supervise the work of their fellow draftee high school graduates in the following fields:

1. Ordinary and regular farming
2. Livestock and dairy farming
3. Poultry farming
4. Horticulture and the creation of a "Model Fruit Farm" composed of improved varieties of fruit stocks and seedlings
5. Vaccination of fowl and farm animals
6. Spraying homesteads, pens, stables as well as orchards, and fields
7. Training in and exchanging vegetable seeds, grains and cereals
8. Introduction of and wider application of fertilizers
9. Row crop production
10. Introduction of proper means and methods and sound principles of irrigation like "strip border irrigation"
11. Proper use of farm machinery and equipment, supplies and materials, etc. already shipped out to the rural areas to be used by the Corpsmen
12. Rural development plans and schemes.

Rural Youth Clubs - It might be worthwhile to mention here that each individual Corpsman is officially required to have organized at least one Rural Youth Club, previously known as 4-D clubs and originally adopted from the American idea of 4-H Clubs, within the limits of his own zone of operation, and actually to train every club member to fulfill specific jobs.

Fertilizer Extension Units - So far, four fully equipped Mobile Extension Units have been trained and assigned to demonstrate the uses and effects of fertilizer application as well as all other related problems involved in the application of fertilizers to the paddy fields in the northern part of the country. The units have in general consisted of two university graduates in agriculture, a Vanet car, and the proper amount of fertilizer required for each demonstration plot. The results so far obtained have really been wonderful.

#### HUSSAINGHOLI'S PERSONAL STORY, SPECIAL CASE STUDY

The following is a short account of the special services that have actually and personally been achieved by our Sergeant Hussaingholi-ye Farzane, at the Shishdeh-e Pasa of Fars. It is a typical example of an Extension and Development Corpsman of our homeland.

The Shishde Village has a population of 508 people. It had not enjoyed any advantages or privileges, now attributed to extension work in modern agriculture, because of unfavorable climatic conditions and lack of public education and training. This village lacked all edible fruits and vegetables, trees and orchards, as well as adequate supplies of potable water. This will give the reader quite a vivid picture of the wasteland and its deplorable living conditions, adversely called, "Shishde." Nevertheless, the following is what we actually succeeded in accomplishing in cooperation with the rural inhabitants themselves and in spite of all the existing handicaps and setbacks:

1. Create a vegetable farm with improved varieties of seeds and bulbs.
2. Create a fruit farm or orchard planted with improved varieties of fruit stocks and seedlings.
3. Establish a wheat farm, sowing improved seed and applying proper fertilizers.
4. Start a model poultry farm, using local domestic capital raised by the farmers.
5. Use a 140-egg-capacity-incubator with eggs from selected breeds, as well as to have the group hatchings successively repeated for three generations and yield the manager a high production percentage of 90 percent of live chicks.
6. Rear and protect the chicks with regular sanitary standards and actually teach the locals to manage the enterprise.
7. Vaccinate the entire local poultry and livestock population of the village, which usually lost great numbers to pest and disease infestation, prior to this vaccination.
8. Sink three irrigation wells (one deep and two semi-deep); install them all with combined motor pumps and have the pump stations eventually operated on a cooperative basis.
9. Have a power station and the necessary network built for the farmers, by one of them, and thus provide electric light for the streets and homesteads.

EXTENSION SERVICE ORGANIZATION AND ADMINISTRATION  
OF WEST PAKISTAN

BY

ABDUL MANNAN KHAN  
Deputy Director of Agriculture, West Pakistan

West Pakistan has a total area of 199 million acres, of which only 131 million (66 percent), is reported. Non-reported areas are defined as those which are not covered by village land records and primarily include tribal areas and the States of Dir, Swat and Chitral. Land utilization statistics available give us the following land-use position:

	<u>ACRES</u>		<u>ACRES</u>
Geographical area	198,600,000	Cropped area	38,077,000
Reported area	127,977,000	Irrigated	28,420,000
Cultivated	45,924,000	Culturable waste	31,821,000
Net sown	3,410,000	Forest	4,496,000
Current fallow	12,514,000	Not available for cultivation	45,736,000

Even though natural advantages like manpower and other resources are available, the country has not yet been able to make effective and substantial headway in achieving the required level of agricultural production. Fluctuations of weather from year to year cause many ups and downs in crop production. Our crop yields are among the lowest in the world. To give an idea of the low level of production the following few instances of per acre yield are given.

Wheat	720 lbs per acre	Gram	485 lbs per acre
Rice (cleaned)	760 lbs per acre	Oilseeds	340 lbs per acre
Maize	898 lbs per acre	Cotton	185 lbs per acre

The problem has always been how best to bring about and achieve increases in the production level within the scope of our available facilities. In a country like ours where the basic facilities that are required for raising agricultural production, that is: irrigation water, high quality seed, fertilizers, improved agricultural implements, plant protection services and credit sources are becoming available, the responsibility for proper harnessing of these facilities, making them available to the farmer and educating the farmer as to the economical, remunerative end use, rests with the Agriculture Department. It is in order to develop an effective line of attack on production problems that the Government of West Pakistan maintains an Agriculture Extension Service. This service operates through four government agencies.

1. Agriculture Department - which directs extension in 40 districts of 11 divisions with 3,800 extension workers.
2. Home Department - which controls extension in six agencies and three states of the tribal division. Field work is guided by the Agriculture Department.
3. Land and Water Development Authority - is responsible for experimental reclamation projects with 225 extension workers. Concentrated work has been undertaken in a selected area of the central region of West Pakistan to combat waterlogging and salinity.
4. Agricultural Development Corporation - is responsible for barrage project areas, covering seven districts with 273 extension employees.

All told there are about 4,400 supervisors, field-level workers and supporting line technical specialists employed in extension work.

Table 1 shows the personnel strength and organization of the Extension Service Organization of the Agriculture Department. The province has irrigation facilities available for only 28.4 million acres out of 46 million acres cultivated; a culturable waste of 31.8 million acres; and uncertain and inclement weather which causes unexpected ups and downs in production. The extension staff has a large task to increase production level.

## AGRICULTURE DEPARTMENT EXTENSION SERVICE

At the divisional headquarters there is a Deputy Director of Agriculture. Staff officers for horticulture, statistics, publicity and economics cum marketing who, as aides, work in their individual specialities. In the districts a deputy assistant director is provided for horticulture and statistics. A special officer for plant protection is available to organize and guide plant protection work. An agricultural assistant is assigned on the basis of 60,000 acres cultivated area and one field assistant in each Union Council. The deputy assistant director of agriculture is usually a specialist in agronomy and water use.

There is a full time superintending engineer at the regional level, under whom agricultural engineers and assistant engineers work on mechanized field services.

### Scope of Activities

The work of our agriculture extension includes the following activities:

#### General extension

1. To give the farmers information on the use of improved agricultural methods and to induce them to adopt these methods.
2. To maintain effective and close contact with the farmers, through meetings, film shows, etc.
3. To help farmers in getting seed, fertilizers, improved implements and necessary plants from the respective agencies, governmental, semi-governmental or private.
4. To lay out a maximum number of demonstration plots on better use of high quality seed and fertilizers. A new idea is being developed to develop a demonstration center in each Union Council. It means concentration of our best laid out demonstration plots in a selected village of each Union Council, besides lay out of individual plots in a maximum number of villages of a Union Council.
5. To demonstrate effective and economical use of improved agricultural implements which includes ploughs, cultivators, harrows, drills and other weeding and threshing implements.

6. To organize crop competitions and award prizes for the best performance.
7. To organize exhibitions at all levels, down to the Union Council level.
8. To plan and organize crop estimation with statisticians.
9. To organize large scale campaigns like the "Grow More Food" and "Grow More Edible-Oil Crops. "
10. To help farmers adopt cropping patterns which ultimately should add to their farm income.

#### Plant protection

1. To make a pre-spray survey of public fields and orchards and assess the percentage of damage and identify the individual nature of infestation.
2. To carry out field spray operations in individual fields.
3. To organize a large scale campaign as and when needed.
4. To report outbreaks of diseases and pests and organize effective combat measures.
5. To help the aerial pest control staff of the Pakistan Government in organizing local aerial sprays.
6. To organize cultural control measures on a self help basis. It should be noted that overall plant protection service till December 1, 1966 was carried on a free-cost basis for the farmers and the expenditure was borne in full by the government. Now a nominal recovery from farmers of 25 percent is made for pesticides used in these services.
7. To organize fumigation for control of stored grain pests both at farms and for the public.

#### Farms

1. To maintain demonstration and experimental farms at selected places for general guidance to farmers on practical adoption of improved agricultural practices.
2. To plant fruit nurseries and maintain nursery gardens to introduce the best quality fruit and plants, and make them available for distribution and sale to the public.
3. To multiply nucleus seed received from research, for use as foundation seed.

## Locust control

West Pakistan is within the locust invasion area. When a locust emergency arises the extension staff of the Agriculture Department undertakes to pool all its resources and deal with the menace on a priority level.

## Agricultural mechanization

- To carry out reclamation of unused soil and bring it under cultivation
- To carry out levelling of public lands
- To help the revenue department in places where flood irrigation is needed
- To drill and dig tubewells.

A full time staff is engaged on this aspect of agricultural extension. Tractor service was charged at 50 percent subsidy until the end 1966. The subsidy was withdrawn in July, 1967.

### RATE OF CHARGES RECOVERED FOR SERVICE

Tractors/Bulldozers	Subsidised rate ending 6/1/1967 (per hour)	Prevailing rate (per hour)
<u>Challengers</u>	<u>Rs. 11/-</u>	<u>Rs. 22/-</u>
TD 14)		
TD 15)	Rs. 15.50	Rs. 31/-
D- 6)		
BTD-20	Rs. 21/-	Rs. 42/-
Wheel type	Rs. 7/8	Rs. 15/-
<u>Tubewells</u>	<u>Bore</u>	<u>Rate (per ft.)</u>
<u>Power rig</u>	<u>8"-10"</u>	<u>Rs. 4.75</u>
	12"-15"	Rs. 5.75
	16"-18"	Rs. 7.75
Hand boring plant	7"	Rs. 0.75
	8"	Rs. 1.50
	10"	Rs. 3.00
	12"	Rs. 4.00
	14"	Rs. 4.00
	16"	Rs. 5.00
	18"	Rs. 6.00

## AGRICULTURE DEVELOPMENT CORPORATION

This supply agency has to produce or procure, transport and distribute seeds, fertilizers and farm implements throughout the province. It has to organize its own extension field service in project areas which at the moment include Guddu Barrage, G. M. Barrage and Thal project areas, spread over seven districts. Seed supply is entirely an A. D. C. responsibility, whereas in case of fertilizers, the procurement and distribution responsibility is shared with cooperatives. More than one distribution center is maintained in all important cities and towns.

### FERTILIZERS DISTRIBUTED

<u>Fertilizers</u>	<u>Nutrient contents</u>	<u>Weight per bag (in lbs)</u>	<u>Retail price per bag</u>
Ammonium sulphate (indigenous)	21%	112 lbs	Rs. 11.00
Amm. nitrate (indigenous)	26%	78.5 lbs	Rs. 11.00
Urea (indigenous)	46%	50.6 lbs	Rs. 11.00
Single superphosphate (indigenous)	16%	112 lbs	Rs. 10.00
Amm. sulphate nitrate (imported)	26%	112 lbs	Rs. 14.00
Triple superphosphate (imported)	46%	112 lbs	Rs. 19.00
Urea (imported)	46.3%	112 lbs	Rs. 25.00
Ammonium sulphate (imported)	21%	112 lbs	Rs. 11.00

### Credit facilities

An Agricultural Development Bank has been established which advances loans to farmers for purchases of seed, fertilizers, bullocks, implements, tractors and tubewells. The cooperatives help the farmers through the Cooperative Bank. The provincial government revenue department also advances Taccavi loans recoverable in easy instalments.

### SUMMARY

A divisional and regional work plan is drawn on a seasonal basis at the start of each cropping season in conferences held first at the divisional headquarters between the Deputy Director of Agriculture and the Extra Deputy Director of Agriculture followed by another held at

the regional headquarters between the Director of Agriculture and his deputies. The plan is finalized on targets fixed for divisional level and ultimately distributed down to the Union Council, Tehsil and District levels.

This meeting is attended by the Agricultural Machinery Organization and the Research wing is also invited. In these meetings the programme for demonstration is limited to a few very remunerative food/cash crops. It also lays stress on use of high quality seed, seed bed preparation, economic use of water, method and time of sowing, seed rate, use of fertilizers, quantity of fertilizer required for each application and its time of use, interculture and plant protection services.

It is important to lay out demonstration plots in large numbers in all Union Councils and concentrate efforts to make at least one village in each Union Council an effective demonstration center. The Agricultural Assistants and Field Assistants, after consulting the Chairman, members of the Union Council and other local progressive farmers, select the farmer-demonstrator who is ready to carry out agricultural practices given to him by the Department. A demonstration plot varies from one-half to one acre. The number of demonstrations are being increased proportionate to extension personnel available.

Four day refresher courses are held in the districts to train extension staff from time to time. To these meetings are invited the subject matter specialist of the service, representatives of the Machinery Organization, Publicity Section, of A. D. C. and of the Research wing.

Union Council level training is organized to induce farmers to adopt effective agricultural practices for boosting agricultural production. Such know-how training conferences are held when the Department has to organize campaigns like that of "Grow More Wheat," "Grow More Maize," "Grow More Paddy" or "Grow More Oilseed Crops."

Technical information is communicated to farmers in the form of wall newspapers, pamphlets, brochures, filmstrips and books. Films and slides on agricultural practices are also shown by mobile units in the evening to the people in villages of Union Councils.

Big national campaigns like the "Grow more food crops," bring together in one committee all the government departments to organize public contacts. It is always the extension worker, who is the organizer

of such committees. A close working relationship exists between all these departments.

Besides the day to day work, new trials and experiments are made to see if, through changes in staffing pattern, extension can be made still more effective. During 1960-65 the contribution of agricultural production to the gross product of West Pakistan rose from Rs. 760 to Rs. 905 Crores (measured at the constant of 1959-60 prices). The increase in production was 4 percent. The Third Plan envisages an increase of 5.5 percent a year. In view of this proposed increase in targets our aim shall be; more irrigation and more fertilizer, more wheat, more maize, more oilseed, more cotton, more tractors and tubewells.

We cannot close our eyes to the fact that farmers also need more education. This requires a well organized and trained agriculture staff equipped with knowledge, facilities of communication, and transport. It has been felt that it is not possible for a Field Assistant to contact 10,000 or more people of a Union Council. An experiment under the initiative of a Commissioner of a Division is now being made to find out if a Field Assistant can make effective contact with 300 farmers and give them help in technical guidance, layout of individual farmers' land, procurement of seed, fertilizers, implements and plant protection service and arrange for credit. In this particular case one Union Council in each district has been selected. It has been provided five Field Assistants under the control of an Agricultural Assistant. A sub-inspector from the Cooperative Department has been assigned to take care of credit facilities and to organize credit associations. An animal husbandry expert has been appointed to take of animal health and also to organize local "Bull" services to encourage good breeds. Poultry is also an essential part of his responsibility. Ten matriculate level farmers' sons have been selected to be trained for one year in agricultural techniques. On completion of their training these farmer-youths will help in educating their co-villagers. Results are being watched.

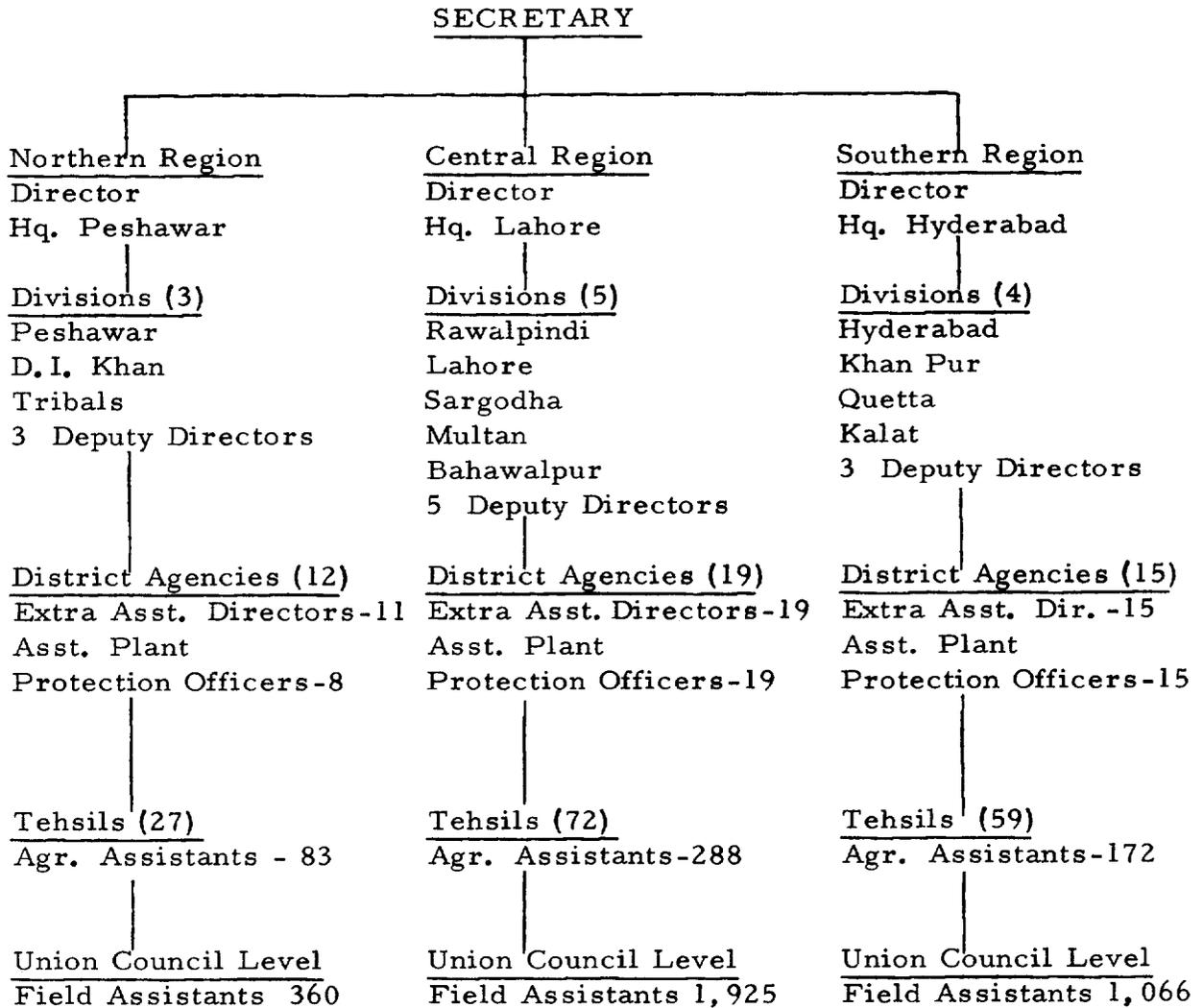
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TABLE 1

GOVERNMENT OF WEST PAKISTAN  
 AGRICULTURE DEPARTMENT  
 EXTENSION SERVICE ORGANIZATION



- NOTE:
1. There is no regular Extension Organization in the three states of Swat, Dir, Chitral included in the "Tribal Division." The extension of another Agency attends to these.
  2. Agriculture Assistants are provided at the rate of one for each 60,000 acres and not less than 3 in a Tehsil.
  3. Field Assistants are provided one in each Union Council.

## AGRICULTURE EXTENSION IN EAST PAKISTAN

BY

ABDUL MUBIN CHOWDHURY

Joint Director of Agriculture, Dacca, East Pakistan

### BACKGROUND INFORMATION

East Pakistan is basically an agricultural country with more than 85 percent of the population directly dependent upon agriculture. Comprising 55,126 square miles with an estimated population of 65.6 million, East Pakistan is one of the most densely populated countries of the world with about 1,200 persons per square mile. There are 62,000 villages, with a farm population of more than 55.76 million. Average size of the farm is 3.5 acres but about 24 percent of the farms are under one acre in size and 97 percent are under 12.5 acres.

Major Crops - Rice is the major crop with an average annual acreage of about 21.5 million acres. Jute ranks second in acreage with approximately 2 million acres. Other important crops are sugarcane, oilseeds, pulses, and different kinds of vegetables.

Staffing Pattern for Agriculture Extension - The province of East Pakistan has eighteen districts, each district is divided into sub-divisions and each sub-division is divided into Thanas and each Thana into Unions. The province program is headed by a Director of Agriculture under whom there are three distinct divisions viz. (1) Research, (2) Extension and (3) Education.

Research - As no effective extension work can be carried on without sufficient research, considerable emphasis has been put by the government on research. An Agricultural Research Institute is in operation in East Pakistan with the following divisions under it.

- |   |  |
|---|--|
| 1. Economic Botanist (Cereals)                | 6. Entomologist                                |
| 2. Economic Botanist<br>(Pulses and Oil seed) | 7. Mycologist                                  |
| 3. Economic Botanist (Fiber)                  | 8. Horticulturist                              |
| 4. Agricultural Chemist                       | 9. Agronomist                                  |
| 5. Agricultural Engineer                      | 10. Soil Fertility and Soil<br>Testing Project |

Education - There is an Agriculture University in East Pakistan and an Agriculture College. A five year course leading to B.Sc. (Ag.) is given in the college and the university. Minimum qualification for admission either in the college or the university is a Secondary School Certificate. There are also seven Agriculture Schools where extension workers are given two years training leading to a diploma.

Agriculture Extension - The organization of the Agricultural Extension Service in the province is shown below:

- In each of the four divisions of the Province there is a Deputy Director of Agriculture who is assisted by a Deputy Assistant Director.
- In each district there is a District Agricultural Officer, a Plant Protection Inspector, a sub-divisional Agricultural Officer (H. Q. ), an Officer of the Agricultural Statistics Division and an Officer of the Soil Fertility Project. (There are eighteen districts in the province).
- In each of the 52 sub-divisions of the Province there is a sub-divisional Agricultural Officer.
- Thana - There are 412 Thanas in this Province. In each of these Thanas, there is a Thana Agricultural Officer.
- Union - The lowest administrative tier in the Province is the Union. There are 4,053 Unions in this Province. In each Union there is an Union extension worker known as Union Agricultural Assistant.

Plant Protection Organization - Incidence of insects in this province is very high. To protect the crops from damage by pests and insects there is an elaborate organization. In the provincial headquarters there is a Deputy Director of Plant Protection who is assisted by two deputy assistant directors and two technical assistants. In each division of the Province, there is a Plant Protection Inspector attached to the Office of the Deputy Director of Agriculture Extension. There is also a Plant Protection Inspector and an Assistant Plant Protection Inspector attached to the District Agricultural Officer.

In each Thana there is plant protection assistant and a sprayer mechanic. For field operation there are 1,000 field operators known as "Makddams."

#### METHOD FOLLOWED FOR EXTENSION WORK

With the establishment of the Agriculture Directorate in 1906, when this country was under British rule, there was a skeleton staff for extension work. Extension work used to be carried on through several demonstration plots which were few and far between and not very effective. After the country gained independence, attention of the government was focussed on development of agriculture with particular emphasis on extension. The method which was followed till recently was (a) establishment of demonstration farms of three acres each in each Union and small demonstration plots of one-third acre spread all over the Union. Incidentally it may be mentioned here that each Union agricultural extension worker has to deal with about 1,500 farmers. It is obvious therefore that an extension worker cannot meet and advise or educate farmers individually. The only alternative therefore was to start demonstration plots where farmers could work with their own hands, use improved seeds recommended by the Department of Agriculture, and apply required doses of fertilizer and irrigation, if available. This practice was found fairly good in teaching the farmers modern agriculture but not to the extent expected because the size of the demonstration plots was small and all the inputs required for increase yield, especially water, were lacking. It has therefore been decided that as of this year there will be 25 acre block demonstration farms in each Union, 50 acre farms in each Thana, 100 acre farms in the subdivision and 200 farms acres in each district.

After the introduction of the Basic Democracy system in Pakistan, people became effectively involved in agricultural development work. In each Union of the province ten persons are elected by the people through adult franchise. They form a Committee known as the Union Council. A chairman is elected by the Council members. This Union Council is entrusted with the responsibility of undertaking all rural development work. The government places sufficient funds at the disposal of these Councils for rural development work. In a developing country like ours, the Union Council has to tackle multifarious problems such as health, communication, education and sanitation. In order to place special emphasis on agricultural development, separate committees have been formed at Union, Thana, District and Sub-divisional

levels. The composition and function of these committees are:

A. Union Agricultural Development Committee

- Chairman (Ex-Officio) - Chairman of the Union Council
- Members - Three members of the Union Council to be nominated by the Union Council
- Member-Secretary - Union Agricultural Assistant

B. Thana Agricultural Development Committee

- Chairman (Ex-Officio) - Circle Officer (Development)
- Members - (1) Official - Officials of the Agriculture, Forest, Fisheries, Livestock, Cooperative and Agricultural Marketing Directorates and that of East Pakistan Agricultural Development Corporation at the Thana level. (2) Non-official (five) - To be nominated by the Thana Council either from its own members or from outside. Nominees shall be persons interested in agriculture.
- Member-Secretary - Thana Agricultural Officer

C. District Agricultural Development Committee

- Chairman (Ex-Officio) - Deputy Commissioner/Assistant Deputy Commissioner
- Members - (1) Official - All District Officials of the Agriculture, Forest, Fisheries, Livestock, Cooperative and Agricultural Marketing Directorates and that of the East Pakistan Agricultural Development Corporation and a Representative of the East Pakistan WAPDA if posted in that district. (2) Non-official - Five members to be nominated by the District Council either from amongst its own members or from outside. The nominees shall be persons interested in agriculture. One non-official members to be nominated by the government from among the MNAs or MPAs.
- Member-Secretary - District Agricultural Officer.

D. Divisional Agricultural Development Committee

- Chairman (Ex-Officio) - Divisional Commissioner/Assistant Divisional Commissioner
- Members - (1) Official - All the Divisional Officers of Agriculture, Forest, Fisheries, Livestock, Cooperative and Agri-

cultural Marketing Directorates and that of the East Pakistan Agricultural Development and a representative of the East Pakistan WAPDA. (2) Non-official (six) - Five members to be nominated by the Divisional Council either from among its own members or from outside. The nominees shall be persons interested in Agriculture. One non-official member to be nominated by the government from among MNAs or MPAs.  
- Member-Secretary - Deputy Director of Agriculture in the Division.

## AGRICULTURAL FUNCTIONS OF DEVELOPMENT COMMITTEES

The Function of each Agricultural Development Committee shall be:

1. Preparation and implementation of plans and programmes -- each Committee shall prepare its plans and programmes of agricultural development and increased food production after a proper survey of the requirements of the area within the general framework of the policy and schemes of the government and submit the same to the parent council for approval and cooperation in implementation. When approved by the council and funds are available, the plans and programmes shall be implemented by the committee. Plans and programmes approved by the council without the requisite provision or assurance of funds may be submitted by the committee (other than the Divisional Committee) to the next higher committee for adoption and implementation or for assistance as may be considered necessary.
2. Coordination of development activities of Government Directorates -- each committee (Particularly Thana and District Committee) shall coordinate the development activities of the various Government Directorates at its level and ensure timely supply of seeds, manures and fertilizers, timely treatment of seeds and plants against insects, proper distribution of agricultural and cooperative loans, establishment of block agricultural demonstration farms, compilation of accurate statistics, holding of farmers' fairs and Chashi rallies, organizing of Chashi clubs, utilization of agricultural research extension workers, education and training of farmers in improved farming, prevention and cure of animal diseases, proper administration of veterinary hospitals,

improvement of animal husbandry, poultry husbandry and fish husbandry, bee-keeping, tree-planting, fruit growing, proper marketing of agricultural products, clearance and destruction of water hyacinth.

3. Preparation and consolidation of requirements of agricultural implements, fertilizers etc. of Unions -- estimates of all various requirements of Unions including agricultural implements, fertilizer, power pumps, seeds, agricultural loans, veterinary and poultry medicines, vaccine fisheries, fish-seed-ponds, fishing gear and equipment, plant protection equipment, saplings, seedlings, insecticides, etc. shall be prepared by the respective Union Agricultural Development Committees and forwarded to the Thana Agricultural Development Committee with the approval of the Union Councils. The Thana Agricultural Development Committee shall collect these requirements and with the approval of the Thana Council, forward the same to the District Agricultural Development Committee. The consolidated statement shall be considered by the District Agricultural Development Committee and placed before the District Council, with recommendation by the District Council, each District Officer of the Agriculture, Forest, Fisheries, Livestock, Cooperative and Agricultural Marketing Department and Agricultural Development Corporation shall take up the matter with the respective divisional officers for the speedy and timely supply of these articles.
4. Training of farmers - The committee shall give special attention to training of the farmers in plant protection work with the assistance of the plant protection staff.
5. Fruit development - The committee shall also function as Fruit Development Boards under the respective local councils.
6. Monthly report of activities - Each committee shall prepare a monthly report of its activities and submit it to the parent council with a copy to the secretary of the next higher tier. The Divisional Council shall send a consolidated report to the Agriculture Department. The secretaries of the committee in turn shall send copies of relevant extracts to the departmental officers concerned who shall keep their superior officers informed. In case of the Thana Agricultural Officers, a copy of the report shall also be submitted

to the Subdivisional Agricultural Officer who shall take up relevant issues with his counterparts.

#### ASSISTANCE BY EXTENSION STAFF

The extension staff of the Agriculture, Fisheries, Livestock, Co-operative and Agricultural Marketing Departments and the East Pakistan Agricultural Development Corporation shall advise and assist the different committees at various levels besides performing the normal functions entrusted to them. They shall also take up a systematic programme of educational and training activities.

The model demonstration farms will be operated by the farmers under the active technical advice of the Union Agricultural Assistants and in cooperation with the Union Agricultural Development Committee. A short description of the plan of action of these farms is given below:

Objectives - The programme will have the twin objectives of raising additional crops wherever possible and raising the per acre yield of the existing crops.

Basic Considerations - The best way to raise an additional crop is by irrigation. Water is the principal input which has to be combined with other inputs for increased yield. The government should attempt to provide water for raising additional crops wherever possible and to provide enough water for the existing crops so that dependence on monsoon does not disturb the timely sowing of paddy. The provision of water for the existing crops will enable the farmers to combine optimum combination of inputs to the best of their ability and experience.

Organization - The following organizational pattern is suggested, keeping in view the political framework of the Union and Thana Councils for representative participation of the people in the Agricultural Development Programme of the Government, and the viability of the programme itself. The primary organization will be the block demonstration committee which will have the function of organizing irrigation for increased yield in the block. The Union Agricultural Development Committee will explore the possibility of organizing demonstration blocks for better production, considering the topography, the sources of water and other relevant factors. After the block selection is made and the agreement among the farmers arrived at the scheme will be prepared by the Secretary of the Union Agricultural Development Committee and placed before

the Committee for further scrutiny. The scheme of the Union will then be considered by the Union Council. The excavation or re-excavation of canals or building an embankment for storing water is the responsibility of the Works Programme. The Union Council will then send the scheme for irrigation to the Thana Agricultural Officer who is the secretary and place this before the committee for consideration. The irrigation schemes will then be considered by the Thana Council, preferably in the same meeting where all Works Programme Schemes are considered. After the schemes are passed by the Thana Council the Thana Agricultural Officer will take all necessary steps to implement the programme. The Thana Council will be periodically informed of the progress of works. The Vice-Chairman of the Thana Council may exercise general supervision, but the implementation of the scheme will be the responsibility of the Thana Agricultural Officer.

#### CROPPING PROGRAMME

Union Level - The cropping programme for model demonstration farms will be drawn up by the Secretary of the Union Agricultural Development Committee in consultation with participant members. The Kharif cropping programme so prepared should be forwarded to the Thana Agricultural Officers by the October 31, and he will approve it and send it back to the Union Agricultural Assistants by November 15. It will be better if the Thana Agricultural Officer approves the programme on the spot in consultation with participants. A copy of the approved programme should be kept in the offices of the Thana Agricultural Officer and Subdivisional Agricultural Officer. A similar programme for Rabi crops will have to be prepared by the middle of June and approved for execution within June.

Thana Level - At the Thana level the Thana Agricultural Officer will prepare the Kharif cropping programme by the October 31, and get it approved by the Subdivisional Agricultural Officer by the November 15. The programme for Rabi crops will be similarly prepared and approved in June.

Subdivisional Level - The cropping programme for Kharif and Rabi crops will be prepared by the Subdivisional Agricultural Officer by October 31 and June 15 respectively. The programme will be approved by the District Agricultural Officer by November 15 and June 30 for Kharif and Rabi crops.

District Level - The District Agricultural Officer will prepare the cropping programme for Kharif crops by October 31. Similar programmes for Rabi crops will have to be prepared by June 15.

Coordination

Special coordination at the district level will be necessary for distribution of Taccavi loan for seeds, manure, etc. for demonstration farms. The data for these loans, at all levels will be collected by the District Agricultural Officer who will arrange for the funds from the Deputy Commissioner.

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EDUCATING THE EXTENSION WORKER  
The Work of the Agricultural Extension Centre, Reading University  
Reading, England

BY

MAURICE JOHN ROLLS  
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Reading, England

INTRODUCTION

An Agricultural Extension Centre was established at Reading University in June 1965, with the financial support of the W. K. Kellogg Foundation. This paper sets out the developments leading up to the establishment of the Centre at Reading, and discusses the principles and practice of its courses run for extension staff. In this paper the term agricultural extension is used, where in Britain agricultural advice is the currently accepted term.

THE EXTENSION SERVICE IN BRITAIN

The principal official agency responsible for agricultural extension work in England and Wales is the National Agricultural Advisory Service, formed in 1946 as a national service to replace the mixture of local and central activity that had existed earlier. Scotland has a service based on the Universities and Agricultural Colleges, whilst in Northern Ireland it is organized by the Northern Ireland Ministry of Agriculture. The N. A. A. S., which is a branch of the Ministry of Agriculture, Fisheries and Food, has an extension staff of over 1,500 (including specialists) whose task it is to give expert and unbiased advice, free of cost, to farmers. The original

aims of the N. A. A. S. were stated, in 1946, to be "to sift the growing harvest of new knowledge and new resources to commend to the individual farmer such new practices as he might with advantage adopt." Changes in agriculture, and in the problems confronting the farmers served, create the need to reexamine and assess these aims.

## THE NEED FOR EXTENSION EDUCATION

The need for training in communication skills such as lecturing, writing, and using visual aids, has been recognized for a considerable time, and the N. A. A. S. has been very acutely aware of the importance of such training for its staff. This training was organized almost entirely on an in-service basis, and took many forms. It was also the case that courses concerned with technical agricultural matters accounted for a good deal of the total time devoted to training in the Service. More recently, however, there developed a growing realization that development in advice on farm economics and management problems was bringing the extension worker increasingly into touch with social problems concerning the farmer, his family, and the agricultural community as a whole. These problems reflect the social changes which have been intimately linked with the technical transformation of farming in Britain during the present century. The extension worker today is concerned with social and psychological factors not only as they affect the resistance to technical change, but also as they affect the economic and organizational changes which are so often necessary if technical advice is to be accepted and applied.

Hence the case was made that a university course in the science, technology and economics of agriculture, together with in-service training based largely on a probationary period of attachment to an experienced extension worker, was no longer an adequate preparation for extension work. During the early 1960's the N. A. A. S. began to explore the possibility of interesting University Departments in providing formal education in extension methods. The Agricultural Education Association in Britain was influential in encouraging this movement, and ran a conference in 1964 on the communication of scientific and technical information to farmers.

During 1963 discussions began between members of the academic staff of the Faculty of Agriculture and the Department of Education in the University of Reading and officials of the N. A. A. S. As a result of this an experimental three weeks course was offered, in July 1964, by the Department of Education in conjunction with the Ministry, for 49 members of the extension staff of the Ministry of Agriculture, Fisheries and Food and the Extension Services in Scotland and N. Ireland, and a further three extension workers from East African countries.

#### Short Course at Reading in July 1964

The approach used in planning the three-week course was modelled on lines established for professional courses for the initial training of teachers. The objectives in teacher-training are generally to develop an understanding of the processes of education, and of the nature of those who are to be educated, and to develop expertise in the methods used in teaching and learning. The trend, in fact, is away from the concept of training towards that of teacher education, with greater emphasis on broadening and deepening the teacher's understanding and insight into the educative processes.

The overall objective of the course for agricultural extension workers was simply to bring together material from the fields of psychology, sociology and education which may be of assistance to extension staff in their task of communicating with farmers.

The main constituents of the course were:

1. An introduction to sociology and psychology, outlining the scope, terminology and methods of study used in the social sciences.
2. Aspects of the sociology of rural communities such as the processes of communication and innovation, and changes in rural social structures.
3. Aspects of psychology concerned with learning, attitudes, advising and counselling, and with group behaviour.

4. Extension methods used for working with individuals, small groups and large groups, and the use of mass media of communication.
5. Aspects of education such as levels of educational attainments and education for agriculture.
6. Aims and practices of extension work in various countries.

Perhaps the most important principle underlying the design of this course was the emphasis placed on developing an understanding of the communication problems with which the adviser has to deal, and the nature of the change processes in farming communities, rather than the more technical approach to communication in terms of methods and skills. As successive courses have been run, the objectives have been redefined towards creating greater awareness of the social difficulties facing an extension worker, greater ability to be objective about his own work, and giving greater understanding of what change at various levels in agriculture involves.

#### THE ESTABLISHMENT OF THE CENTRE

The favourable response to the initial experimental course led the Director of the N. A. A. S. to ask that further courses should be provided for about 1,000 extension staff over the next five years. It was obvious that training on this scale could only be provided by a Centre with a full-time teaching staff. It was also recognized that, while a great deal of material is available on the human problems of extension work from a number of countries (notably U.S.A. and Holland), much study, evaluation and validation was necessary before a completely satisfactory and comprehensive system of training could be devised for extension staff in Britain.

A proposal was therefore made, in 1965, to the W. K. Kellogg Foundation in the U.S.A. for financial assistance towards the establishment of an Agricultural Extension Centre, at Reading University, with the following tasks:

- to develop the most appropriate form of one-year post-graduate course for the new entrant to extension work, or the worker with some experience in the field, and to teach the course to graduates on a university diploma course;
- to develop the three week course by a similar process and teach it to groups of about 50 extension workers at a time;
- to conduct evaluation studies to investigate the effectiveness of the three-week and one-year courses, and surveys to evaluate extension methods in Britain and to find out how far the findings of research workers in other countries can be applied in extension theory and practice in the U.K.

On June 11, 1965 the announcement was made that the Foundation would give a grant of 75,000 pounds over five years to help establish the Centre. At the present stage of its second year of work 19 students have attended, or are attending the one year course, and over 200 students have attended the three-week courses held in vacations. One research study has been published\*, and a further five projects are being pursued.

#### Educating the Extension Worker

The courses aim to provide a postgraduate, professional type education for extension workers. This assumes that students will already have completed their studies in agriculture. The main outline of the one-year course is as follows:

1. Psychology - A course of lectures and seminars on aspects of psychology concerned with adolescents and adults, including personality and motivation, learning theories, and reactions to change.
2. Rural Sociology - A course of lectures and seminars on aspects of sociology concerned with rural and agricultural life, including discussion of social groups, a comparative study of rural communities in various countries and structural changes in agriculture.

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\* A farm "open-day" on grain drying and storage: an assessment of an advisory method, G. E. Jones and Jeremy Howell, 1966.

3. Sociology and Agricultural Extension - A course of lectures and seminars concerned with selected aspects of sociology of particular relevance to an understanding of social change in agriculture, including the processes of innovation and communication in farming communities and a discussion of community development.
4. Education and the Countryside - A course of lectures and seminars concerned with aspects of education and in particular its role in improving socio-economic conditions in rural areas; educational aims and extension work; levels of educational attainment in farming communities; education for agriculture.
5. Extension Methods - A course of lectures, seminars and practical activities concerned with the theoretical background and use of the mass media, large groups, small groups and the individual approach in agricultural extension work.
6. Extension Principles and Planning - A course of lectures and seminars on the aims and objectives of agricultural extension; the selection of technical content of extension programmes and the choice of methods in achieving objectives.
7. Measurement of Extension Activities - Design of investigations; conduct of surveys and other forms of data collection; analysis of data; reporting the results.
8. Comparison of Agricultural Extension - In a number of countries, outlining the organization, aims and methods of agricultural extension.

There are also a number of organized visits, including a visit to another European country, to study extension activities. Considerable importance is attached to the investigation of a problem in the field, and each student in the course undertakes a dissertation based on the study of a chosen problem. The importance of this dissertation is not only that it gives practice in the research methodology taught in the course, but also that it enables the student to integrate his studies from several academic disciplines.

The course is essentially an educational course rather than a training course. It emphasises the understanding of the change processes in agriculture, and the formulation of policy and programmes in agricultural extension, rather than the basic skills of communication. These skills are obviously important, but extension methods can only be really effectively employed in the light of an understanding of what is involved in the processes of social and technological change in agriculture.

## SUMMARY

A one year postgraduate course and numerous three-week in-service courses are being developed at Reading University for agricultural extension workers. The courses set out to develop an understanding of the change processes in agriculture, based on studies in psychology, sociology and education, which must be appreciated if the widening gap between what could be done by the immediate application of what is known about agriculture and what is in fact generally being achieved, is to be narrowed. Although the confrontation, in abstract terms, is between agricultural research and its application in agriculture, in practice this means the interaction between farmers and agricultural extension workers whose aim is to make the research results widely known. If agricultural extension workers are to successfully encourage agricultural development they must persuade farmers to change their ways. This requires an understanding of farmers and rural people as individuals and communities, and a sound philosophy of change in agriculture.

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## AGRICULTURAL EXTENSION PROGRAMS IN TURKEY

BY

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Agricultural extension programs must explain not only the felt needs of a region, but also the reasons that these needs occur. At the present time, agricultural extension programs in our country are prepared at the province or county level. They are aimed at the villager's needs and emphasize the local situation, goals and problems. Although agricultural extension programs are continuous they often require revision.

### County Extension Programs

This is the total activity of extension service within the villages. These villages belong to a county and within the possibilities of the province the activities can be carried out. The program includes the needs and recommendations to solve the problems of the local people.

There is a need for a committee at the village level for program planning and application of teaching and training. This committee, consisting of five to seven persons, includes village teacher, religious leaders, leading farmers, health officers, midwives and chairman of the cooperative. It is called the Agricultural Extension Committee.

There are three ways of extending the village program to farm or village families. These are: (1) By adult farmers (men), (2) By adult farmers (women), (3) By youth (4-K).

### Role of Province Extension Director in the Program Planning

The Technical Agricultural Director is a person who is the guide in preparation and application of the village extension programs during the program planning. At the end he brings the program which will be accepted by all the people. He develops the program with the co-operation and help of the specialists, county agents and also provides for the coordination with village people in finding and analyzing the problems and finding solutions to these problems.

### Role of Specialists in Extension Program Planning

Specialists who are trained in the subject matter are leaders working with their own subject. They find scientific, as well as practical, economical, and applicable solutions to problems. It is their duty to put the results of research findings in a simple, understandable manner for farmers. They work as advisers in program planning, gathering and evaluating the necessary information about the area and the local people.

### Role of County Agent in Extension Program Planning

The best program includes the suggestions, proposals, knowledge and information gathered by the extension committee. The County Agent prepares the program with the idea that it will be applicable by the villagers. For this reason it is his duty to re-check the program and do it according to the principles of program planning.

### Role of Village Technical Agricultural School Teacher in Program Planning

Great importance is given to the idea of using village technical agricultural school teachers who know the area to aid village program planning. The first level of program planning is in the village. A program which is prepared in draft takes its final form after it is reviewed by province and county officials, with the approval of Ministry of Agriculture and a work plan is forwarded to the village and then put into practice. Better results are obtained if leading farmers, officials, and agriculture workers participate in village program planning. After finding the problems, the next step is to give them priority according to importance.

In determining solutions of the problems, it is necessary to ascertain the village resources and possibilities. The best solution to any problem is the one which is accepted by the majority of the people. A program prepared in the village is sent to the county for revision and coordination. As a result a county program is established.

## PROVINCE EXTENSION PROGRAMS

The province program is the one which meets the needs and problems of villages and counties. Technical, financial, administrative, and other services needed in the county program are included in the basic activities of the province. Technical personnel working at the village level determine which teaching methods and means they will use in solving the problems.

Work Plan - This explains what the people who are responsible within this plan will do, when, where and how they will do it. For example, if a person who is responsible for planning a machinist course to be held in a village does not go to the villages at the time set it causes the loss of villagers' confidence in him and in the extension organization. That means the work plan is not only to cover the teaching and training activities to be extended to villages but at the same time it is the plan of using all possible resources: manpower, money, equipment, etc. for the realization of the program.

All of the problems taking place in Agricultural Extension may not be interesting for all farmers. For example - courses for use and maintenance of tractors (machinist course) may not be of interest for all villagers. In the agricultural extension program we must use methods corresponding to the social and cultural structures of the people we want to reach. The place and environment must also be taken into consideration.

### Agricultural Extension Methods Used:

1. Demonstrations (Method and results)
2. Agricultural courses
3. Field days
4. Competition for encouragement
5. Technical information
6. Visits to village and technical meetings
7. Individual contacts and publications.

Pictures, circular letters, slides and films are used in addition to the methods mentioned above.

Leaders working on the application of extension programs are classified under two categories: (1) Professional leaders - (extension workers): these are the ones who influence the people in their thinking and attitudes, thus motivating them to act. (2) Local leaders - these are the volunteers who help in the preparation and implementation of the program according to the environment in which they live.

Since agricultural extension programs and their application is explained already in the Denizli Pilot Project report, I will give some examples of the activities in Hatay Province where I work as a technician.

Hatay is a province located in the southern part of Turkey. On the East it is bordered by Syria, on the West by the Mediterranean Sea, on the North by Gaziantep and Adana provinces. It covers an area of 553,500 hectares, 289,900 of which are not available for agriculture cultivation. Although 147,800 hectares of land is suitable for irrigation at the present time only 71,400 hectares can be irrigated. The population of Hatay Province according to the 1960 census is 441,198. Families dealing with agriculture number 52,932. In 1966 the agricultural land distribution of agricultural crops is as follows: cereal, cotton, fallow, olive, viniculture, horticulture, vegetable, citrus fruits, leguminous plants, tobacco, oily seeds, and rice.

Because Hatay Province is under the influence of Mediterranean climate, every kind of agriculture crop grown in Turkey can also be grown here. Farmers in Hatay have 2,000 tractors to cultivate their lands, but this number must be increased up to a minimum of 4,000. As for the agricultural machinery and equipment: there are 1,400 subsoilers, 1,020 discsoilers, 1,850 cultivators, 1,440 cotton planters, 350 seed cereal planters, and many other kinds of agricultural equipment, but these do not meet the demand. In Hatay the plow is still used and animal and human power take the place of the motor to a large extent.

In the Hatay Province Technical Agricultural Directorate, there are 33 technical personnel (agricultural engineers and technicians), 28 administrative and assistants. All counties of Hatay Province are

included. In order to carry out the extension activities of the central county as well as the other nine counties 14 vehicles are available, 12 of which are already very old. We also have in the organization 18 selectors (seed cleaning machines), two tractors used on various extension activities and various other equipment.

In 1966 in Hatay Province the following agricultural extension activities were accomplished: In 9 counties (including many villages) 49 short courses (three days), called Agricultural Public Courses, were organized in order to increase the knowledge and skills of farmers. Before starting the courses of this kind village surveys are made by the county agents and specialists.

According to the results of the survey the specialist prepares a paper on the subject that he is going to discuss. If it is necessary he distributes a mimeographed paper on the subject or a summary. The course is started on the date set after obtaining the necessary information, extension equipment and demonstration materials. In these types of courses questions which may be asked by the farmers are answered by the specialists.

These courses are liked by many of the leading farmers who have had training in various agricultural subjects and by the untrained farmers as well. For example, in a village called Beşirbeyli where men are trained in grafting and fertilizing olive trees, they are asked to graft the trees in other villages or counties. Of course if these people want to do the job they are paid for it.

In 1966 for the first time in our Hatay Province, a course on care and usage of tractors was started covering two counties and six villages. It was continued for a month with the participation of 60 people. All who participated in the course found it very useful and interesting. Those who received a certificate at the end of the course were sought out to work on tractors usually earning 20 to 30 percent more than the regular price. The General Directorate of Agriculture spent from its budget 1,000 TL. for this course.

In order to increase the knowledge of the technical personnel and to prepare the county program, five technical one-day meetings were organized. In addition to these meetings two exhibitions, 210 demonstrations (method and results), five competitions and 110 field days took place. Three circular letters, 1 pamphlet on care of motors and tractors, and 45 news stories related to agricultural extension were

published in the local newspaper. Visits to farm families were 2,200 and a great number of individual farmer contacts were made and their agricultural problems discussed.

Along with the training of adults (men farmers), training of village women farmers are included in the program. At the beginning these activities were carried out very well but later because of the lack of facilities the desired level was not reached.

4-K Activities in 1966: In three villages 65 girls, and 85 boys for a total of 150 4-K members and 20 volunteer leaders worked on six different projects.

As is done every year, in 1966 a trip to a province, in this case to Samsun, was organized for the leaders and assistant leaders in order for them to increase their social, cultural and agricultural knowledge and attitudes. On this trip, a program studying cooperatives in the provinces was undertaken. At the end of this trip, with the leaders and the assistant leaders participating, activities for establishing five village development cooperatives were started. Only the bus fare was paid by the organization and the farmers who participated in the trip paid their own room and board.

#### Other Extension Activities

In 1960 chemical fertilizer used in Hatay was 1,500 tons and in 1966 it was raised to 45,000 tons. This increase in the usage of the chemical fertilizer is due to agricultural extension activities.

In the last six years the area where cotton is grown has increased by 20 percent while production increased 50 percent. Again agriculture extension played an important part by teaching the farmers the techniques of cotton growing, using good quality seeds, desirable cultivation and irrigation.

Many of the farmers accepted the idea of cultivating the land according to the kind of soil and the area. Of course this is done after having discussions with individual farmers. This way more than 2,000 hectares of agricultural land was protected from erosion, and more than a 10 percent increase in the production was obtained.

As a last example of agricultural extension activities influencing farmers, teaching better techniques, improving ways of living and

earning more money, I will give brief explanation of straw weaving done in three poor villages of Hatay Province. The influence on the farmers is positive and the results have been outstanding.

The project was carried out in the villages of Paslikaya, Karmanca, and Babayetir. In 1962 with the participation of 60 farm families it was started. Later on it included all the villagers. The project continued for three years.

The aim of the project was to make use of the leisure time of the villagers, to help them to earn money and to prevent the migration to other places. The first year, villagers are taught how to braid straw and various kinds of braids. The braids in meters are bought by the Antakaya Technical Institutes for Girls. In the second year the women worked on hand and beach bags. As the quality of bags improved the third year the selling procedure started. Last year TL. 120,000 was earned only from the straw weaving.

All the above mentioned developments are obtained because of the achievements of the agricultural extension program in the province.

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## THE SUCCESS OF "PROGRAM BUILDING" IN EAST PAKISTAN

BY

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Program Building is based upon training of government workers and farmers to develop their program solving ability by actually having each farmer report his problems in the order of importance to the agricultural workers. This work and training is just as practical and perhaps more important than teaching how to grow more rice, more fruit and more fiber.

As Program Building continued to develop in the field in East Pakistan, it could easily be seen that Basic Democracy officials, local government and public administrators must become an integral part of the rural development program, as well as the agriculture directorates.

Through the Program Building activities the farmer has learned to accept the guidance of educated outsiders who have shared the farmers' problems and helped them find solutions. These farmers can now make their own decisions administratively, technically, and structurally. The people themselves have become involved in planning and no more do the "privileged" and "educated" hand down jobs and commands to the farmer. This is the greatest change from the past community development attempts.

More leadership positions have been created in Program Building than ever existed among the traditional leaders. Many of the 4,043 unions have developed in excess of 80 volunteer workers at the farmer level. This means that more of the so-called underprivileged

workers are being trained and added to the much needed number of new technical leaders.

As union council elections are held, more of the active past sub-committeemen who have proven their place in technical development have replaced the traditional leaders who were leaders by birth and status only. Farmers have learned to accept trained technicians and local administrators to support their local programs and the technicians have learned to work with the farmers and recognize their needs.

Program Building has resulted in the following:

1. GOEP has accepted Program Building as the rural development program in the province and it has been implemented throughout the province of East Pakistan.
2. It has unified the development program involving all pertinent departments in the province: Agriculture, Livestock Services, Fisheries, Marketing, Credit Agencies and Cooperatives, Forestry, Health and Sanitation, Education, Home Making and Basic Democracies. These agencies must participate by government order.
3. By government order, each of the 4,043 unions in the province has organized and activated Union Agriculture Development Committees with one farmer member from each ward within the union plus three members of the union council. The union council chairman is an exofficio member and the union assistant is a secretary member.

In addition to the Union Agriculture Development Committee, numerous subcommittees are organized. These subcommittees act upon the different problems arising from the farmer's fact finding, whereupon the subcommittees present an action program to the Agriculture Development Committee to be implemented by the Union Council with the help of all committeemen involved. Each union will have from 50 to 150 volunteer workers on the various problems and projects.

Subcommittees in the various unions are listed below:

- |                                    |  |
|------------------------------------|--|
| a. Crops Subcommittee              | j. Health and Sanitation Subcommittee        |
| b. Horticulture Subcommittee       | k. Small and Cottage Industries Subcommittee |
| c. Irrigation Subcommittee         | l. Recreational Subcommittee                 |
| d. Communication Subcommittee      | m. Home Making Subcommittee                  |
| e. Animal Husbandry Subcommittee   | n. Marketing Subcommittee                    |
| f. Fisheries Subcommittee          | o. Farmer Mechanization Subcommittee         |
| g. Forestry Subcommittee           |  |
| h. Credit and Finance Subcommittee |  |
| i. Education Subcommittee          |  |

A team is created in each union of the farmers who are voluntary agricultural workers. These men work much harder than anyone else because it is their life.

With 4,043 unions organized there is a total of 323,440 volunteer workers on agriculture and rural development throughout the province. At present, Program Building training is given in each of the eighteen districts in East Pakistan. It is now estimated that by 1968 every union of the 4,043 unions will be organized.

Many problems yet remain to be solved and it will take a long time but the farmers, administrators, technicians and government workers have a good working knowledge of what they face. They can talk intelligently about their problems and approach them in an objective manner.

It is up to the rural people of East Pakistan to continue their already successful approach if they are to become selfsufficient in food within the next three years. These people have developed very rapidly over the past five years with little technical assistance except a good foundation for starting their work plus some good common sense. Through their agricultural officers and other departmental officers they have achieved many things.

- Each year for the past three years, East Pakistan has exceeded the last five year period in rice production by 3.2 million tons per year.
- They have formed blocks of one million acres of improved practices which more than doubles the provincial average in yields per acre.

- Over 200,000 result demonstrations with over one and one-half million farmers attending have yielded an average of over 40 maunds per acre compared to the provincial average of 15 maunds per acre before this work started.
- Farmer subcommittees have tested new varieties of vegetables, soybeans and peanuts, all of which are very essential to the economy and health of the province.
- Over 2,000 night schools for illiterate adults with 150,000 attending have been started by the farmers without any financial help.
- Thousands of commercial plantings of fruits have been started.
- Power pumps have been installed as rapidly as they can be supplied with a huge demand for more power pumps.
- Deep tubewells for irrigation involving from 200 to 300 farmers in each group have been organized. This is far beyond what can be supplied within the next few years.
- Thousands of miles of farm to market roads have been built both through works programs and by volunteer labor.
- Organization of mass immunization campaigns for millions of cattle and poultry have been organized by the Animal Husbandry Department.
- Mass immunization campaigns for thousands of people have been organized by the Health Department.
- Thousands of unproductive fish tanks have been reactivated. It is possible to produce one ton of fish per acre of tank as has been demonstrated hundreds of times by fisheries subcommittees. There are 267,000 acres of such fish tanks in East Pakistan.
- The Forestry Department has distributed three million young trees through forestry subcommittees.
- Mass credit projects have been organized for mass lending from the Agriculture Development Bank through credit and finance subcommittees. Defunct cooperatives in many unions are becoming reactivated through efforts of credit and finance subcommittees. Storage warehouses for credit, storage, marketing and savings program have been started by credit and finance subcommittees in cooperation with marketing subcommittees.

In conclusion, it would be difficult to say that a farmer who produced 36 maunds of rice in 1960 and produced 360 maunds in 1966 by use of better seed, fertilizer, pump irrigation with three crops per year, preventive plant protection, improved inter-cultural methods and improved harvesting methods, would ever go back to the old lazy methods of production. The answer is no and justly proven so.

TRAINING REQUIRED FOR PRACTICAL EXTENSION  
AT THE FARMER LEVEL

BY

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AND

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It is indeed a pleasure and privilege for me to participate in this Agricultural Extension Conference and to address such a distinguished group of Agricultural Extension officials. I feel right at home in such a setting because first I have been a farmer myself and grew up on a farm in Oklahoma where I was a member of rural youth organizations known as 4-H Club and Future Farmers of America, second I have worked with rural education and development programs most of my life and third I have had the privilege of living and working in three countries other than my native one and those three countries are the three CENTO countries of Iran, Turkey and Pakistan.

It is my assignment here to-day to discuss with you some of the aspects of training required for the accomplishment of practical extension work at the farmer level. I previously stated, in my report of a preliminary survey for this conference, that "Agricultural Extension Education Services, to be effective in increasing agricultural income and improving living conditions of rural citizens, cannot operate in isolation but are dependent on coordination among many agencies and services." And I also stated that "Agricultural Extension should be

viewed as a total program including the extension process of providing to the farmers not only the "know-how" but also the services, supplies and equipment which make it possible for the farmers to operate "doing programs." The main objectives of this conference as expressed in the preliminary program are to help increase production and efficiency and increase farmer income.

To start my discussion on training required for operating practical extension programs to accomplish the objectives of increased farmer income and improved well being of farm families I would like to make three assumptions which I believe are important keys to successful agricultural extension programs. First agricultural extension programs must be "People Programs" and not "Government Programs", second agricultural extension is primarily and essentially an educational process, and third the farmer must be the central figure in the extension program. Agricultural extension programs to be successful must be people-oriented programs with the star actor being the farmer. Programs should be developed by farmers with the help and assistance of governmental extension workers to meet the need of the local community. Success in increased agricultural production can only result from action which takes place on the farms of any country. The farmers, who might be termed the managers of the countries' agricultural production factories, must undergo changes in behavioral patterns brought about by educational processes if we are to maintain an enduring program of increased agricultural production. Methods used in extension programs must be educational and not compulsive nor authoritative.

Everyone agrees that we need increased agricultural production. Much emphasis has been placed on a "Grow More Food" campaign in Pakistan. Increased food production is essential in all countries not only to better meet the needs of the present population but to insure sufficient food for today's rapidly increasing population. In all countries of the world, and most especially in those developing countries which still have large numbers of people with low cash incomes, we need to give added attention to better nutrition programs. Increased agricultural income is also essential both to improve the well being of farm families and to increase their purchasing power whereby they are able to create the necessary market to stimulate industrial production. Agricultural production is also one of the important means of creating needed foreign exchange by the countries represented here today.

How do we get increased agricultural production? I maintain that an increased agricultural production program must be essentially an educational program. Education not in the terminology in which it is sometimes used to mean the mere acquisition of a certain body of knowledge. Education in the Agricultural Extension meaning indicates not only acquisition of knowledge but involves understanding and changes in abilities and attitudes. Let us use the definition of education, which has been widely accepted by extension workers, that education is the production of changes in human behavior. Acceptance of this definition of education dictates that we must develop learning experiences in which the learner is personally involved. This concept of education dictates further that the only valid means of evaluation of results of educational or training programs in agricultural extension is through the changes in human behavior of the trainees. I once heard education defined as that which remains after the pupil has forgotten everything he was taught. This definition I think has some merit and is probably essentially correct if we equate what is taught with the mere facts presented to the learner and then equate that which remains with the understanding and changed ideas and attitudes of the learner. Training of an agricultural extension worker then involves not only his acquisition of increased agricultural knowledge but involves his understanding of how to use this knowledge to assist farmers in increasing agricultural production. It also involves changes in interests, ideals, habits, and attitudes of the trainee. If we send an agricultural extension worker to a training program and on completion of the program he returns to his position and operates in exactly the same manner he did before attending the training program then no education has taken place.

What knowledge do we have to help us increase agricultural production? There is no lack of scientific knowledge which if properly applied would result in tremendously increased agricultural production. A tremendous gap exists between agricultural technical knowledge known and the agricultural practices adopted in the fields and on the farms of cultivators. Communications between countries have improved to the extent that significant scientific discoveries are available to the scientists of every country in a relatively short time. However, knowledge by a few of our highly educated people does not necessarily result in changed behavioral patterns of the masses. As an example during the past year I stopped to talk with a farmer harvesting his rice crop. When asked about his rice crop he stated that it was very poor this year due to factors beyond his control. When asked if he thought application of fertilizer might have improved his yield he replied that he would not consider using commercial fertilizer as he was sure it

would poison his soil. In spite of all the body of agricultural knowledge available extension education programs had not as yet bridged the gap between what was known by agriculturally trained personnel and the understanding, attitude and performance of this farmer. Extension programs to be effective must through extension training manage to bridge this gap between knowledge and performance; between the known and the practiced.

Let us consider the question of who needs training if we are to accomplish the objectives of increased agricultural production, improved well being of rural families and a bridging of the gap between available knowledge and the utilization of this knowledge on the farms to increase agricultural production. As I have previously stated the key to increased agriculture production rests with the farmer himself. Our goal then needs to be education and training of farmers to increase their knowledge, their understanding, to change their attitudes and opinions and to result in their adoption of improved agricultural practices which will lead to an improved agriculture.

We need improved education and training of agricultural producers. We need to educate both the man behind the plow and the community leaders who as voluntary extension workers are often instrumental in securing adoption of improved practices. Much of the training of the farmers is on an informal basis and is directly dependent on the professional extension worker. I am using professional worker to distinguish from a voluntary community leader, who assists with extension work, and am applying the term to any paid worker of any governmental agency involved in extension work. I shall therefore give major attention in this discussion to the training needed by the professional agricultural extension worker. An agricultural extension service can be no better than the education and training of its personnel. We should therefore be concerned with the education and training of all professional agricultural extension workers from the farmer level worker up to the top administration of the extension service.

When should extension workers be given training? It is easy enough to divide needed training times into two major periods. First the education and training needs of persons prior to employment as agricultural extension workers which may be termed pre-service training. Second, education and training of extension workers after their employment which might be termed in-service training. Certainly we need to insist that extension personnel be selected with the best available education and training. However, I believe extension services

have a responsibility also in the pre-service training of extension workers. At least they must become involved and determine and make known to the training institutions what beginning extension workers "need to know" and "be able to do" to carry out effective programs of agricultural extension.

We must insist that professional extension workers be educated to the highest professional academic level affordable by the society in terms of (1) available resources for training of people, (2) the quality of people and educational level of personnel which are available from the general educational system of the country and (3) how long we can wait with action progress to increase the training of workers.

A training program for preparation of an agricultural extension worker must include:

1. A general educational program with emphasis on knowledge and understanding of the basic sciences.
2. A program to insure a broad background of agricultural knowledge. The extension worker must be familiar with the general agricultural situation of the area in which he is to work and must possess general understanding of agricultural procedures, processes and their relationships with other segments of the economy.
3. The extension worker must be provided with specific agricultural knowledge whereby he will contribute to increased agricultural production. He must know the procedures necessary for an efficient agriculture. The primary requisite of an agricultural extension worker must be a knowledge of information to extend. I have previously mentioned that we must bridge the gap between technical agricultural knowledge available and agricultural practices on the farms. In this respect we might say the agricultural extension worker is a bridge builder. It is the extension worker's job to bridge this gap between knowledge and practice. A bridge, a building, or an extension organization can be no stronger than the foundation on which it rests. The foundation of an agricultural extension program must be the "technical knowledge," "know how" and "ability to do" of the extension worker. We must insist on agricultural extension workers with highest possible level of education in agriculture.

4. The extension worker must be trained in educational principles. Agricultural extension is essentially an educational process. The worker must have an understanding of how people learn and a familiarity with the principles of leadership development. He must have knowledge of effective teaching techniques and be familiar with how he can influence changes in human behavior through adoption and diffusion processes.
5. A program of training to prepare agricultural extension workers must be a "learning to do" program. The extension worker must be able to perform agricultural practices and be able to demonstrate his agricultural knowledge in a usable manner. The only efficient way of "learning to do" agricultural practices is by "doing." Training programs for agricultural extension workers must emphasize the ability to do as well as general and specific agricultural knowledge.
6. The training program for the agricultural extension worker must create the willingness to do as well as the ability to do. There is often a cultural and educational gap between the extension worker, who has had the opportunity for education and training for a government job in agricultural extension, and the farmer with whom he works. The proper attitude must be created for working with farmers. The extension worker should never equate lack of formal schooling with ignorance on the part of farm cultivators. The extension worker must be imbued with the attitude of a learner as well as a teacher.

About a year ago I was talking with an agricultural extension educator in one of the Asian countries. The university, where this man was head of the agricultural extension department, was preparing to graduate its first extension workers at the bachelor's degree level. He stated that some people thought that persons with a college degree would be overtrained for working with farmers. However, this educator did not share this view, and had no doubts about his pupils' willingness to go out on the farms and work directly with farmers. He had confidence that his training program had developed his pupils with not only the agricultural knowledge needed but also the ability and willingness to demonstrate their knowledge. He had confidence that his training program in agricultural extension had developed the proper attitudes and changed behavioral patterns in his students to make them

willing and effective agricultural extension workers. We must develop educational training programs for extension workers which will inspire the confidence of both extension educators and extension administrators in the performance to be expected from the trainees of these programs.

In-service training of agricultural extension workers is an important and necessary function of the national extension service if it is to live up to expectations in performing its role of increased agricultural production and improved well-being of rural families. The agricultural extension organization often has to accept beginning employees without the education and training which they would like to have. These beginning workers in agricultural extension are most often placed in the key role of farmer level workers. The whole effectiveness of the extension program is largely dependent on the effectiveness of these workers at the farmer level. Regardless of how well an agricultural extension worker is trained today he must acquire additional education, training and know-how if he is to be an effective agricultural extension worker five years from now.

#### IN SERVICE TRAINING

I would like to present the following ideas on what I believe in-service training programs for agricultural extension workers should be.

1. In-service training programs should be carefully planned, long range programs. They should be a part of a coordinated national program to help all agricultural extension workers acquire and keep up-to-date on the knowledge and ability to do required for carrying out their agricultural extension jobs efficiently.
2. In-service training programs should have the support of the central governmental extension agency. Incentives should be provided to workers for engaging in training programs which result in increased effectiveness in working with farmers.
3. In-service training programs should be based on definite goals and objectives. A careful determination should be made of what we want the worker to know and be able to do and we should determine content of training programs accordingly.

4. Programs must start where the trainee is and what he knows. New knowledge to be meaningful must relate to trainees' past knowledge, conditions, ideas and concepts. We learn by relating new knowledge to things already known. Personal development of the trainee should be considered an important part of any training program.
5. Training programs must provide motivation for the trainees. They must create the desire and develop the need for the knowledge and learning experiences provided in the training programs. They must provide trainees with concepts of how to use knowledge and "ability to do" acquired in the training programs for improvement of job performance.
6. It is necessary to provide meaningful learning experiences in which the trainee is personally involved. Providing information is not enough. The more the trainee becomes involved in the processes of the training program the greater will be the values of that training program to him and his future activity.
7. In-service training programs should follow the principle of "learning-to-do-by-doing." If we want "doing" programs and not "paper" programs of agricultural extension our workers must know how to do. The only practical way to teach people to perform agricultural operations is by giving them an opportunity to practice doing those operations.
8. It must be recognized that changes in understanding, attitudes, and ideas are of equal importance with increased agricultural knowledge in training programs for agricultural extension workers.
9. Provide opportunity for trainees to practice what they have learned in the field on completion of their in-service training programs. Knowledge on the part of the extension worker becomes a useful tool and contributes to the central objective of increased agricultural production only on its application to problems on the farm.
10. In-service training programs must provide for increased understanding and improved skills in the principles of helping people develop and execute their own self-improvement programs.

11. Extension services need to provide trainees with basic facilities and equipment, instructional aids and other supplies needed to convert what they have learned in their training into action programs in the field.
12. In-service training programs should be subjected to careful, continuous evaluation. Determination of the success of a training program should not be based on either (1) the trainees' ability to answer questions at the end of the program, nor (2) his expression of whether or not he had a good time at the training school; but rather on changed behavior in his job as an extension agent and its result in an improved extension program.
13. Organized in-service training programs should be developed for all levels of agricultural extension workers. Every worker should be involved in organized in-service training at least every few years.
14. Quality should take precedence over quantity in developing in-service training programs for agricultural extension workers.

I propose to conclude my talk here today with an eight-point challenge to agricultural extension workers in the CENTO countries. I want to address this challenge to all agricultural extension workers but most especially to the extension personnel in positions of leadership and responsibility because they are in a position to be more influential in bringing about changes.

#### MY CHALLENGE TO AGRICULTURAL EXTENSION WORKERS

1. Insist that all new employees of extension services have the highest level of professional training the country can afford.
2. Involve professional extension personnel in the pre-service training of workers. Most of the pre-service training of extension workers can probably be left to existing educational and training institutions but the extension service should assist in determining the content of this instruction to assure that the trainees not only acquire the knowledge but also the "Know-how to do" and the "Willingness to do" needed by effective agricultural extension workers.

3. Provide a continuous program of in-service education to agricultural extension workers. Extension workers must continually be provided with new up-to-date agricultural information to keep abreast of the rapid technological changes taking place in today's agriculture. Education and training received by an agricultural worker in rice varieties five years ago is not very appropriate today. As a young man in vocational agricultural courses I learned to raise corn (or maize as it is more often termed in the Middle East). I not only studied corn production but also practiced the latest cultural methods recommended at that time in the actual production of corn. I would be a totally ineffective corn producer today if I relied solely on information I acquired in my pre-service agricultural educational training. The extension worker must be the leader in adopting modern agricultural methods to increase agricultural production.
4. Provide agricultural extension workers with programs of instruction, training and practice in utilizing modern methods and processes of education. Not only should training programs for agricultural extension workers be concerned with technical agricultural knowledge but should also emphasize how to work with people. Training programs need to include methods and procedures for transforming technical knowledge of agriculture into action on the part of farmers for increased agricultural production.
5. Evaluate programs on the basis of changed behavioral patterns of people. Let the central theme of an evaluation of the effectiveness of the extension worker be how well he has been able to develop an "organization of people for action program." This organization effort of which I speak has gone under many different names. I am not particularly concerned with whether you choose to call it a Program Development Committee, a Village Council, a Cooperative Organization, Rural Development Program, a Union Council or any one of a dozen different names. The important ingredient of the program is the coordination of the efforts of rural people in the planning and conducting of programs of self-improvement. Let us recognize that the effective programs of extension education are going to be people-oriented and will be programs actively engaging rural people in cooperative efforts to carry out programs planned by themselves.

6. Operate training programs for agricultural extension workers which will insure that every extension supervisor can perform the jobs required of any of his subordinate workers. Every farmer level extension worker must have the ability to go on the farms and demonstrate improved agricultural practices. It is of even greater importance for the supervisor of the farmer level employee to be able to go to the farms and demonstrate improved agricultural practices, both for education of farmers and for on-the-job training of the farmer level workers. The higher the level of the extension worker the greater should be his ability "to do" and to demonstrate agricultural practices as well as having a greater knowledge of agricultural science and educational practices.
7. Do all possible to provide the farmer level extension worker with the services, supplies, equipment, educational devices and technical backstopping needed for the operation of effective field programs of agricultural extension. We need not only to supply these ingredients to the farmer level workers but must assure that we have sufficient on-the-job training and supervision to guarantee effective use of these inputs in the extension program.
8. Work diligently to increase the coordination of the activities of research, teaching, and extension to provide a freer exchange of information. My final challenge to you as agricultural extension personnel is that you will go more than half-way in coordinating your programs with all other organizations charged with the responsibility for helping to develop agriculture.

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## WATER MANAGEMENT IN IRAN

BY

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The irrigation water supply in Iran really constitutes an important limiting factor in the agricultural economy of the country as the total tillable land area is actually too great compared to the total available water supply. Immense tracts of land have been left untilled and arid.

The farmers are unable to make use of available water supply. Substantial amounts of surface water runs into the sea unused through the existing network of rivers and qanats, especially in winter and spring. Even a great portion of irrigation water available in summer goes to waste being inefficiently used in the existing system of canals, ducts and aqueducts, as well as on fields and farms.

### GOALS AND OBJECTIVES OF WATER MANAGEMENT

The first goal is to teach the farmers better and proper methods to use in land preparation with special attention paid to water economy. Then it is necessary to provide and locate other abundant sources of irrigation water supply through:

- a. reclamation of existing qanats, and
- b. drilling new irrigation wells, deep and shallow, as required to develop agriculture with the actual participation of the farmers.

The State must create and reconstruct the diversion and reservoir dams required to:

- a. preserve runoffs and surface waters going to waste in the winter and spring rainy seasons
- b. irrigate dry lands and lands with lower rainfall, and finally
- c. bring more tillable arid lands under cultivation.

#### Technical, Financial and Extension Methods

Necessary research measures have been adopted by the existing schools of agriculture and the Department of Agricultural Engineering of the Ministry of Agriculture, with results being taught to the farmers through the services of the extension agents and use of extension methods and techniques.

Surveys and studies conducted so far on the State Experimental Farms have covered the following points:

- a. estimating irrigation water requirements for wheat, cotton and sugar beets
- b. determining the best interval to be observed between applications and replications of irrigation water in the case of the crops mentioned above
- c. estimation of actual water requirements for each application of irrigation water in respect to the same crops
- d. research on the actual dates best suited to commence and terminate irrigation applications in the case of these crops
- e. estimating the actual water requirements per hectare
- f. computing water efficiency tables.

Long term loans have been extended to the farmers through the State Agriculture and Development Banks as well as the semi-State Central Cooperative Organization to:

- a. reclaim and recondition existing faulty and defective qanats and canals
- b. drill deep and shallow water wells, and
- c. purchase and install water pumps required for irrigation.

Diversion and reservoir dams and canals, already erected by the State on a fairly large scale, are still being increased in number each year and constitute quite a significant source of ample irrigation water for the old and the newly developed farms and fields of the country.

## RAINFALL IN IRAN

Iran lies on a geographical belt stretching between the latitudes of 25 and 40 degrees of the northern hemisphere and has great variations in elevation. Iran has been divided into the following three rainfall zones:

1. The Inland Plateau of Iran
2. The Caspian Coasts and Plains
3. The Gulf and Omman Coasts and Plains.

### The Inland Plateau of Iran

The greatest portion of the surface area of Iran lies within this continental plateau, and is sub-divided into two sub-zones:

1. The mountainous regions and the in-lying plains and valleys
2. The great inland deserts, consisting of:
  - a. The central inland desert, and
  - b. The Lute Desert.

The mountainous regions and the in-lying plains and valleys - The differences in temperature of this sub-zone are great, high in the valleys and quite low in the mountains within short distances. The peaks and the higher altitudes of the sub-zone prevent the clouds from moving downwards and snow covers the mountains in winter and thawing snow waters feed the rivers and the qanats and wells in spring.

The rainfall precipitation in this sub-zone varies from 200 to 500 millimeters during the year and provides the main source of water supply required to cultivate dry farm wheat and barley on the hills and fields adjoining the mountains.

Irrigated wheat is only grown inside the in-lying valleys where the rivers and qanats provide the source of irrigation water. The greatest portion of rainfall however occurs in winter. Other cultivated crops, including cotton, sugar beets, tobacco, pulses, cereals, truck crops, and vegetables, as well as fruit farms and orchards must also be irrigated, subject to the availability and adequacy of irrigation water.

The great inland deserts - The great inland deserts constitute one-third of the entire land surface of the country and still remain as an untilled and devastated piece of sandy wasteland. Being devoid of elevation, no clouds can be stopped to create a reasonable precipitation which actually does not exceed 20 mm a year. Drilling wells or qanats would serve no purpose in this area.

The Caspian coasts and plains - This is the belt that lies between the Caspian Sea on the north and the Alborz Range of Mountains on the south. Eastward along this belt the humidity is borne on the clouds coming from the Mediterranean Sea. The Black Sea and the Caspian Sea constitute the main source of snow and rainfall precipitated in this area. This is because of the fact that the Alborz Mountains, being quite high in elevation, provide a barrier to the movement of these clouds southwards above the Range and over to the desert plateau. The range decreases the temperature of the clouds and saturates them with moisture that later falls as rain or snow in the adjoining area. This explains the high average rainfall (1,000-2,000 mm per year) to the north of this range and all along the western coast of the Caspian Sea.

All the local crops cultivated here are dry-farmed with the exception of paddy which must be irrigated and is actually fed through the local rivers and the Sefeed Rud River.

Further to the east along the belt less rain falls, until it gradually decreases to 400-500 mm per year at the extreme east end of the belt. Wheat, barley, pulses, cereals, tobacco and oil seeds are cultivated in this area with dry farming. Only paddy is irrigated here and fed through the local rivers. On the extreme east end of the belt, there is a fertile plain where cotton does quite well but occasionally demands several applications of irrigation water. This water is furnished by the local rivers and irrigation wells, some of which are artesian.

The Gulf and Omman coasts and plains - This strip stretches along the southern coasts of Iran east to west and is hot and dry. In spite of the fact that the strip adjoins the Persian Gulf and the Omman Sea, all

the prevailing sea winds blow longitudinally east to west or west to east seldom inland towards the north and the adjoining coastal plains. Some dates, citrus fruits and other tropical crops are grown here and in some years wheat and barley are produced. It follows that available irrigation water supply is widely variable throughout the country. Because of this, immense tracts of fertile land have been left untilled and arid especially within the inland plateau and along the coasts of the Persian Gulf and the Sea of Omman.

To improve the situation, long and short term state loans are extended to the farmers and coops to reclaim the existing qanats and erect new ones. Loans are also used to finance the drilling of deep and shallow wells. The construction of diversion and reservoir dams is financed by the State.

However, there are areas where no possible irrigation water can be made available. Use of sweetened sea water along the southern coastal plains of the Persian Gulf and the Sea of Omman, through highly developed and modern schemes, is under survey. This should help develop the area tremendously.

It is incumbent upon the extension agents to save all available irrigation water, by constantly watching the behaviour of all the farmers and teaching them proper practical irrigation methods and techniques. Otherwise our children may find it difficult to provide their own food supply when the population of the country increases.

#### THE EXTENSION ORGANIZATION AND IRRIGATION

The Extension Organization is in charge of the irrigation projects and is required to teach the farmers the following:

1. Measuring exact amounts of irrigation water used on each farm
2. Land levelling for irrigation
3. Proper days and dates of irrigation
4. Actual amounts of irrigation water to apply
5. Soil moisture estimation by "feel"
6. Practical skills and procedures required to apply irrigation water
7. Irrigation water requirements of specific crops
8. Farm irrigation structures
9. Draining the waste water
10. Irrigation water application methods and techniques.

## Actual Irrigation Methods Used in Iran

1. Border irrigation method
2. Basin irrigation method
3. Furrow irrigation method
4. Sprinkler irrigation method

The border irrigation method - This is the method generally used on level lands with gentle slopes that might be prepared by levellers or graders. Where this method is used, the land, thus levelled, is ridged and divided into strips 5 to 15 meters wide and 50 to 200 meters long depending on soil permeability and slope with ridges as high as 30 to 60 cms. Irrigation water is then applied to each strip at the rate of several liters per second until the water covers the whole strip in the form of a thin sheet till it reaches the opposite end of strip. The flow is immediately stopped a few meters before the water actually reaches the far end of the strip. The border irrigation method is generally used to irrigate wheat, barley, alfalfa and other grasses.

The basin irrigation method - This is the method generally used on quite uneven lands of higher slopes. The land is usually first divided into several irrigation plots and then levelled and made even to make the water stand or flow evenly all over the plot. The use of this method avoids soil erosion and is best adapted for fruit farms and orchards and similar crops cultivated in Iran.

The furrow irrigation method - This method is generally employed on level lands of a gentle slope where the land is first levelled, if necessary, and then ditched and ridged out with a furrower, into long narrow ditches called "turroees" or "corrigators" with long flat ridges along them where the plant is seeded and cultivated. Irrigation water is first run into the head ditch and then on to the furrows through the irrigation ditch, or a number of plastic syphon tubes. The surplus water from the furrows is finally fed into the waste ditch at the opposite end of the furrows, parallel to the head ditch. The waste ditch serves as the head ditch for the furrows and plots laid out lower down thus supplies them with the irrigation water required. The length of the furrows usually varies from 70 to 200 meters depending on soil permeability and slope.

The border irrigation method is the method that has been adopted in Iran within the last few years to irrigate fruit farms or orchards and all other crops with the exception of rice. It has proved to be especially favorable for alfalfa, cotton and sugar beets and has already facilitated the use of the mower in cutting the alfalfa crop. It increases

the use of farm machinery required in the weeding, crust breaking and pest control operations.

The sprinkler irrigation method - This method has been introduced within the last few years to irrigate some of the sugar beet and cotton fields. It requires a high initial capital to provide for motor pumps and tubes and thus becomes a costly project. Only wealthy farmers have succeeded in making use of this method. It is applicable on newly developed soils and lands where no levelling is required and the irrigation water is supplied through rivers and pumps.

It must be pointed out, here, however that the application of this method is restricted to certain valley lands and plains where heavy winds frequently blow. The winds accelerate moisture evaporation from the sprinklers and reduce the efficiency of the system.

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## WATER MANAGEMENT

BY

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### INTRODUCTION

The total area fit for cultivation in West Pakistan is 61 million acres. Thirty nine million acres are cropped and of these 33 million acres are irrigated by various systems. The rainfall in West Pakistan is very scanty. In most of the plains the total annual rainfall varies from 5 to 10 inches and in the arid zones from 5 to 7 inches.

The amount of precipitation is very short of actual crop requirements and therefore cultivation depends upon artificial systems of irrigation such as canals, tubewells, Persian wheels, and other systems like Jhara and Jhalar.

### WATER MANAGEMENT

Economical use of available water for increased crop production requires reliable information pertaining to water requirements of various crops. Of all the irrigation systems, the most important is the canal system which is responsible for irrigation of about 80 percent of the total irrigated area or about 60 percent of the total cropped area. The other important source for irrigation is the tubewell. Presently we have about 37,000 tubewells in West Pakistan and it is hoped that 40,000 more will be installed during the next three years. The old system of irrigation is the open well which is still an impor-

tant and sure source and exists mainly near the rivers. Economical use of water in West Pakistan is very necessary because water in the eastern rivers of West Pakistan is controlled by the Indian authorities.

## RESEARCH WORK FOR MANAGEMENT

The bulk supply of irrigation water is through the canals which are run under the supervision of the Irrigation Department which as a commercial concern always desires to spread the available supply of water over a maximum area. The cultivators, for reasons of their own, desire to concentrate on a smaller area. Under the circumstances there is a need for scientific handling of the problem of irrigation. The irrigation authorities as well as the Agriculture Department have been making efforts to study the problems since 1902 but a regular system was not started until 1940, at Lyallpur. The irrigation water provided for the research area was elevated to a tank sixteen and one-half feet in height from which, under controlled conditions, it passes through five measuring tanks in the area. Each tank is four feet from the ground level and measures 10x10x4 1/2 with a capacity of 2,500 gallons. The tanks were well scattered on the area (100 acres) and were connected with a concrete channel 670 feet long.

### Important Findings of Research

The irrigation authorities have concluded that the water can be used more economically by dividing the fields into small plots of one-eighth of an acre. It was also decided that the number of waterings required for a crop differed in different colony areas and on different soils. It found that in certain parts of West Pakistan, farmers were using more water than actually required for their crops. The agricultural experts also said that the number of waterings could be decreased when deep harrows were used. It was also maintained that in the case of cotton, the number of irrigations could be reduced by sowing the crop in lines and by hoeing the crop at intervals (six times). In the case of sugarcane it was found that 14 percent of the water could be saved by small sized plots.

## PLANNING FOR INCREASED PRODUCTION

The climate of the irrigated area throughout West Pakistan is quite suitable for good crops. In spite of this Pakistan does not

produce enough to feed its growing population. Important plans have been made to remedy these conditions.

Long range efforts - Construction is under way to irrigate 17 million acres more in the near future. Forty thousand more tubewells are being installed to make use of the subsoil water wherever it is fit for crop production. Installation of more open wells is planned. More production of fertilizer within the country is anticipated.

Short term measures - Short term solutions are meant to increase crop production on the lands now being cultivated. This is being done by the cooperation of the cultivators who are being educated as to - when to irrigate - how much water to apply - what method of irrigation is the best.

Interval for irrigation - A series of trials have been conducted to ascertain the actual water requirements of important crops in the Agronomy Section of Ayub Agricultural Research Institute, Lyallpur. The results indicate that heavy irrigation of 4.5 to 6 inches after 15 days and light irrigation of 3 inches after an interval of 10 days is more suitable for our crops and this finding is being demonstrated to the cultivators at their farms under the Model Farms scheme where all sorts of agricultural recommendations are demonstrated to the cultivators who supervise their own farms and with the technical advice of the extension service of the Agriculture Department. The recommendations have been very popular among the cultivators. Model Farms which are being established at Union Council level will also give demonstrations.

Size of the plot - Our research workers have found that there can be a saving of ten percent if the bed size is reduced from one-half to one-eighth acre. This practice is being demonstrated on the Model Farms.

#### Water Course Construction

It is the responsibility of the government to provide adequate structures for distribution of water but the growers are required to improve the water course and to minimize the losses of irrigation water by proper maintenance. It has been observed that straight, evenly laid out ditches at uniform distances of 100 feet can save water. This practice was demonstrated at official and semi-official farms and subsequently on the model farms of the progressive

growers. The demonstration has been so popular that the model farms are being provided with this system of water courses and the Extension Service is so well versed in the demonstration that all melas and exhibitions contain a lay-out of this design of water course. It is now the exclusive responsibility of the Extension Service to educate the cultivators and also to cooperate with them in the lay-out of this design on their farms. These recommendations are prerequisites for installation of model farms, which presently are developed at Union Council level with the cooperation of the cultivators.

### Defective Irrigation

Defective irrigation results in poor crops and water logging. The growers are educated to make economical use of the water. The problem is being tackled in West Pakistan by the active cooperation of the cultivators and the government. Water logging is being checked by surface drainage systems as well as a series of tubewells for keeping surface soil dry.

### Evaporation

The agronomy department of West Pakistan finds that the application of mulch especially for the sugarcane crop saves one or two irrigations during the hottest months when the water requirements for the crops are comparatively greater. The Extension Service has demonstrated the application of mulch on the cultivators' fields and they are fully convinced of the usefulness of this method for saving irrigation water. This is a part of the Extension Service training.

### Levelling of Fields

Unlevelled fields require much more irrigation to raise a good crop. It is therefore important that the fields are properly levelled.

### Soil Problems

The nature of the soil is also a pre-determining factor for the quantity of water needed to increase crop production. If there are known salts more water is required for leaching the soil. Usually the soils in West Pakistan are salty and rainfall is scanty. Necessary washing of the salts by application of more irrigation is essential. To remove the leaching water sub-surface drains are necessary and mutual cooperation of the cultivators and the government to build trunk drains is essential.

## Cropping Patterns

Cropping is an important factor in increased production. Cropping patterns are selected for each illaqa in view of climatic conditions and the availability of irrigation. The cropping patterns are first demonstrated at the government operated farms and later the recommendations are passed on to the cultivators through the Extension Service. The extension workers educate the farmers and induce them to adopt the requisite cropping pattern on the demonstration farm. They in turn educate other farmers as to the benefits of improved cropping patterns.

## Rotation

Crop rotation not only maintains the fertility level of the soil but also saves irrigation water. The rotations are worked out by research workers as well as extension workers at departmental farms and the useful ones are adopted by progressive cultivators on other farms. This practice has been very popular even among those cultivators who have not made proper lay-out of their model farms.

## Capital Investment

In irrigated areas where capital investment in the development of land is very high, the government helps the cultivators by granting subsidies for the installation of tubewells and levelling of fields. A considerable amount is being spent to import tractors and bulldozers. With the improvement of the financial position of the cultivators there are many who intend to have their own machinery for levelling, harvesting, etc.

The government of West Pakistan through the courtesy of the Ford Foundation is demonstrating heavy machinery for levelling, sowing and harvesting. The demonstration has been made on several occasions and cultivators from different parts of the West Pakistan have been invited to see the demonstration of the machinery at Yousafwala near Sahiwal in the Punjab. The field staff is also being trained in the operation of the machinery.

## Economical Holdings

Proper measures need to be taken for farming optimum economical size holdings. The small fragmented holdings are being united in the

Settlement Scheme in various districts in West Pakistan to make better use of the available irrigation water and soil.

### Credit Facilities

Through the Agricultural Development Bank the Pakistan Government is advancing liberal credit to growers for the development of their land by installation of tubewells and other machinery. To achieve the most efficient use of water, especially in water deficit areas, it is necessary that the supply of irrigation water be on volumetric basis. Presently water is supplied on the basis of area cropped which provides no incentive to the cultivators for economical use of water.

### Communications

To develop and exploit sub-soil water by installation of tubewells, the provision of electricity and better communications are essential. Under the present communication system, roads are being constructed on a self-help basis by the farmers. Development of electricity is being done by the West Pakistan Government.

### Markets

The improvement in the market system is also an important factor in the increase of field production. Under the existing market system, the middlemen get maximum benefit. The Extension Service has been very helpful in educating the cultivators as to quality production of their crops but even so improvement in the marketing system is essential to ensure better prices to the cultivators. Under our reorganized scheme for a separate Directorate on Marketing the government has agreed to and the necessary legislative measures are being taken to improve the marketing system which will ultimately effect farm production and ensure better prices to the growers.

### Fertilizer Application

The application of fertilizer is an important factor in increased production. In the recent wheat sowing campaign in general and Mexican wheat in particular, liberal application of fertilizer along with a greater supply of irrigation water was actually emphasized among the cultivators by the extension service. The campaign proved very useful and despite several unfavourable factors, the cultivators

have been making proper use of fertilizer and irrigation water for a good harvest of wheat which is expected this year.

### Soil Texture

The requirements of the crop also depend upon the texture of the soil. It has been proved that the practice of green manuring improved the texture of the soil and water holding capacity with the result that with the same quantity of water better crop yields can be obtained.

### Seed Rate

The use of good quality seed properly sown gives a good stand of the crop and results in better yields. In case of thin and patchy germination the water evaporation becomes greater hence more water is required to produce good yields.

### Special Training for Application of Water

Generally the water requirements of the crops are more at the time of maximum growth period and in the early and late stages of the growth. But under the climatic conditions in West Pakistan, the requirements of the cotton crop are more at the latest stage than at the mid-growth stage. Our cultivators understand this and never take the risk of giving less irrigation to the crop at the later stage. However, it has been observed and recommended that the extra water to the cotton crop after the September 30 is not required. This observation is now being recommended to the cultivators in general and at the demonstration blocks/plots of model farms in particular.

### Use of Plank

Use of plank before irrigation and after sowing saves the water. Under water deficit conditions the growers are generally taught to level their fields with planks before application of water.

### Method of Sowing

The old method of sowing of crops in West Pakistan is very inefficient and much water is wasted at the time of first irrigation after sowing the crops. The latest observation made by agriculture experts is that if the crop is sown in lines, there is a saving in the water at the time of first irrigation after the germination of the crops. The

Extension Service of the West Pakistan has been endeavouring to educate and demonstrate this practice at special demonstration plots and model farms. The practice still is not very common in out of the way places and the West Pakistan Government has directed the Extension Service to make this practice popular even in the far flung areas of the country.

All the recommendations for the economical use of water can only be useful if the cultivator is made to change the old methods and apply modern improved practices. The cultivators, however, hold the key to the future success of any change in methods of irrigation. The findings of research and training of the extension staff are of no use unless they are successfully adopted by the cultivators. The cultivators would be ready to apply these recommendations and solutions if convinced of the efficacy of the solutions. The actual cooperation of the government and the cultivators is as essential in West Pakistan as in other countries of the world. The pace of development is very encouraging and it can be easily said that Pakistan is going to become a self-sufficient nation. The facts and instructions by the government through press and radio and help and cooperation of the Extension Service and other agencies have made the cultivators realize their responsibilities for achieving self-sufficiency in food and farming.

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TECHNICAL HELP AND EDUCATION FOR  
IRRIGATION FARMERS IN TURKEY

BY

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INTRODUCTION

Of the 8,500,000 hectares of irrigable land in Turkey, only 1,500,000 hectares are under irrigation. Additional new capital investments are needed to irrigate the remaining 7,000,000 hectares.

To achieve the proper use of irrigation water, the farmer has to know the best way of applying it. This knowledge when applied will increase irrigation efficiency. Although it is generally agreed that farm irrigation efficiency should not be lower than 60 percent, today in Turkey this is around 30 percent.

ORGANIZATION

There are two main organizations responsible for water resources development and irrigation in Turkey. These are: (a) The General Directorate of State Hydraulic Works (DSI) under the Ministry of Energy and Natural Resources, and (b) Soil Conservation and Farm Irrigation General Directorate (TOPRAKSU) under the Ministry of Village Affairs.

To develop the water resources for irrigation and convey it to the field is the responsibility of DSI. TOPRAKSU has the same responsibility but limited to water sources less than 500 liters/sec.

Once irrigation water is available, no matter by which of the above two organizations it is provided, the additional essential services and features of the project such as land leveling, farm irrigation, drainage, and water control structures are directly carried out by TOPRAKSU. TOPRAKSU provides these services through its 17 Regional Directorates, 50 Province Chief Engineering Offices (these are under the Regional Directorates), 3 Training Centers, 1 Cartography Directorate, and 2 Research Stations. In addition, experiments on the subject of irrigation are conducted by the 4 Irrigation Research Stations that are under the Ministry of Agriculture.

## TRAINING ACTIVITIES

Although both DSI and TOPRAKSU have activities in training farmers on the subject of irrigation, TOPRAKSU is much more active than DSI since the responsibility for the use of water for agricultural purposes belongs to it.

The training activities by TOPRAKSU can be differentiated as follows: (a) Training of Agricultural Engineers, (b) Training of Sub-Professionals, (c) Training of Irrigation Foremen, (d) Training of Farmers.

### Training of the Agricultural Engineers

Engineers in TOPRAKSU are given on-the-job training in order to increase their knowledge and skill in the field of TOPRAKSU's general purposes.

Engineers, when first employed, are allowed to work for a certain period during which they familiarize themselves with the activities of TOPRAKSU in general. Later, they are given the opportunity to attend the courses held in the Training Centers. In the Training Centers, the Soil Conservation and Farm Irrigation course lasts six months. Following this six months of training, they are allowed to get the on-the-job training opportunity by working on project sites with an experienced engineer. From time to time, they are also requested to participate in several seminars on special subjects to up-date their training.

Personnel from DSI, Ministry of Agriculture, and General Directorate of Sugar Factories and other related government organiza-

tions are also given permission to attend the six month course held at TOPRAKSU Training Centers.

#### Training of the Sub-Professionals

Sub-Professionals such as topographers, surveyors, and designers are important personnel for the TOPRAKSU's success. In other words, they are the cornerstones of the building and work directly on the farmers' land. This makes it necessary to pay special attention to their training. So they are trained both at the Training Centers and in their own Regional Directorates.

#### Training of the Irrigation Foremen

The main aim of the organization is to take the services right to the farmers. Ten years of experience showed that this is not possible with a program at the engineer or sub-professional level. To close this existing gap, farmers who possess the ability of a leader are trained as irrigation foremen. Since these foremen have a much better understanding of the farmers and talk and feel the same, they are considered to be the primary helping hand of TOPRAKSU in project implementation.

This program was initiated in southern and western Turkey in 1965. Only 60 foremen were trained and now they are in the villages working with the farmers. Our aim is to expand the program to the whole country.

#### Training of the Farmers

To get the most advantage from the irrigation projects, it is very important that the water users, the farmers, should have a better understanding about irrigation practices. Because of the lack of irrigation knowledge and heavy application of water, first the problem of high water table and later salinization began to show. In addition, the irrigation efficiency is very low so it is not possible to irrigate all of the area within a given project. This brought up the problem that a very intensive training of the farmers is necessary. They should know sound irrigation practices and should hear about and see the results of the research.

Training of the farmers is mainly done through (a) Training Camps, (b) Field Demonstrations, (c) Field Days and (d) Technical Help.

a. Farmers training camps

Initiation of this program is aimed at training farmers in the fields of irrigation, drainage, soil and water conservation; to modernize the present field practices; to make more efficient use of manpower in agriculture; resulting in increased agricultural production.

The first camp was opened in 1961. Each camp unit includes 100 young farmers who are 20 to 30 years old and have completed their military service. Members of the camps are selected from the 15 to 20 villages within the camp project site by the help of the village leader (muhtar) and the school teacher. Depending on the climatic conditions, the duration of the camps is 6 to 10 months.

Each camp has a camp director and some other administrative personnel. The camp members live in tents, and the meals are served in the camp. A certain amount of money is paid to each member for his personal needs.

"Learn by doing" is the method used at the camps. In addition, each evening they are given one to two hour lectures. During these lectures use is made of slides, photographs, films and available publications. Instructors from other organizations are also invited for teaching at the camps. Field-days are held at the camps to show the activities to the neighbor farmers.

Activities of the Training Camps are summarized in the table below for the period of 1961-1966.

<u>Years</u>	<u>Number of Irrigation Training Camps</u>	<u>Project Area Hectares</u>
1961	1	130
1962	-	-
1963	1	200
1964	32	5,333
1965	59	13,513
1966	56	8,710

14,900 farmers have received training in these camps.

At the end of the camp period the members return to their villages. Their activities in the villages are closely followed by TOPRAKSU and the Ministry of Agriculture.

Use is made of the successful members. They are invited as foremen for the coming camps. Demonstrations are done in the fields of these members and priority is given when they apply for agricultural credit. Usually they are the first farmers who would receive technical help. Some of the farmers have become Contractors on projects of land preparation for irrigation.

b. Demonstrations, field-days, and technical help

Services related to the use of water in agriculture was initiated at the irrigation experiment stations in 1947 by the coordinated decision of the Ministry of Agriculture and the Ministry of Public Works. These stations were four in number in 1951. Experiments on the interrelations of climate-soil-water and of various crops were conducted at these stations and the results were demonstrated on the fields.

During the field-days that were held at the stations and at the demonstration fields, irrigation technique was shown to the farmers and the purpose of irrigation was explained.

Within the few years following these activities, farmers have begun to practice proper irrigation and applied for technical help. With the establishment of TOPRAKSU Regional Directorates, the activities were introduced to every province in Turkey.

Although the acreages of cotton fields served was only 400 hectares when the technical assistance program was initiated by the Adana Chief Engineering Office of TOPRAKSU Regional Directorate in Içel in 1957, it increased to 20,000 hectares by the end of 1962.

On the areas that received technical help, land leveling, direction of irrigation, spacing, to decide the irrigation time by soil moisture determinations, the quantity of water to be applied, crop rotation, pest control, and other relevant factors were kept under control. This resulted in about 50 percent increase in cotton yields compared to irrigated areas that did not receive any help.

It is agreed that the success of any irrigation project is directly dependent on the efficient use of irrigation water by each farmer. When one thinks of the essential features such as leveling, drainage, and various control structures, for a proper farm irrigation system, then it becomes clear that the farmer does need help. This help is given to them through "Farm Planning Projects" by TOPRAKSU staff and the implementation is kept under close control and advice of the staff to the farmer.

Farm planning projects are financed by the farmers themselves. In case of inability, credit based on the project is given them by Agricultural Bank. The utilization of credit is under control too. For the period of 1960-1966, 3,288 individual farm irrigation projects that covered 30,650 hectares were made and 50,500,00 TL. in loans were given for this purpose.

For the farmers to get all these services more easily they are advised to organize "Cooperatives." For this purpose a proposal is already prepared on the organization of "Development of Soil and Water Resources Districts" and sent to the Parliament. If it passes the Parliament then this law, besides providing new possibilities and ease in handling the problems of the farmers, will also make it possible for the government to cost-share the farmers' investment and will foster the local private contractors for implementing the projects which have been prepared by TOPRAKSU staff.

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WATER MANAGEMENT

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Water Management is a short title which encompasses the many related activities that must be successfully implemented before substantial increases in production can be realized on irrigated farm land.

Successful storage, conveyance and distribution of irrigation water to farm turnouts does not automatically bring about correct, maximum utilization on the individual farms. In Turkey the presence of irrigation water at the farm turnout signifies the successful implementation of extensive project activities by TOPRAKSU (Soil Conservation and Irrigation Directorate) and Devlet Su İşleri, (State Hydraulic Works). Implementation of On-Farm Water Development activities includes additional technical assistance activities by TOPRAKSU with land leveling, farm drainage, and the establishment of correct irrigation systems and methods. These activities are directly related to the many activities of the Extension Service, Plant Protection Directorate, as well as activities of other Directorates of the Ministry of Agriculture.

Only recently the joint TOPRAKSU-USAID On-Farm Water Development Project was approved for Turkey. This new project, while limited in application to irrigated lands, has the capability of supplying

adequate technical services and equipment for implementing the basic on-farm water development activities.

Successful utilization of these basic activities by farmers working in close cooperation with subject matter specialists of the various Ministries of the Government of Turkey will accomplish the goal of substantial increases of agricultural production throughout Turkey.

The following information is provided to better acquaint the conference members with the magnitude of the new project, as well as to provide information which will assure maximum coordination of all future activities.

## U.S. ASSISTANCE TO TOPRAKSU

### On-Farm Water Development Activities

Despite a record growth of 8.4 percent in 1966 in agricultural productivity, the performance in the agriculture sector remains a major disappointment in Turkey's efforts to achieve self-sustaining economic growth. In the past ten years, the annual growth rate has averaged approximately 2.5 percent. This is significantly below the target of 4.2 percent of the First Five-Year Plan and the projected target of 4.5 percent for the Second Plan period (1968-1972).

Since the agriculture sector produces nearly 40 percent of the economy's total output and more than 80 percent of the exports, the prospects for Turkey's freeing itself of concessional assistance in the early 1970's depends considerably upon the performance of this sector. Continued performance at past levels will not only mean a failure to achieve the full potential of this vital sector, but will jeopardize its contribution to foreign exchange earnings as population growth (2.8 percent) and increasing consumer demands (4 percent) force diversion of production to domestic markets.

During the First Plan period, the Turkish Government is investing 18 percent of its total gross investments in the agricultural sector, one of the largest allocations. The preliminary projections for the Second Plan indicate a relatively smaller percentage allocation for agriculture (11 percent) but approximately the same amount in terms of funds (TL 11 billion). This is less emphasis than needed, but the initial statements of what aspects of agricultural development are to

receive priority attention fit reasonably close with those aspects which we believe will be most productive (fertilizer, irrigation, seeds).

### U.S. Strategy

U.S. efforts are focused on (1) encouraging the economic policies (related to price incentives, allocation of resources, private sector, etc.) which will stimulate increased productivity, and (2) developing specific program goals (increased use of fertilizer, water, etc.) toward which project activities can be directed.

Although previous assistance efforts have been moderately successful particularly in developing agricultural institutions, a greater effort is required to achieve a growth rate to meet Turkey's future needs. Since U.S. assistance is entering its final phase in Turkey, agricultural activities are being reviewed and directed toward priority objectives.

In late 1966, a team of U.S. agriculture experts reviewed the agriculture sector to provide a clearer picture of where our efforts ought to be concentrated and to help develop a joint program of action with the Turkish Government. Although the Study Team's recommendations will be refined to indicate more clearly the order of priorities for U.S. assistance, one major conclusion endorses an activity which we have already proposed to undertake and whose priority will likely remain unchanged.

The Study Team emphasized two recommendations which could lead to substantial increases in productivity in three or four years. One of these was to encourage "the widespread use of new agricultural techniques, particularly with respect to on-farm water management." Without such a program, the Study concludes, the already large investments made to develop irrigation facilities will produce only a fraction of potential returns.

### Project Proposal

Since practically all arable land has been put into cultivation in Turkey, increases in productivity can be achieved only by increasing yields. One of the primary means of increasing yields is to develop proper use of irrigation water. Only about one-fourth of the irrigable land in Turkey has been irrigated, and of the irrigated land, it is indicated that almost none of it has been properly irrigated.

A large investment has been made by the State Hydraulic Works (which is in the Ministry of Energy and similar to the U.S. Bureau of Reclamation) to make irrigation water available to farm land. However, TOPRAKSU (which is in the Ministry of Village Affairs and similar to U.S. Soil Conservation Service) has been unable to develop the on-farm irrigation and soil conservation practices necessary to achieve maximum returns on the investment. It is estimated that if TOPRAKSU could provide its services (land-leveling, drainage, soil conservation practices) effectively, newly irrigated land would provide up to 100 percent increase in production value.

This significant increase can be achieved through a relatively modest increase in investment. Average Turkish investment in developing water resources is about TL 4,000 to TL 6,000 per hectare. Of this approximate cost only about one-third is TOPRAKSU cost. Therefore, this modest additional investment can bring a revolutionary change in Turkish agriculture.

To help bring about this change, we propose to initiate an On-Farm Water Development project. This project is designed to assist TOPRAKSU (in the period of FY 1968 to FY 1973) to develop into a technically competent service organization capable of preparing irrigated land for maximum proper irrigation and soil conservation practices.

Specifically, the project will help TOPRAKSU develop the capacity by 1973 to prepare land at the rate of 50,000 hectares per year, one-half the rate at which D.S.I. is capable of making water available to the farm lands.

This project essentially will be an expansion of irrigation activities provided through the Land and Water Use Project which terminates June 30, 1967. The terminating project, however, has been a multi-faceted activity including assistance in organization improvement, irrigation, soil survey and land classification, cartographic service, and legislation. The new project will concentrate almost exclusively on training cadres of TOPRAKSU technicians and developing other capabilities necessary to provide efficient services in on-farm irrigation.

The project, designed ultimately to achieve a broad impact with large scale farmer participation, will begin on a very modest scale. Ultimately, the project area will include four regions which cover most aspects of Turkish agriculture. For the first two years, however,

the project will be limited to one area. This area will be chosen in consultation with the GOT, but the Izmir-Denizli area is the leading possibility.

The project also will be carried out in two distinct phases. The first phase, covering the first three years, will be concentrated on training of TOPRAKSU personnel, strengthening of TOPRAKSU management, and development of technical design and implementation standards for irrigation practices. A start will be made on carrying out some of the work on private farm lands.

The second phase will be a massive application phase, during which TOPRAKSU field units will advise farmers and private contractors in applying proper irrigation practices. The magnitude of the second phase will depend upon GOT progress during the first phase; the number of field units trained, the passage of legislation enabling TOPRAKSU to participate in cost-sharing programs, and the availability of equipment for private contractors.

#### Specific Objectives and Course of Action

1. To overcome the shortage of trained personnel, particularly at the professional level - TOPRAKSU, with approximately 700 professionals and 500 sub-professionals, will need an additional 150 professionals and 500 sub-professionals by 1973. Training will be the most important activity in the project. This activity will involve all U.S. technicians assigned to the project, but primarily U.S. Department of Agriculture - Soil Conservation Service (USDA/SCS) technicians. Each year 30 professionals and 120 sub-professionals will be trained in Turkey; an additional 30 professionals will be trained annually in the U.S.

Training will focus on instruction in (a) land leveling and drainage techniques and (b) water application and related agronomic practices. Once adequate numbers of personnel are trained to form field units, they will be assigned to work unit areas where they will train and advise private groups of farmers and contractors (with equipment pools) as well as promote the technical services (surveying, staking, computation) for actual land preparation irrigation techniques.

2. To improve TOPRAKSU's organization and management - Largely because of its lack of experience and shortage of qualified personnel TOPRAKSU does not have the competency to operate efficiently. Most important needs are improved planning methods and greater decentralization of authority.

One of the three USDA/SCS technicians (Chief of Party) will work closely from the outset with TOPRAKSU headquarters to assist its planning for this project and to observe its capabilities. During FY 1968 agreement should be reached on a scope of work in organization and management assistance. Following this agreement, two short-term consultants will assist in this activity. At a later time, two more technicians will return to evaluate progress and assist in implementation of procedures if necessary.

3. To develop technical design and implementation standards for proper water and soil management - At present TOPRAKSU has not published standards for design and construction of on-farm irrigation facilities and for proper application of irrigation and agronomic techniques. Without development of these standards, no efficient large scale training of TOPRAKSU or of private farmers can take place. Therefore, a priority objective is to develop these technical guides as soon as possible.

Agreement on standards to be used is to be reached by June 30, 1968. Handbooks will be published in Turkish for distribution by January 1, 1969. In addition to specific use of TOPRAKSU engineers and technicians, these handbooks could be very beneficial to all agricultural engineers and technicians working on activities related in any way to on-farm development activities. It is assumed that apart from TOPRAKSU utilization, the Extension Service would make maximum use of this basic but highly necessary handbook information. This handbook information is one of the many sources of information referred to in Mr. Ralph Gleason's, (Chief, Food and Agriculture Division, USAID, Ankara, Turkey) opening address on April 12, 1967.

These services, requiring 12 to 13 months, will involve 6 to 8 technicians and will be provided through a contract with a consulting engineer firm. The services are proposed to be financed on a loan basis using funds available financing feasibility studies (Economic and Engineering Studies. 277-H-062). A preliminary estimate of the cost is \$ 300,000.

4. To develop incentives for farmers to invest in land improvement  
In addition to the requirement for technical guidance to carry out on-farm water development activities, a major requirement is the availability of funds to finance the activities.

To reduce the costs of the activities to farmers, the GOT is prepared to adopt cost-sharing legislation. This is the key element in providing incentive for farmer participation. Therefore, a condition of continued project assistance is passage of this legislation within 24 months (i. e. , before July 1, 1969).

This legislation will enable farmers to organize local associations (TOPSU groups) which will cooperate in the development of irrigation and soil improvement projects. The GOT will provide up to 50 percent of the cost of the local projects and the TOPSU groups will provide the remainder. The actual work will be done by the farmers or other private organizations on a contract basis. A special loan fund at the Agricultural Bank will provide credit funds for TOPSU groups.

In support of this aspect of the project, the U.S. has already provided technical advice for implementation of a cost-sharing program under the terminating Land and Water Use project. Direct-hire and USDA/SCS personnel will provide guidance as necessary in actual implementation of the program. Also, if local currency funds become available, the U.S. will consider such assistance to maintain the Agriculture Bank's funds.

5. To develop the capability to manufacture required equipment locally - Landshaping equipment, field vehicles and tractors will be needed to carry out this project. Some tractors and field vehicles are available locally, but at present no landshaping equipment is manufactured in Turkey. The type of equipment required consists of relatively small implements (i. e. , land scrapes and land planes) which can be pulled by farm type tractors and which can be easily manufactured and/or fabricated in Turkey. The small scale equipment is necessary for economic operations on the relatively small plots of land being cultivated in Turkey.

In order to initiate the training phase of the project, landshaping equipment will be provided on a grant basis for demonstration purposes. The requirement for the first year will be \$ 50,000 for approximately 25 units of equipment. A full-time U.S. contract technician will assist TOPRAKSU and local manufacturers in maintaining imported equipment and in designing and producing equipment locally.

Adequate numbers of field vehicles and tractors are available for the initial phase.

To encourage participation of the private sector, and because TOPRAKSU does not have the capacity to maintain a large equipment pool, bulk of the equipment is expected to be privately owned, largely by contractor groups.

Since equipment is so essential to the project, the progress in developing local manufacturing sources will be closely watched by the USAID. If it appears that adequate supplies will not materialize but the progress in other aspects of the project warrant continuation of the activity, USAID is prepared to propose that the items be made eligible for program loan financing.

#### U. S. Personnel

U.S. technician services to be financed by this project will be provided in FY 1968 by five direct-hire technicians (and one secretary), two USDA/SCS technicians and a personal services contract technician (equipment specialist). This does not include the possible six to eight contract technicians who will be financed on a loan basis to develop the needed technical standards.

The three USDA/SCS technicians include the Chief of Party assigned to TOPRAKSU headquarters in Ankara, an engineer and an Agricultural (Agronomy) Advisor will be assigned to the initial project area. The Chief of Party will provide advisory assistance at the top-level of TOPRAKSU, while the other technicians will initiate the first training programs in the field with the assistance of direct-hire personnel.

If the initial phase progresses satisfactorily, and particularly if GOT self-help efforts are adequate, a substantially enlarged (up to eight full-time technicians) USDA/SCS team may be fielded in future years. Except for the Chief of Party, they will work in the various regions of project outside of Ankara. The five-man direct-hire team will provide general support for the USDA/SCS activities and for TOPRAKSU. All but one will be assigned to Ankara. Therefore, when the project reaches its full scope, most likely in the third or fourth year, a total of 15 full-time technicians will be on board.

#### GOT Self-Help Efforts

The two most important self-help steps required of the GOT are: (1) budget support for TOPRAKSU and (2) passage of cost-sharing legislation.

Budget support will be required to enable TOPRAKSU to recruit and train adequate numbers of personnel. Funds will also be necessary for procurement of locally available equipment or, procurement on a loan basis. The GOT has assured USAID that it will provide this support. Without this support the training phase cannot succeed.

Without cost-sharing legislation, the second phase of the project cannot be undertaken. This legislation is the key to involving farmers on a large scale, and therefore must be passed by June 30, 1969. Once passed, the GOT must follow through with budget support for implementation of the program, particularly in providing funds for the Agriculture Credit Bank.

GOT performance will be reviewed during 1969 to evaluate self-help efforts and the requirements for continued U.S. support.

## CONCLUSION

The development of TOPRAKSU into an effective service organization will help the GOT realize maximum return on its already large investment in water resources development. The dramatically increased productivity resulting from efficient irrigation practices should well provide the stimulus for large scale participation of farmers in the modernization of agriculture. This revolution will be a major break through in Turkey's efforts to be free of external assistance.

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## FERTILIZER EXTENSION ACTIVITIES

BY

GHOLAM-ALI FAGHIH

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Fertilizer extension activities in Iran conducted under the supervision of the Extension Organization of the Ministry of Agriculture, have been used to teach the use of fertilizers to the local farmers. In 1957, fertilizer extension demonstration farms were established across the country. Through the efforts of the extension agents, at the village level, 340 such plots were started. The number has constantly increased, depending on available funds and personnel and had reached the significant number of 5,167 in 1962. Despite the fact that all the agricultural extension activities of the country including those in fertilizers were recently held up and rather overshadowed by the introduction of the progressive land reforms, many extension agents stationed in areas where fewer land reform activities were being introduced, did not neglect their work and rather continued organizing new fertilizer extension demonstration farms.

The existing number of extension agents serving the organization are inadequate to cope with the increased land reform activities, and to accelerate the fertilizer extension measures. For this reason the unusual idea of Mobile Extension Units was introduced. These Mobile Units had difficulty because of lack of funds until the Extension and Development Corps was initiated. With the sincere and untiring cooperation extended by the extension agents and the officers of the Corps, Mobile Units or teams of fertilizer extension workers were rapidly organized and assigned to serve the areas where permanent resident groups had not yet been stationed. Thus, the agents and the officers had to serve the rural areas as resident officers, as well as,

itinerant ones travelling about in the Mobile Units. Their work mainly consisted of organizing fertilizer extension demonstration farms or fields.

The units generally consisted of two agricultural engineers, or specialists drafted into the army to serve the Extension and Development Corps, a driver, a Vanet car, supplies of fertilizers, publications on extension, and posters required to identify plots as well as equipment needed to apply fertilizers on the spot. This was how teams and units were initially assigned to serve the provinces of Khorasan, Gueelan, Mazandaran, and Tehran. In fact, the combined accomplishment of these resident and Mobile Teams or units, could be said to be nearly equal to all that was achieved by the extension agents taken together.

The means and facilities so far employed by the Extension Organization and associated agents, specialists and Extension and Development Corps officers, have included the following:

- Lectures
- Discussions and discussion groups
- Wireless broadcasts
- Printed extension material, with a circulation of more than one million copies suited for the literate, illiterate and semi-literate farmers and their drafted sons
- Films and Mobile Film Units.

The program of the Mobile Fertilizer Extension Units having already proved quite successful. The project will be extended to cover the whole country within the current year.

The number of the fertilizer extension demonstration farms so far developed within the country in the last ten years are given below and this is a positive evidence of the success of the project:

Year	Number of Extension Demonstration Farms Organized
1957	340
1958	2,109
1959	3,112
1960	4,955
1961	5,167
1962	2,856
1963	1,207
1964	2,730
1965	3,845
1966	5,711

The following table shows the amounts of fertilizer imported into the country, domestically produced and consumed within the last 11 years:

Year	Amounts Imported	Amounts Produced in Iran		Total Home Consumption
		Urea	Ammonium Nitrate	
1956	2,090	-	-	2,090
1957	4,890	-	-	4,890
1958	15,000	-	-	15,000
1959	20,450	-	-	20,450
1960	36,070	-	-	36,070
1961	39,250	-	-	39,250
1962	47,300	-	-	47,300
1963	48,721	6,731	2,548	58,000
1964	47,339	19,454	4,207	71,000
1965	58,222	21,152	5,626	90,000
1966	72,652	40,244	11,415	124,313

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# THE USE OF FERTILIZER AND THE EXTENSION WORKERS' ROLE IN THE FERTILIZER PROGRAM

BY

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## INTRODUCTION

In West Pakistan the soil consists principally of deep alluvial derived from a parent material of a complex mixture. Red desert, reddish brown and grey desert zones all occur. The alluvial soils are deep, naturally fertile and generally permeable and contain calcium carbonate and the soil crust is from 0 to 18 feet thick. The soils of West Pakistan are generally deficient in nitrogen, organic matter and phosphorus. There are some pockets of potash deficiency as well, especially in the rice tract and the sub-mountain area. The soils are generally adequately provided with micronutrients but in some areas the deficiency of copper and zinc has also been recognized. Where the rain-fall is 20 inches or above there is a deficiency in available boron. The soils are generally calcareous in nature, with PH varying between 7.8 to 8.3 and in some cases up to 10.5 in highly alkaline areas.

## SOIL FERTILITY

The crop yields depend upon effect and interaction of several factors most important of which are soil, climate and agronomic practices. We have no control over the climate and soil conditions but we can control the organic factors and modify some of the soil conditions. Thus by proper utilization of soil we can get high crop yields which are now low. The low level of yields is mainly attributed to the low level of fertility of our soils due to constant cropping without replacement of nutrients.

## FERTILIZER REQUIREMENTS OF IMPORTANT CROPS

Until 1951-52 the use of fertilizer was limited and used on officially managed farms only. However, the Extension Service of the Agriculture Department demonstrated to progressive growers the usefulness of fertilizer on small size plots. The results were so encouraging that the use of fertilizer became popular among the growers and the government managed to import fertilizers like ammonium sulphate to be sold to the growers at subsidized prices. The research workers have made continuous efforts to work out requirements of our soils and have concluded that under ordinary conditions our important crops deplete the nutrients as follows:

TABLE 1

Crop	Per acre nutrient depleted in pounds		
	N	P <sub>2</sub> O <sub>5</sub>	K <sub>2</sub> O
Rice	16.70	7.13	6.08
Wheat	13.2	11.2	6.1
Maize	16.35	9.34	7.25
Cotton	16.68	4.04	5.32
Sugarcane	18.88	15.2	13.19
Potatoes	16.16	8.2	20.2

The area total nutrient requirements are given below:

TABLE 2

Crop	Area in thousand acres	Total nutrient required in thousand tons		
		N	P <sub>2</sub> O <sub>5</sub>	K <sub>2</sub> O
Rice	2,283	17.02	7.26	6.19
Wheat	10,478	61.8	52.4	28.87
Maize	996	7.25	4.15	3.22
Cotton	3,119	23.11	5.62	7.61
Sugarcane	603	5.06	4.09	3.55
Potatoes	168	0.124	0.061	0.15

## HOW TO IMPROVE SOIL FERTILITY

The data given in the above table indicates that the nutrients have to be replaced by other organic or artificial fertilizer. The use of organic fertilizer is very desirable but in practice it is very limited because of the non-availability of the requisite quantities. The value of green manuring is recognized by our farmers but few have the facilities to practice it. Compost making has been tried and found very useful for our soils but the practice could not become very popular for want of compost material. The only alternative for increasing crop yields and maintaining soil fertility is the use of chemical fertilizer. Proper crop rotation also must be adopted to maintain soil fertility.

### Selection of Fertilizer

We have been using nitrogenous fertilizer, mainly ammonium sulphate, but recently it has been found that phosphorus and potash are also deficient in our soils. Now it is believed that the combination of nitrogenous and phosphatic fertilizers is most economical.

### Popularizing the Use of Fertilizer

The most effective way to popularize the use of artificial fertilizer is by large scale demonstration trials on the cultivators' fields. In 1952 trials were carried out on paddy. Field trials were conducted during 1952-53 on wheat. These trials were continued up to 1958 on wheat, paddy, maize, cotton, sugarcane, potato and groundnut. Since 1958 the work of fertilizer trials has been conducted through the Rapid Soil Fertility Survey Scheme on wheat, paddy and maize. In these trials the response of crops to nitrogenous, phosphatic and potassic fertilizers has also been studied.

Research findings - Since 1952, about 5,000 trials have been conducted which have confirmed the results obtained from the departmental farms on convincing field workers and farmers of the value of fertilizers. Trials have dispelled the prejudice of the cultivators against artificial fertilizers and now they are being used on a large scale. On the basis of these trials it has been found that almost all major crops show good response to combined fertilizer i. e. N. P. K. rather than nitrogenous fertilizers. The results obtained in a large number of trials are given below:

TABLE 3  
OVERALL AVERAGE YIELDS IN MAUNDS PER ACRE

Crops	Rate of Fertilizer	No. of Expts.	Control	Increase over control			
				N	N	NP	NPK
<u>Wheat</u>	N <sub>1</sub> P <sub>1</sub> K <sub>1</sub>	674	14.0	3.8	5.1	7.7	9.3
	N <sub>1</sub> P <sub>2</sub> K <sub>2</sub>	589	16.1	4.3	4.6	8.3	9.9
	N <sub>2</sub> P <sub>1</sub> K <sub>1</sub>	542	16.7	4.7	3.3	9.3	10.5
	N <sub>2</sub> P <sub>2</sub> K <sub>2</sub>	523	18.2	4.9	6.3	9.5	11.5
Grand Average		2,328	16.0	4.3	5.2	8.1	9.7
<u>Maize</u>	N <sub>1</sub> P <sub>1</sub> K <sub>1</sub>	298	19.7	4.9	6.2	9.3	11.8
	N <sub>1</sub> P <sub>2</sub> K <sub>2</sub>	289	18.8	4.9	6.5	8.4	10.6
	N <sub>2</sub> P <sub>1</sub> K <sub>2</sub>	240	23.5	5.8	6.5	10.3	10.6
	N <sub>2</sub> P <sub>2</sub> K <sub>2</sub>	266	20.8	3.6	4.9	9.2	10.5
Grand Average		1,093	19.5	4.8	5.7	9.2	10.5
<u>Rice</u>	N <sub>1</sub> P <sub>1</sub> K <sub>1</sub>	196	24.07	5.5	4.8	11.1	14.7
	N <sub>1</sub> P <sub>2</sub> K <sub>2</sub>	172	23.9	6.8	6.3	13.3	17.2
	N <sub>2</sub> P <sub>1</sub> K <sub>2</sub>	196	26.8	6.5	8.0	12.5	14.9
	N <sub>2</sub> P <sub>2</sub> K <sub>2</sub>	131	29.9	5.3	6.0	11.7	13.0
Grand Average		695	26.0	6.0	6.3	12.1	15.0

N<sub>1</sub>=30 lbs. N., P<sub>1</sub>=30 lbs. Phosphorus, K<sub>1</sub>=30 lbs. Potash

It is evident from the data given in the table, that the use of ammonium sulphate at the rate of 30 lbs, in the form of (NH) SO<sub>4</sub> or A/S gave an increase of 3.8, 4.9 and 5.5 maunds over control in the case of wheat, maize and rice respectively. But the application of 30 lbs. N in ammonium nitrate gave an overall increase of 5.1, 6.2 and 4.8 maunds in the case of wheat, maize and rice. The data further reveals that the use of 30 lbs. N in combination with 30 lbs. P in superphosphate gave an overall increase of 7.7, 9.3 and 11.1 maunds in case of wheat, maize and rice. The application of 30 lbs. N. in AmSO<sub>4</sub>, combined with 30 lbs, P<sub>2</sub>O<sub>5</sub> in superphosphate and 30 lbs. N in K<sub>2</sub>O gave an overall increase of 10.5, 10.6 and 14.9 maunds

respectively. The data also reveals that in the case of wheat the most economical dose is N.P.K. The same combination holds good for other crops.

But it may be added that at this stage the Mexican wheats being dwarf and having stiff stems can give logical results with the application of 92 lbs. N, 40 lbs. P and 40 lbs. K and the doses can be reduced or increased depending upon the fertility of the soil.

#### Consumption of Fertilizers in West Pakistan

The use of fertilizer has become very popular during the last fifteen years. Fertilizer was procured for the first time for distribution among the growers during 1952-53. The total consumption of fertilizer during the last fifteen years is given in the following table:

TABLE 4

<u>Year</u>	<u>Nitrogen</u>	<u>Phosphatic</u> (in thousand tons)	<u>Potash</u>	<u>Total Nutrients</u>
1952-53	1.0	-	-	1.0
1953-54	14.8	-	-	14.8
1954-55	14.1	-	-	14.1
1955-56	6.6	-	-	6.6
1956-57	9.0	-	-	9.0
1957-58	16.4	-	-	16.4
1958-59	18.0	-	-	18.0
1959-60	19.3	0.1	-	19.4
1960-61	31.1	0.4	-	31.5
1961-62	37.2	0.5	-	37.7
1962-63	40.8	0.9	-	41.7
1963-64	183.0*	-	-	183.0)
1964-65	505.0*	-	-	305.0) Carrier
1965-66	1,005.0*	-	-	1,005.0)

\* Hand Book of Agricultural Statistics, 1964 Planning Commission (Agr. Food Section).

\* Includes Phosphatic fertilizers

During 1952-53 only one thousand tons nitrogen as nutrient was utilized for a vast cropping area of 60 million acres, of which about 3 million acres are irrigated. The increase has been phenomenal and the per acre consumption of nitrogen which was 2.6 lbs. in 1958-59

rose to 12.0 lbs. per acre during the year 1965-66 and should be 22.4 lbs. per acre during 1969-70.

#### New Trend in the Use of Fertilizer

The use of phosphatic fertilizer is increasing. It is estimated that by 1969-70, West Pakistan will be consuming about 2.0 million tons of fertilizers. One million tons of phosphatic fertilizer would mean about 11 lbs. nitrogenous, 11 lbs. phosphorus per acre for the entire irrigated area of about 30 million acres.

#### Subsidy by Government to Increase the Use of Fertilizer

To start with the fertilizer was being procured by the West Pakistan government at subsidized rates. The growers were required to pay 50 percent of the cost. During 1965-66 the subsidy was removed but still 35 percent of the cost is borne by the government. The reduction of the subsidy at this stage has not hampered the use of the fertilizer.

#### Various Organizations for Distribution of Fertilizer

Various organizations have been entrusted with the distribution of fertilizers since 1952. The Extension Service has a skeleton staff and could not distribute fertilizers on a large scale and in 1960 the distribution was entrusted to the Rural Supply Service Cooperative Societies, on an experimental basis in important districts of West Pakistan. Subsequently the responsibility for the distribution of fertilizers was entrusted to the Rural Supply Service Cooperative Societies in almost all the districts of West Pakistan but the procurement and import functions remained with W.P.I.D.C. The consumption of fertilizer has increased and large quantities are being imported by W.P.I.D.C. for distribution to the cultivators. The Rural Supply Service Cooperative Societies alone could not cope with the situation and the Agricultural Development Corporation came into existence to share the responsibility for the distribution of fertilizers. Since the inauguration of the Agricultural Development Corporation, procurement and import of fertilizer is being done by the A.D.C. whereas the local distribution and sale among the cultivators is done by the Service Societies organized by the Cooperative Department and A.D.C. in the ratio of 75 to 25 percent. The W.P.I.D.C. still performs an important role in the local production of fertilizer. The allocation of the imported as well as locally manufactured fertilizer

is done by a Higher Power Committee at the provincial level. The quota of each district is estimated by the District Administrators as well as District Agricultural Officer for the general information of the cultivators. The District Agricultural Officer further allocates the quota of fertilizer to each and every Union Council according to the requirements.

Role of Extension Workers in the Distribution of Fertilizer

In the fertilizer programme in West Pakistan we are presently procuring about ten lac tons of fertilizer. These are nitrogenous fertilizer (ammonium sulphate, ammonium nitrate, ammonium sulphate, nitrate and urea) and phosphatic fertilizer (single superphosphate and triple superphosphate) in the ratio of 3:1. The requirements for fertilizers are increasing year by year and local production will be increased by the expansion of the existing factories and the installation of new factories at several places. By the time the local production is increased our requirements will also increase because of sowing Mexican wheat, hybrid and synthetic maize and wonder rice, on a large scale. This will be coupled with the improvement in irrigation facilities by the installation of tubewells (37,000 + 40,000) and completion of Mangla and Terbela Dams. Our targets for the remaining three years of the Third Five Year Plan (1967-70) and our local production is given in Tables 5 and 6 below:

TABLE 5

TABLE SHOWING CONSUMPTION OF FERTILIZER FROM 1967-70

<u>Year</u>	<u>Annual Consumption</u>
1967-68	1,300,000 tons
1968-69	1,700,000 tons
1969-70	2,000,000 tons

TABLE 6

PRESENT LOCAL PRODUCTION AND PLANNED PRODUCTION  
(000 NUTRIENT TONS-EQUIPMENT)

Location	Ingredient	CAPACITY	
		Present	Proposed
Lyallpur	Super Phosphate	3.6	10.8
Daudkhel	Amm. Sulphate	10.5	18.0
Multan	Calcium Amm. Nitrate	34.3	44.2
	Urea	26.5	34.2
Darki (ESSO)	Urea	-	77.0
Gas Well	Urea	-	225.0
Private	Urea	-	225.0
Daudkhel	Amm. Sulphate Nitrate	-	156.0
Karachi	Trip. S-Phosphate	-	69.7
		74.9	786.7

So far as the popularity of the nitrogenous fertilizer is concerned our cultivators have been fully educated with the result demonstrations. A large number of cultivators are still ignorant of the efficacy of phosphatic fertilizers. Similarly the cultivators of the rice areas have to be educated about the utility of potassic fertilizer. The Extension Service of the West Pakistan still has to play a role in the fertilizer programme in the following aspects:

To acquaint themselves with the nature of the soil of the individual cultivators and to tell them the practical doses for each crop keeping in view:

- Texture of the soil; water resources at the disposal of the cultivator; crop to be sown and the time of sowing; date of sowing; seed rate, etc.
- To teach the cultivators about the proper time of application of fertilizer to each crop keeping in view the water supply system and seasonal factors
- To teach the people the combination of the fertilizers in proper doses.

The Extension Service should perform advisory service to help the cultivators in the procurement of fertilizer at proper prices and also must study the reaction of the cultivators towards various fertilizers.

### Training and Education of the Cultivators

It is estimated that the consumption of fertilizer which was only 31,000 tons in 1960 and half a million tons during 1964-65 will be 1.3 million tons in 1967 and can be increased to 2 million tons in the last year of the Third Five Year Plan. As more area will be planted to Mexican wheats, hybrid maize and coarse rice, the fertilizer requirements may further increase. The introduction of synthetic maize and Bajra will also help increase fertilizer consumption. The total requirement of fertilizer for 1974-75, the end of Fourth Five Year Plan, will be 3.5 million tons. It is worth mentioning that the increase in consumption depends upon the cooperation of the cultivators. The government has devised several measures to be adopted for this venture.

### Publicity

Press - Effective publicity through the press has been organized. The deliberations of conferences and the reports of the higher authorities are significantly covered in daily newspapers.

Publications - The publicity wing of the Extension Service of the Agriculture Department is publishing useful leaflets and booklets prepared by specialists. The papers and articles of specialists and extension workers are also published in "Zarat Nama." This popular newspaper is sent to all the Chairmen of Union Councils, Field Assistants, Agricultural Assistants and to other important functionaries of the Extension Service for their guidance.

Radio - Radio interviews, talks, discussions of the specialists, extension workers and progressive growers are a common feature of Radio Pakistan. The publicity through radio is of course meant for all agricultural recommendations on salient topics and includes publicity on the use of fertilizer.

Propaganda - Effective propaganda on consumption of fertilizer is the duty of the extension workers who go to each and every individual and educate them in this respect. According to the latest instructions of the West Pakistan government the District Administrators and

other field staff are also required to place emphasis on the use of fertilizer.

Training of the field staff and farmers - Recently it has been observed that combined meetings of the field staff and growers at various centers are very useful. During the campaign for the sowing of the last rabi crops, the training of the extension staff and cultivators at the headquarters of the Agricultural Assistants was attended by many cultivators. It was found that they were very interested in having more technical knowledge on fertilizer application.

#### Demonstration Plots by Department

The usefulness of fertilizer has been brought to the notice of the cultivators by preparing demonstration plots of fertilizer alongside the controlled plots under similar conditions at conspicuous places. The cost of the fertilizer for demonstration plots in the growers fields was paid for by the department. Now the utility of fertilizer has been established and only the proper doses, the method of application and the time of application are to be demonstrated. The cost of fertilizer is borne by the cultivators and the demonstration plots are sown by modern methods.

#### Expansion in the Technique of Demonstration Plots

Under the express orders of the President of Pakistan, the demonstration plots now are being laid out at the Union Council level under zemindara conditions so that all the cultivators may have the opportunity to see the actual condition of the crops to which the fertilizer is applied.

Block demonstration - During the last rabi sowing, blocks varying from 5 to 50 acres of wheat were planted by the cultivators and the fertilizer was applied under the technical advice of the extension workers. The condition of crops in these blocks is apparent everywhere and this large scale demonstration has established superiority of fertilizers in every part of the country. The sowing of Mexican wheat in the last rabi and the sowing of the maize in the spring and of wonder rice in the ensuing summer have been done with active cooperation of the government and the cultivators with the result that the old methods and doses of the application of fertilizer have been considered useless and inadequate. It may be pointed out that the recommended doses of fertilizer which vary from 90 lbs. to 138 lbs. of nitrogen and 40 lbs. of phosphorus have caused logging at many places because of a wind-storm during the last week of March.

Demonstration by private concerns - ESSO has arranged fertilizer trials with wheat at several places where they demonstrated the importance of the different doses of fertilizer especially for Mexican dwarf wheat. Group meetings of the cultivators at the site have been arranged to show the significance of the use of fertilizer in various doses.

It can be concluded that our recommendations for the economical use of fertilizer for better crop production can only be useful if the cultivators are educated as to proper use. The cultivators hold the key to the future success of our plans for crop production and to attain self-sufficiency. The findings of research are of no use unless they are passed on to the cultivators. If the cultivators are convinced of the efficacy of the findings they will be ready to adopt them. The pace of development is very encouraging and Pakistan is going to become a self-sufficient country within the next two or three years. Our publicity through press and radio and help and cooperation of the Extension Service and other allied agencies have made the farmers appreciate their responsibilities for achieving self-sufficiency in food and other fields of farming.

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## FERTILIZERS AND THEIR USE IN TURKEY

BY

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### CROP DEMAND

Before starting my speech I wish to express my satisfaction in participating in this agricultural extension conference of CENTO. No doubt the objective of this conference, agricultural extension, is one of the most important approaches for the raising of living conditions of rural people as well as raising crop yield. As is known within the three neighbor countries Turkey, Iran and Pakistan, the rural population is increasing yearly at a high rate and needs every type of assistance in solving the problems in those two fields. In this connection may I draw your attention to the situation in Turkey where the present population of 32 million is increasing annually by nearly three percent. This means that we will have to feed and employ 90 million people in the year 2000. By the same date certainly we will have to obtain necessary agricultural raw materials for the agricultural industry to supply the demand of those people and from the same acreage. Since we reached the limit of increasing of farm land we must now plan to increase its productivity.

### LAND AND FERTILIZER USE

The most effective measures to help farmers in increasing the yield of arable and pasture land are: Fertilizer use, irrigation, use of improved seeds, plant protection and finally mechanization. The

total cultivated area is 25 million hectares excluding 28 million hectares "grassland." In Turkey at present, approximately 1.5 million hectares are irrigated, while about five million hectares are suitable for irrigation. In 1966 more than 1,000,000 tons of straight fertilizers were used. The demand for fertilizers is increasing rapidly. By the year 1982, it is estimated that the total consumption of fertilizer will be about 10 million tons.

Under the natural conditions of Turkey the relative importance of the above measures to increase yields is generally estimated as follows: (in percent)

Fertilizers	40
Irrigation	30
Seeds	10
Plant protection	10
Mechanization	10
	<hr/> 100

The combination of these measures will certainly give important interaction.

#### GOVERNMENT POLICY ON FERTILIZER

The essential effect of fertilizer on the increasing of crop yield and its contribution to farmers' income was thoroughly recognized by the Turkish Government in establishing the development plan. During the first five-year period (1963-67) emphasis has been given to fertilizer extension including research, education and training, as well as credit and distribution systems.

Actually chemical fertilizer use in Turkey started after the republic was founded. It was the Turkish sugar corporation which adopted fertilizer on a large scale. The consumption then was rather low until the nineteen fifties when the average annual consumption was around of 75,000 tons. At that time special fertilizer credit was not available to the farmers and a distribution system was not sufficiently known. Farmers' training also was not as developed as it is now. In the beginning of the nineteen sixties the government, realizing the unsatisfactory development of fertilizer use in the previous decade and also realizing the proven effect of applied agricultural science in soil fertility, enabling modern development, has taken

the following measures:

- a) Establishing of a special fund in the Bank of Agriculture for the purpose of providing farmers with fertilizers on credit. In the first stage it was 150,000,000 TL. In 1967 this amount is 600,000,000 TL.
- b) Improving the government fertilizer distribution agencies which include the agricultural supply organization (Türkiye Ziraat Donatım Kurumu), the sugar factories corporation (Türkiye Şeker Fabrikaları Anonim Şirketi) and a number of independent cooperatives. Attention also was paid to improving local storage facilities.
- c) The government, in cooperation with FAO, has improved its extension service for the purpose of more effectively training the farmers in the proper use of fertilizers.
- d) Agricultural research has adopted a fertilizer research program for the purpose of continuously reviewing the fertilizer recommendations to be given to the farmers.

#### DEVELOPMENT OF FERTILIZER USE

As was pointed out earlier, the annual fertilizer consumption was low till the first five year period of the development plan and as a result of measures taken by the government it has been steadily increased. The following table indicates the yearly fertilizer use.

TABLE 1  
FERTILIZER CONSUMPTION IN TURKEY

Years	Nitrogenous (N 21 %)	Phosphate (P <sub>2</sub> O <sub>5</sub> 16-18 %)	Potassium (K <sub>2</sub> O 48-50 %)	Total
1950	28,900	13,133	70	42,103
1954	21,069	40,432	20,561	82,062
1958	46,225	24,129	-	70,354
1960	40,085	59,889	1,358	107,332
1962	180,316	104,528	10,447	295,327
1964	258,000	265,000	9,000	532,000
1966	468,000	546,000	11,480	1,025,480

## FERTILIZER EXTENSION PROGRAM

After the planning period the joint fertilizer program between the Turkish Government and FAO started in autumn 1961. The most effective accomplishments have been observed in the field of farming and establishing a working group in the Ministry of Agriculture dealing with fertilizer advisory work, training field personnel of the Ministry, carrying out a large number of fertilizer demonstrations on farmers' fields and evaluating findings, discussing the demonstrations with the farmers, carrying out on a limited scale simple trials with the aim to provide further information required for fertilizer demonstrations.

- a) Working Group - A working group dealing specifically with fertilizer extension matters was set up in the Ministry of Agriculture under the Department of Plant Nutrition. The working group includes now a counterpart, 35 full time fertilizer officers who are assisted by a FAO soil fertility specialist, and an associate expert. Members of the working group are graduates of one of the three agricultural faculties of the country. Their duty is to supervise the field work of the Fertilizer Program in one to four provinces (total number of provinces 67). These 35 fertilizer advisors supervise the work of some 570 part time available county agents of the Ministry.
- b) Training - The training of field staff and farmers was carried out in the following way:
  - In order to assure proper staff formation all officers appointed as fertilizer advisors attended a series of training courses in Ankara. Adequate knowledge was provided by these courses enabling the fertilizer advisors to carry out their duty efficiently and to a certain degree independently.
  - Necessary training courses were held for all county agents who are available part time to the Fertilizer Program. All county agents and field crop specialists attended these courses. These training courses were carried out in the working area of the participants.
  - Despite the fact that the training for farmers may better be called advisory or extension work it is being mentioned here for systematic order's sake. The advisory work for

farmers comprises the laying out of fertilizer demonstrations, organization of field days and farmers meetings as a means to explain technical matters at the demonstration site during the growing season, and the evaluation of the results of fertilizer demonstrations.

- c) Fertilizer demonstrations - The main objective of fertilizer demonstrations within the present fertilizer program is to convince farmers that the use of fertilizer leads to a higher farm income.

For the planning of demonstrations the existing crop patterns of the country were taken into account as well as the working capacity of the field organization. The total number of fertilizer demonstrations per crop was carried out and finally evaluated as shown in the following table:

TABLE 2  
NUMBER OF FERTILIZER DEMONSTRATIONS

<u>Crop</u>	<u>Laid out</u>
Cereal	9,188
Maize	1,607
Sunflower	368
Potato	726
Cotton	1,868
Rice	595
Olive	313
Fodder crops	554
Peanut	120
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T O T A L .....	15,339

The ecological regions where different demonstrations were carried out is shown in the table below with their results.

TABLE 3

## ECOLOGICAL AREA AND RESULTS OF DEMONSTRATIONS

Region and Crop	Design	Year	Y I E L D S			Net return TL/ha
			Unferti- lized kg/ha	Ferti- lized kg/ha	Per- cent increase	
Wheat						
Central Anatolia	(0/60/0)	1961/62	920	1,350	46.7	194.0
With less than	"-	1962/63	1,200	1,960	63.3	334.2
400 mm rainfall	"-	1963/64	898	1,443	60.6	256.6
per year	"-	1964/65	854	1,468	71.9	310.1
	"-	1965/66	780	1,271	62.9	
Higher rainfall area						
	(60/60/0)	1961/62	1,260	2,270	80.1	508.0
	(40/60/0)	1962/63	1,260	1,980	57.1	247.7
	(40/40/0)	1963/64	1,198	1,906	59.1	312.2
	(40/40/0)	1964/65	1,015	1,748	72.2	335.7
	(40/40/0)	1965/66	982	1,709	74.0	
Irrigated wheat						
	(60/60/60)	1963/64	1,530	3,010	96.7	704.4
	"-	1964/65	1,147	2,313	101.6	450.4
	"-	1965/66	1,496	2,315	54.7	
Maize Black Sea						
	(100/60/0)	1961/62	1,421	2,338	64.5	248.0
	(80/80/80)	1962/63	2,140	3,910	82.7	639.0
	"-	1963/64	1,790	3,335	86.3	404.0
	"-	1964/65	1,849	3,088	67.0	267.8
	"-	1965/66	2,023	3,656	80.7	
Maize Thrace						
	(100/60/0)	1961/62	1,338	1,784	33.3	81.8
	(40/40/0)	1962/63	1,290	2,410	80.0	548.0
	(40/40/0)	1963/64	1,480	2,100	41.9	136.0
	"-	1964/65	990	1,734	75.1	284.4
	"-	1965/66	1,394	2,245	61.0	

Region and Crop	Design	Year	Unferti- lized kg/ha	Y I E L D S		Net return TL/ha
				Ferti- lized kg/ha	Per- cent increase	
Peanut	(0/80/80)	1962/63	2,580	4,560	75.7	2,617.0
	"-	1963/64	2,242	3,110	38.7	949.0
	"-	1964/65	1,945	3,486	79.2	1,958.5
	"-	1965/66	2,258	3,406	50.8	
Irrigated Alfalfa	(0/60/60)	1963/64	50,756	67,057	32.1	876.4
	"-	1964/65	47,025	65,598	39.5	1,035.4
	"-	1965/66	20,271	42,095	48.9	
Rice	(40/40/0)	1962/63	3,560	5,240	47.2	1,444.0
	(60/60/0)	1963/64	2,948	4,293	45.6	1,663.5
	(60/60/0)	1964/65	3,409	4,860	42.5	1,822.1
	(60/60/0)	1965/66	3,256	4,631	42.2	
Potato (irrigated)	(80/80/80)	1962/63	9,431	13,637	45.6	1,503.0
	"-	1963/64	14,019	23,519	67.8	3,675.0
	"-	1964/65	10,458	17,192	64.4	2,430.1
	"-	1965/66	10,547	17,547	66.3	
Sunflower	(80/80/80)	1961/62	825	1,198	45.2	133.7
	(40/40/40)	1962/63	1,290	1,870	44.9	338.0
	(40/40/40)	1963/64	1,318	2,027	53.8	409.0
	(40/40/40)	1964/65	853	1,396	63.3	243.0
	(40/40/40)	1965/66	919	1,455	58.3	
Cotton South	(80/80/0)	1961/62	1,483	2,036	37.3	678.0
	(80/80/0)	1962/63	1,370	2,070	51.1	928.0
	(80/80/0)	1963/64	1,317	1,969	49.5	832.0
	(80/80/0)	1964/65	1,321	1,964	48.6	815.0
	(80/80/80)	1965/66	1,278	1,966	53.8	
Cotton West	(80/80/0)	1961/62	1,765	2,489	41.0	1,020.0
	(80/80/0)	1962/63	1,790	2,540	41.9	900.0
	(80/80/80)	1963/64	1,850	2,670	44.3	1,032.0
	(80/80/80)	1964/65	1,531	2,296	49.9	930.0
	(80/80/80)	1965/66	1,614	2,477	53.4	

## FERTILIZER PILOT SCHEME ACTIVITY

It is generally agreed that present and future increase in fertilizer consumption in Turkey depends on three major factors i. e. fertilizer advisory work, fertilizer distribution, and fertilizer price and credit policy.

The fertilizer program in Turkey devoted its main effort during the first phase to fertilizer extension problems.

The main objective of fertilizer pilot schemes in Turkey is to establish an improved cooperation between the extension service, fertilizer distributing bodies (T. Z. Donatim Kurumu and cooperatives) and the Bank of Agriculture. This goal is trying to be reached by setting up a supervised form of fertilizer credit procedure, fertilizer distribution accompanied by a technical supervision of the use of fertilizer, and an agricultural extension activity during the season. It is anticipated that with such a supervised work scheme the repayment rate of fertilizer credit would be increased.

Several principles govern the work scheme:

- Participants in pilot schemes are to be small or medium farm holders.
- Participating cultivators are to obtain an amount of fertilizer adequate to fertilize about two hectares.
- Fertilizer is given on credit but only in kind; a mutual guarantee is to be accepted as the only security.
- The available fund is to be used as a revolving fund thus enabling a continuation of the pilot scheme for at least three years.
- Participants have to accept all technical recommendations and strict supervision of the field work.

The first pilot scheme was launched in the western part of the country on cotton in early 1965. Cotton having been identified as one of the region's most important crops is cultivated in alluvial plains under irrigation.

A second pilot scheme with winter wheat was launched in autumn 1965 in a transitional area between the coastal part of the country which is well fed by rain and the semiarid central plateau.

The third implementation of a pilot scheme started in Kulu County of Konya Province on winter wheat, the fourth in Gazipaşa, Antalya on groundnut in the 1966-67 growing season.

The successful results of these years is shown in the following table:

TABLE 4  
FIRST RESULTS OF PILOT SCHEMES

Location	Crops	Number of Farmers	Area Applied Dk.	Check Plot kg/ha.	Fertilized kg/ha.
Izmir	Cotton	437	6,654	1,731	2,300
Eskişehir	Wheat (with improved seed)	253	3,630	525	2,550
TOTAL .....		690	10,284		

#### FERTILIZER TARGETS

As was indicated before, fertilizer consumption during the last five years rose in a way never experienced in the past. But the actual need of the cultivated land as well as "grassland" is certainly much higher than these amounts.

Realizing these facts and the importance of fertilizer the Ministry of Agriculture worked out the future targets of fertilizer use. The table below shows these targets till 1982.

TABLE 5

## FERTILIZER TARGETS AT THE END OF FOUR FIVE YEAR PLANS

Year	Nitrogenous Fertilizer	Superphosphate P <sub>2</sub> O <sub>5</sub> 18 %	Potassium Sulphate 48-52 %	Total
1967	600,000	1,062,000	38,000	1,700,000
1972	1,680,000	2,880,000	58,000	4,618,000
1977	2,730,000	4,580,000	78,000	7,388,000
1982	3,800,000	6,300,000	100,000	10,200,000

## PROPOSED FUTURE PROGRAM

The aim of the proposal is:

- to train the technical personnel
- to teach the farmers to use fertilizers properly
- to establish a large number of small Pilot Schemes for credit distribution for fertilizers to the farmers.

In the first two years of this activity the emphasis will be placed on training of technical personnel in teaching farmers and instituting Pilot Schemes including supervision of the proper use of fertilizers.

After this initial period, a certain routine will have been established and as many farmers' training courses will be carried out by the technical personnel as possible. Each farmers' training course must result in providing fertilizers on credit to the participating farmers, within the frame of the Pilot Scheme activity including the principle of the Revolving Fund.

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PRODUCTION, DISTRIBUTION AND USE OF FERTILIZER  
IN THE CENTO REGION COUNTRIES

BY

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(Presented by Mr. Marion F. Ward)

INTRODUCTION

A CENTO Traveling Seminar reviewed the situation and outlook for fertilizer in Iran, Pakistan and Turkey during July and August 1966. Specialists from each of the countries constituted the team led by Dr. John L. Malcolm, U.S. Soils and Fertilizer specialist. An outline of the observations and principal conclusions of this team were summarized in a CENTO document EC/15/A6/D26 dated March 9, 1967, and presented at the CENTO Symposium by Marion F. Ward.

In presenting the paper, Mr. Ward noted -

The purpose of the CENTO Traveling Seminar on Fertilizers was to determine the regional needs for fertilizers based on the needs of a growing population and agricultural production capability shown by agricultural research, to observe extension efforts, to consider sources of fertilizer and how the fertilizer reaches the farmer, to study industrial and farm credit, and finally to estimate the significance of the added production to the community.

The principal subjects covered in Dr. Malcolm's paper are as follows: value of fertilizers; current and future fertilizer needs; potential means to increase fertilizer production; fertilizer sources in the regional countries; fertilizer distribution; credit services; physical services such as power; transport and storage; technical

information; marketing; laws and public policy affecting fertilizer; impact of fertilizers on economic development; and conclusions and recommendations.

The fertilizer requirements of the CENTO regional countries over the next twenty-five years are dependent on the food and fibre needs of a rapidly growing population and on the improving economic conditions providing more disposable income for the majority of the population. The minimum requirements are amounts which could maintain the present levels of consumption without any improvement in per capita availability. This is far below the intentions of all three countries as outlined in their development plans but still sets formidable economic and physical goals when extended over 10 and 25 years. The members of the Seminar observed the present situation, or base and have made their own assessment of the present and potential possibilities.

The per capita production of grain in Turkey is quite adequate at present but that of Iran and Pakistan is near the subsistence level. Nevertheless since people are willing to continue eating as they are but usually unwilling to accept less except in times of dramatic emergency, the present per capita grain supplies have been taken as the required levels of minimum availability in 1975 and 1990. The population of all three countries was assumed to be increasing at 2.5 per cent per annum, or about double in the next twenty-five years (Table 1).

TABLE 1  
Population in CENTO Regional Countries  
Present and Projected

	(Millions)		
	<u>1965</u>	<u>1975</u>	<u>1990</u>
Turkey	31	40	57
Iran	23	29	43
Pakistan	112	143	208
Region	<u>166</u>	<u>212</u>	<u>308</u>

There is little undeveloped arable land in any of the three countries and the additional food required for these people must be produced by increasing the yield per hectare. Fertilizer is one of the most certain inputs to increase agricultural production. A review of research in many countries has established that each ton of plant

nutrient,  $N + P_{205} + K_{20}$  will produce ten times of grain, or its equivalent in some other crop.<sup>1</sup> If the present low levels of grain availability in Iran and Pakistan are accepted as tolerable, even if inadequate, one ton of plant nutrient will feed approximately 60 persons. Stated in another manner, for each 1,000,000 additional persons 16,700 tons of fertilizer nutrient will be required.

The calculation of minimum fertilizer requirements for each country, as shown in Table 2, was based on the grain requirement.

TABLE 2  
Foodgrain Requirements Based on Present  
Consumption Levels  
(Million tons)

	<u>1965</u>	<u>1975</u>	<u>1990</u>
Turkey	14.5	18.6	26.9
Iran	3.8	4.9	7.0
Pakistan	17.0	21.8	31.5
Region	35.3	45.6	65.4

First it was assumed that only half of the fertilizer supply would be used on grains and the remainder on cash crops. Compensating for this, other improved practices and inputs such as more productive varieties, additional irrigation, better soil management, and conservation of additional production with pesticides will contribute as much as fertilizer to the available food supply. Therefore the additional requirement for fertilizer nutrient is one-tenth the required food increment. The results of this calculation plus current use are reported in Table 3. It should be noted that the fertilizer use given in Table 3 as reported by the FAO<sup>2</sup> is lower than that reported to the Seminar during its travels.

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1 Parker, F. W. "Fertilizer and Economic Development," Soil Science Society of America Workshop, February 1962.

2 FAO "Fertilizers, An Annual Review of World Production, Consumption and Trade 1965", Rome 1966.

TABLE 3  
Fertilizer Nutrient Use and Minimum Requirements  
(Thousand tons)

	<u>1965</u>	<u>1975</u>	<u>1990</u>
Turkey	96.3	506	1,336
Iran	31.2	141	351
Pakistan	94.1	574	1,544
Region	<u>221.6</u>	<u>1,221</u>	<u>3,231</u>

These lower figures are used to make comparisons with other countries possible and to assure comparable estimates for the three countries. Since the current use, even the more optimistic use, is small compared to the projected need no difference in interpretation results from using the lower figures.

The present use of fertilizer in the CENTO regional countries is extremely low. The world leader, the Netherlands reported the use of more than 550 kilograms of plant nutrient per hectare per year as shown in Table 4.

TABLE 4  
Arable Land and Fertilizer Use in Selected Countries

<u>Country</u>	<u>Arable Land (Thousand hectares)</u>	Plant nutrient use kg/ha. arable land	
		<u>1963-64</u>	<u>1964-65</u>
Turkey	26,120	4.2	3.7
Iran	16,850	1.4	1.8
Pakistan	25,500	3.5	3.7
India	162,290	3.8	4.4
Japan	6,060	304	304
Netherlands	988 *	564	555
U.S.S.R.	230,000	14.0	19.4
U.S. A.	185,152	51.7	54.5
Asia	350,000 **	11.0	11.6
World	1,350,000 **		

\* Netherlands also reports 1,301,000 hectares of permanent meadow and pasture a substantial portion of which is probably fertilized but not included in the calculation.

\*\* Asia and World figures do not include Mainland China, North Korea, North Vietnam from which reliable statistics were not available.

Japan reported 304 kilograms per acre used in each of these two years, or about 100 times as much per hectare as the regional countries. The reported use was only about one-third of the Asian average. In Turkey with a low population density and high grain availability, this is not serious but in Pakistan with both high population and density, food scarcity is inevitable until fertilizer use increases. Fertilizers use levels in the United States, with widely varying weather and rainfall present more reasonable goals for the region, 50 to 55 kilograms per hectare than do either those of Japan or the Netherlands. It is worth noting that the increase in the rate of application in U.S.S.R. was greater in one year 1963-64 to 1964-65 than present use in the CENTO region. If, as in calculating fertilizer minimum requirements a 2.5 percent agricultural production growth is projected, use in Turkey and Pakistan in 1990 will be equal to current United States rates. At a 4 percent growth rate, which more nearly approaches plan targets the current United States rate would be reached in about 15 years (Table 5 and 6).

TABLE 5  
Fertilizer Nutrient Requirements at the Projected  
Agricultural Growth Rate of Four Percent per Annum  
(Thousand tons)

	<u>1975</u>	<u>1990</u>
Turkey	796	2,516
Iran	211	661
Pakistan	<u>914</u>	<u>2,924</u>
Region	1,911	6,101

TABLE 6  
Fertilizer Nutrient Use Per Acre of Arable Land  
in 1990 with Two Projected Growth Rates (kg/ha.)

	<u>At 2.5%</u>	<u>At 4.0%</u>
Turkey	53	96
Iran	21	39
Pakistan	61	115

In Turkey this higher use rate will either provide a surplus of grain for export or a substantial increase in higher value but lower efficiency crops. In Iran and Pakistan the more rapid rate of growth would allow improved dietary levels. Even with this improvement the grain yield would not supply the "adequate diet" as proposed by the National Research Council even for persons engaged in sedentary

work. Although some reduction can be made for warm climate, the relative youth of the population raises the average energy requirement.

The plan projections of the regional countries actually envisage more rapid growth rates for agriculture over the next five to ten years. Even if these more rapid growth rates cannot be sustained they will raise the effective base. Secondly it can be hoped that the rate of growth of population will decline as a result of conscious efforts at control.

Returning to the most modest targets, roughly 510 million dollars in capital investment will be required for expansion in the next 10 years and 1.5 billion over the next 25 years as shown in Table 7.

TABLE 7  
Estimated Capital Requirements for  
Expansion of Fertilizer Production

	<u>1965-75</u>	<u>1975-90</u>	<u>1965-90</u>
Turkey	205	415	620
Iran	55	105	160
Pakistan	240	485	725
Region	<u>500</u>	<u>1,005</u>	<u>1,505</u>

This is based on estimated cost of \$500 per ton of annual nitrogen production. Phosphatic fertilizers can be produced with a lower capital investment but the addition of mixing facilities makes the suggested figure approximately correct. Recent proposals in India, the ESSO project in the Mari gas field in Pakistan, and a study by Imhausen on fertilizer costs in Pakistan all support this approximation. While improved technology can decrease the costs, inflation is increasing them. In the near future forty to fifty percent of the capital investment will be foreign exchange. The inclusion of community development costs, necessary to an operating factory increases the cost over a similar plant in a highly industrialized country. Shipping of components also raises their cost. Although labor costs are low, utilization is inefficient both from lack of training and custom. Sale and collections are likely to be slow, even in the face of acute shortage, so that working capital requirements will be higher than in the United States or Western Europe. Roughly eighty percent of the capitalization is for the physical plant and the remaining twenty for operating funds.

Without further new commitments Iran will soon produce enough nitrogen to meet the projected requirements through 1990. Even so further investment of both local and foreign capital is likely. The unique raw material advantages of this country and favourable investment laws, regulations and policies will all encourage expansion of production for the export market. This will provide capacity to satisfy regional requirements. The projected capital requirements for the region may well be exceeded by investment in Iran alone. The proposed increases in production in Pakistan will make that country self-sufficient in from three to five years. If full production is achieved and the consumption targets are not exceeded large exports will be possible. Turkey will remain an importer of nitrogen fertilizer for some time, which may well be the most desirable position for that country. Although many countries will desire to purchase fertilizer, in the near future most of these will not have foreign exchange or goods to pay for it.

As in the case of nitrogen fertilizers, Iran is in a relatively favourable position with respect to phosphate fertilizer. Turkey has also an advantage but neither has known economic phosphate. Their strength lies in an adequate supply of sulphur which is critically short the world over. Sulphur recovery from the Iranian sour gas is an integral step in utilization of this resource. At the Shahpour Chemical Company the estimated sulphur yield will be 1,500 tons per day. Turkey will depend on more expensive pyrite and copper sulphide ores but is still in a highly advantageous position, because these ores are needed for iron and copper production.

Pakistan has no significant sulphur resource developed at present and is likely to find that this shortage will delay the development of a domestic phosphate fertilizer industry.

All three countries have phosphate deposits but to date no commercially exploitable sites have been found. Although phosphates are available on the world market, there is immediate need to locate workable resources of phosphate rock to avoid a continuing drain on hard currency resources.

Even if all of the known deposits prove unworkable, it is probable that other deposits exist and will be discovered if more patient and thorough exploration is undertaken. Investigation of new methods of beneficiation of rock from the known deposits may also be worthwhile, although limited work indicates that this would be prohibitively

expensive. If no domestic sources of phosphate are developed provision must be made for their purchase abroad. Turkey could export grain for this purpose and Iran should have a ready market for sulphur in the phosphate producing countries. In this latter case a shuttle tanker service carrying molten sulphur from Iran and returning with super-phosphoric acid for diammonium phosphate production seems worth exploring. It would involve no empty backhaul or single use cargo heating installations, since heated bunkers would be desirable for both products. The active ingredients in both products would be maximized. Although portside facilities would be slightly different for the two products, pipeline movement, convenient for both, would limit congestion at the berths and permit both rapid and inexpensive loading and discharge.

Although no considerable use of potash fertilizer is now practised in any of the three countries, there are areas in each where experimental work shows a genuine need. Since the deficiency of this element always follows the liberal use of the other two major elements, its use most certainly will increase. Now is the time to explore for mineable potash. Pakistan, with potash brines already known, is most likely to be successful. Such a discovery would have value not only to satisfy an internal demand but also to meet the requirements of tropical agriculture to the east.

However it may be obtained, through production or imports, fertilizer must be made available to the extent farmers can be persuaded to use it. For the farmer and the country the returns will vary from three to one to five or six to one on the investment whether the fertilizer is used to produce food for home consumption or a commercial crop for export. Care must be taken that the advantages of this investment are understood, particularly when imports are involved.

The advantages which can be gained by farmers through the use of fertilizer are not just theoretical, calculated by bands of visiting experts, but actually proven in commercial practice and by research conducted by the central and branch research stations in each of the three countries. All three countries are committed to agricultural research and fertilizer investigations have played a prominent role within each of the programs. Good facilities and a well trained professional staff are available in all three countries. The data obtained with grain varieties customarily planted showed good response and a close correlation with moisture availability, either rain or adequate irrigation greatly increasing the returns on fertilizer. Nitrogen was

seen as the key element in both Pakistan and Iran but in the Turkish plateau phosphate was more critical. In Turkey the scarcity of water, rather than a truly adequate supply of nitrogen appeared to restrict its value.

Potash fertilizer was not generally considered necessary at the present time, except in East Pakistan and European Turkey, although research results indicate that it might be profitably used if it could be obtained at or near the international price.

New varieties are adding new dimensions to the possibilities of food production in the regional countries. They are also requiring new, integrated experiments to define the profitable limits of fertilizer use. Unlike much older work which demonstrated that fertilizer had value under existing farm conditions, the new work must be and is being planned to incorporate the best practices of soil and water management, variety selection, and pest control. Not only must soil scientists test fertilizers using the best available varieties but plant breeders must take advantage of the most favourable soil conditions, both fertility and management, which can be established for selection of their most promising varieties.

The economics of many operations must also be reassessed since higher yields, three or four times traditional levels, will justify much greater capital expense such as land leveling or terracing and current inputs such as fertilizer, hybrid seeds, and pesticides. Previously 60 kilograms of nutrient,  $N + P_2O_5 + K_2O$  was considered the practical limit of fertilizer use, now 140 to 160 kilograms is clearly practical and it appears likely the 300 kilograms per hectare, the current use in Japan, will prove economical when adequate moisture supply can be maintained and flooding be controlled.

Most of the soils laboratories visited had modern equipment but maintenance and repair was a problem in many of them. The instrument service and design section at the Turkish Soil Research Institute is an example which should be followed. This section, employing specialists in instrumentation and provided with funds and authorization to keep a good inventory of replacement parts or to import those necessary on an emergency basis, protects the investment in costly equipment and permits the scientists in the research and service laboratories to continue their work without delay or preoccupation with broken down apparatus. This is not simply a repair shop but is doing work on the design of new specialized equipment and accessories and designs for

current instruments which can be produced from components available in Turkey. Because of these responsibilities it has been possible to recruit and retain competent professionals who are accepted as peers by the other staff members.

The extension services have been well developed in all three countries but all hope for and deserve to be expanded. The vast numbers of small independent farms, especially in Pakistan, make the task of introducing new techniques to farmers and gaining acceptance of these techniques formidable. A rough calculation shows there are about 1,000 farm units per extension agent in Iran and 2,000 per agent in Turkey and Pakistan. The greater concentration in Iran is achieved by employing home demonstration agents on a career basis and by use of the Army Extension Corps in which, following basic training the recruits fulfil their military obligations by working as agricultural extension agents. The men for this program are usually agricultural graduates. Even so, their program is focussed on a limited number of crops and in one or two communities to produce a maximum impact on a critical sector, mostly grain production. To enhance their value both the career agents and corps agents are supplied transport. The corps is supplied military jeeps or pick-up trucks. The career agents are supplied motorcycles which they purchase out of their travel allowance. This purchase scheme minimizes the supervision and maintenance of vehicles, a major administrative problem among government agencies. It is a scheme which might well be copied with appropriate modifications to suit local conditions and customs by the other two countries. The value of greater extension effort cannot be overemphasized. Research results are not automatically transferred to the fields. The information must be demonstrated to the producing farmers. Furthermore, the extension agents can help to identify the real problems of farmers and enlist the aid of the research staff in solving them.

Although time did not permit any close assessment of the industrial research in the three countries visited, most of the work in progress was in process modification, to provide greater efficiency of existing units or better balancing of components. Some work was also being done on product conditioning and packaging so that a more useable product could be delivered to the farmer. No work was observed on new product development and no organized investigation of fertilizer marketing was seen. It is probable that it is not yet time for either of these activities but rather that production should receive most attention.

Rapid and in some cases unpredictable change is characteristic of the fertilizer distribution systems in the countries studied. Perhaps the most abrupt changes have occurred in Pakistan where government fertilizer distribution was supplemented by sales through private agencies, which disposed of available supplies but were charged with profiteering and then replaced by distribution through cooperatives and a government corporation. Even now, before this corporation can fully establish itself, distribution will begin through the agents of the domestic fertilizer producers. Since these factories will produce more than the immediate needs of the country, the imported supplies, on which the Agricultural Development Corporation and cooperative development were based, will no longer be available to them. Undoubtedly the management of the new factories will take advantage of these existing facilities but the elaborate machinery for import will not be required. Even within Pakistan the developments have not been parallel in the two wings.

Private import of fertilizers has practically stopped except in Turkey it is allowed under a system of allotments. The terms of import, duty free as an essential agricultural input, are excellent but at least one major importer stated without qualification that he could have sold twice his allotted quantity. The replacement of imported mixed fertilizer in the Caspian region of Iran with indigenous products has created local shortages, in part at least, because the new distributing organization has not developed sufficiently. The Turkish agricultural supply agency, which was seen most intimately, perhaps because it is older and more experienced, seemed to be the most efficient of those observed.

Retail sales were handled through direct sales from branch offices of the wholesale agencies, through their agents, through cooperatives and by commodity purchasing and processing organizations, such as sugar factories and tobacco companies.

The branches and cooperatives normally supplied fertilizer at the lowest cost but in most cases private agencies could sell significant quantities of fertilizers in the same community. Sometimes these private sales were accomplished through more aggressive selling, sometimes by maintaining flexible, rather than institutional business hours, and sometimes through supplying credit beyond the limited capacity of controlled government agencies or cooperatives.

It should not be inferred that all the difficulties are organizational. The physical problems are formidable and the rapidly changing situation complicates matters. East Pakistan has changed over the last five years from importer, to exporter, and to importer again. Within a few years the exports should exceed local consumption of fertilizer and again within no more than the six or seven years from now domestic demand again will absorb the entire production. This shifting pattern makes it impossible to install permanent port and terminal facilities, except for the most adaptable types. The rapid changes in volume and direction will certainly strain the capacities of both the ports and railways. The projections in Iran and Turkey are a bit simpler. Iran will probably continue to be a net exporter of fertilizer and the proposed factories at port locations will minimize the need for internal transport. The gradual increase in domestic usage can be accommodated readily. Turkey will remain a net importer for some time, with indications that as local nitrogen facilities are installed and imports are no longer necessary, the import of phosphate rock and potash will be substituted.

#### Transportation of Fertilizer

The calculations based on the minimum requirements of fertilizer use in 1975 indicate 745,000 carloadings will be required to handle the material and the consequent produce and in 1990 almost two million as shown in Table 8.

TABLE 8  
Carloadings to Handle Minimum Fertilizer  
Requirement and Resultant Agricultural Production  
(Thousand wagons 20 ton capacity)

	<u>1975</u>	<u>1990</u>
Turkey	309	815
Iran	86	214
Pakistan	350	942
Region	<u>745</u>	<u>1,971</u>

This calculation was based on an average 45 percent plant food content for solid fertilizer and ten tons of grain from each ton of nutrient. It can be agreed that substantial portions of the agricultural produce will be consumed on or near the farm, not requiring commercial transport but this is offset by the materials to be handled for making fertilizer and packaging for both the fertilizer and agricultural commodities.

For Pakistan alone this movement will amount to ten one-hundred car trains per day and these will not be despatched uniformly over the year but will show definite peaking before planting and after harvest. Again if we choose to accept plan targets as more realistic, the need will be two or three times as great. Not all movement will be by rail of course but normally two, three or four trucks will be required to carry as much as one rail wagon.

This leads to another observation of the Seminar. Anomalous rate structures made it less expensive to ship fertilizer by truck, even up to 600 kilometers, than to use rail. The raw materials to produce superphosphate in West Pakistan have higher rail tariffs than the finished products but in most cases long distance movement of fertilizers was more economical by rail than by truck. The Shiraz plant in Iran must ship by truck because it has no rail service.

### Storage of Fertilizer

Warehousing of fertilizers was a confused problem except in Turkey. In that country strategically located regional warehouses were accepting most of the available supplies to meet seasonal demands. Some fertilizer shortage still exists and they might not be adequate if full farm requirements could be met. In the meantime the factory stores at Kutahya are lying empty and will probably be more than adequate to store buffer stocks after the current expansion in nitrogen fertilizer production is complete. In Iran, with a more difficult internal transport problem, regional storage to meet seasonal demands seems absolutely essential. Since storage at some point is required to achieve production efficiency, the only real question is whether the storage should be located at the factory or in the consuming areas! The possibility of high utilization of transport facility argues strongly in favour of regional storage.

Even at the regional level all storage need not be in central warehouses but advanced stocking at 60 to 90 days in the weather-proof local warehouses is desirable. Such stocking, practised in East Pakistan, is good insurance against seasonal inaccessibility with the onset of the rainy season. Acceptance of advanced deliveries involves direct expense and an element of risk for which dealer or user must be compensated.

Local storage, particularly at retail outlets is likely to be poor because the return on small quantities of fertilizer is low. For the time being this must be accepted. As economic conditions improve

and all-weather roads can be built, larger more adequate stores and a delivery system to reach the farm or the village will develop.

Common complaints are shortage, even when unsold stocks existed, delays in delivery, and that the wrong fertilizers were supplied. This last was often based on misinformation or poor market preparation. Inconvenient sales hours were often the main complaints of farmers.

Although none of the financially sound means of distribution should be abandoned in the search for an ideal system, those which provide a financial incentive to the organization and the employees are most likely to accomplish their purpose. The sugar companies are good examples of this, they are providing seed, fertilizer, and technical support to their growers. In many cases good practices such as rotation are basic requirements of the growers' contract. Since the receiving stations are within normal delivery distance for the sugarcane or sugar beets, they also are convenient supply points for fertilizer, although at times not in exactly the same location. Since the planting and fertilizing time, at least for beets, do not overlap with the harvest time, the same staff can do both distribution and receiving. The visits of agronomists to the field not only assist the farmer to get maximum yield but also allow the factory manager to have progressively improved estimates of his potential production. Finally, credit extended through this same organization is protected by securing good farm production, allowing the grower increased profits and loans are collected with minimum risk and inconvenience to both the company and the farmer by systematic withdrawals from the payments at the time of delivery of the beets or cane.

#### Financing Fertilizer Use

Credit is a major problem for farmers, dealers and producers. Government farm loans or government financed loans were found to be at very low rates of interest but except in some very old and well established cooperative societies in Turkey there were complaints that processing of applications was slow, frequently requiring repeated visits to the loan office, and then still another store must be visited to purchase the fertilizer. Often the terms of the loan restricted the free choice of fertilizers, requiring purchase from one store offering a single product. There were also complaints that the amounts available to an individual farmer, except when land was offered as security, were not realistically related to the costs of crop production, especially

the costs of production of new high yielding varieties.

Poor collections of loans has plagued most of the official lending agencies. This has cut into their available funds and farmers with overdues have been excluded from further credit. This has made agencies overcautious in matters of security, for example, limiting loans to farmers with lands to mortgage and denying it to the vast number of farmers who rent their land. A second cause of low collections is that the loaning agencies are not directly interested in crop production and neither assist nor check the progress of the borrower's crop. Finally, the terms of the loan, in some particulars unreasonably restrictive, usually gave sufficient time after harvest for the crop to be sold or consumed before repayment was made. Thus it became a simple matter for the farmer to use the credit, produce a good crop, consume the income and have nothing for the succeeding crop and no way to repay the loan.

The sugar companies cited earlier, even when semi-official, have avoided most of these pitfalls and seem to offer a basic scheme which might be adapted to link better financing with better production and full repayment except in times of genuine disaster.

Simple private loans play an important role even today. One very satisfied farmer in East Pakistan was a sharecropper, returning half of the produce of about five acres to his landlord. However, this landlord also shared half of all of the cash outlay, purchase of improved seed, fertilizer, and insecticide. Both profited. The landlord also sold this farmer's surplus, a potential source of abuse, recovering the loan. Having his more comfortable economic position, the landlord apparently held the grain, sold it on favourable market, and increased his profits. Recognizing the hazards of potential abuses, this type of contract should be strongly encouraged by all governments. It makes private savings available for productive use. It improves the position of the tenant and the income of the landlord. It protects the tenant from contracting a long term unpayable debt. Finally, it increases the supply of food, paddy is the example, to the country.

Another example of private credit was seen in western Turkey. In this instance the fertilizer dealer extended credit, an important service to farmers who could not obtain enough to buy their requirements through officially sponsored agencies. This was highly specialized credit available to the heavy users and those whose conventional credit worthiness could readily be established. While this may not

meet some social development goals, it can have a major impact on agricultural production because it assists the most progressive, market-oriented farmers. In spite of the deficiencies, private credit is and can be most important in agricultural development. Guidelines, sample contracts and disciplinary action against those who abuse their wealth are necessary but complete substitution of government credit circumscribed by all of the normal official checks and balances should not even be considered.

Estimates of minimum credit requirements in each country by 1975 and 1990 are given in Table 9. These were calculated assuming that half the fertilizer used would be purchased from earnings but that the remainder would be bought on credit. It also assumes adequate repayments and interest to cover costs and bad debts.

TABLE 9  
Projected Credit Needs of Farmers  
(Million dollars)

	<u>1975</u>	<u>1990</u>
Turkey	51	134
Iran	14	35
Pakistan	<u>57</u>	<u>154</u>
Region	122	323

The credits available to dealers did not appear to fall into any pattern. Often this credit seemed to be secured by tardy payment of obligations. In other cases, specific short term loans were arranged. As a general rule the margins, particularly through cooperative distributors did not adequately allow for the cost of these inventory loans. This, although viewed as a saving for the farmer, normally delays stocking and advance procurement eventually denying at least some of the farmers vitally needed fertilizer with which they could raise their production and income. This results in a net loss not only to the individual but to the country as well.

An inflexible system of dealers credits also increases the production costs by requiring more working capital and factory storage. Also it will increase capital investment in rail and motor transport facilities if highly concentrated seasonal demands are to be satisfactorily met.

The necessary investment in fertilizer production has already been mentioned along with other aspects of production. Both Iran and Pakistan have attracted foreign capital and foreign collaboration in nitrogen fertilizer plants. Although other countries have offered rather liberal terms to foreign investors, the choice of collaboration in fertilizer production seems to be closely tied with permission for the associated companies to participate in the development of mineral resources within the host country. Production in Iran will be export-oriented and a net foreign exchange earner. Although Pakistan may export for a time the cost of foreign collaboration will have to be earned by other exports, to earnings which now are spent on the import of grain and fertilizer.

Since all of these investments are serviced on a payment out of profits, there is no obligation to the foreign share holder until a necessary product has been manufactured and sold. Capital obtained through loans on the other hand bears no direct relation to either productivity or to the ultimate use of the fertilizer by farmers. One problem facing all fertilizer producers is the keen competition for investment funds both local and foreign. Pricing policies must be realistic and allow profits from fertilizers to equal or exceed those from other investments or the capital will go elsewhere within the country. For the foreign collaborator the return must be better, or at least better assured than that available elsewhere.

Fertilizers will have a sizeable impact on the entire economy. The first effect is of added income to construction workers and their production personnel. These people will draw new service industries to supply their needs. The next, or concurrent step, is the expansion of the shipping and fertilizer marketing staff. Once the fertilizer is sold, usually involving one or several credit transactions, the farmer will use it to produce more food, or other crop. The surplus production will certainly be above the producers immediate needs and move into commercial channels where this will be multiplied again. For each rupee, rial or lira invested on fertilizer five or six will be added to the national income.

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## SEED BREEDING AND PRODUCTION

BY

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It has been proven that improved seed production is one of the simplest ways to improve the quality of agricultural products and increase levels of production. Increases in yields based on improved seed varieties have been said to be as high as 35 percent. Improvements in quality have always included a wide range of features and characteristics, such as:

- disease resistance
- drought resistance
- resistance against undue rains
- winds
- weathering and falling
- alkaline and saline resistance
- marketability
- desirable baking qualities

The following are some of the extension activities carried out by the Extension Organization on the demonstration farms in Iran.

Cotton - Short staple cotton is more desirable and in demand by our domestic gins, mills, plants and markets. The following short staple varieties are grown:

- a. Coker No. 100 Wilt, best adapted to all zones and areas
- b. Acala No. 1517C, best adapted to Shiraz and surrounding area
- c. Variety No. 108F, best suited for colder climates, Azerbaijan
- d. Variety No. 349, which has proved to be wilt resistant and adaptable to the Kurd Kuy cotton zone of Gorgan, where it is intended to replace the Coker No. 100 Wilt Variety.

Jute and Hemp - In Iran the Costarrican special variety was cultivated until the end of this year. The Cuban 108 variety will be replacing it gradually through extension teaching and training, as it has already shown better yields in comparative field experiments.

The main fiber jute growing regions of Iran are Gueelan and Western Mazandaran. But actually the seed of the Cuban No. 108 variety crop is produced in the south around Dezful and Darab. The actual fiber crop is produced in the northern jute area around the demonstration farms.

Soya - As this plant is quite sensitive to light and temperatures above  $38^{\circ}\text{C}$  stop its growth, the most suitable soils, degrees of temperature and humidity, as well as planting time and length of daytime required for the blooming season must be decided in advance.

Sunflower - Improved, desirable strains and varieties, as established by local experiments, should be introduced. This is usually done through the cooperation of the extension agents.

Rice - The leading rice area of the country has the same geographical latitude as that of southern Japan and enjoys almost the same climatic conditions. It follows that the varieties and strains of rice grown in the Caspian Area of Iran are similar to those grown in southern Japan. This has already been confirmed by the introduction of the Japanese short varieties No. 172, No. 346 and Taychung 65. The latter has done much better than No. 172, which is a taller but less productive variety than the Taychung. The local rice growers have been harvesting quite attractive crops of Taychung 65 variety. One produced a total yield of 45 tons of paddy rice on five hectares with this special Japanese short variety rice.

Nevertheless, the local tastes of the people being different because of different social and cultural habits, our native consumers have traditionally preferred the long grain Indian varieties. This explains why the extension organization has been endeavoring to publicize the two Feeruz and Mehr long varieties that have been developed by our Research Institute. This is usually done through demonstration farms.

Wheat - Based on the latest figures obtained our wheat production has followed this pattern:

Dry farmed winter wheats	1,950,000 hectares
Irrigation winter wheats	1,850,000 hectares
Irrigation winter wheats	150,000 hectares
Dry farmed winter wheats	150,000 hectares
TOTAL	<u>4,000,000 hectares</u>

The figures indicate a total dry farmed cultivation of 2,100,000 hectares of wheat, in spite of the fact that nature has not granted us adequate rainfall and that 70 percent of the 80 percent of the total rainfall precipitation of the country provided through winds borne with moisture from the Mediterranean Sea, is neither evenly distributed over the year, due to irregular westerly winds, nor evenly over the total land surface of the country, because of scattered elevations. The remaining 20 percent of the land surface of the country, is irrigated by rainfall from the Indian Ocean which falls 10 to 12 times within the entire year.

In spite of all the difficulties encountered, certain resistant varieties of wheat have been developed. The variety known as the Azar, named after Azerbaijan, is a drought and rust resistant winter wheat and grows in the colder states of the country. The Ommid variety is grown mainly on the irrigated demonstration farms, though a winter wheat itself, and relatively drought resistant. The Zar-Joe, or the Golden Barley is a similar and familiar crop in these areas, where barley is also grown.

In the tropical southern sections of the country the famous Sho'leh or Flame spring wheat is cultivated as a dry farm and irrigated variety and does particularly well here where spring varieties usually flourish, because of mild winters. The familiar barley produced in this area is called Zafar Joe or Barley of Victory.

Two main grain producing zones, Azerbaijan and the hot Khuzistan, lying between the two extremities of the cold regions, should be noted here.

- a. The dry and hot inland deserts is where the famous Tabas variety of spring wheat and the Gohar Joe barley are grown on demonstration farms for extension purposes.
- b. The moderate zones where the Rowshan and the Zar-Joe strains of improved wheat and barley varieties are grown for demonstration and extension purposes.

Where the grain producing areas such as Gorgan, Mazandaran and the Plains of Moghan enjoy a Mediterranean climate, the Aqua Turkey wheat strain is introduced to the farmers. This special variety is a hardy wheat and can stand all unfavorable local conditions.

Other reliable strains and varieties of wheat have likewise been developed: Shahpassand, the Italian Rayhani, Adl, the Dehghani, the Khaleej, Narmeyeh Karun, Dastguirdi, Javanjai etc., which can just as equally be introduced and recommended to the producers, under similar climatic conditions, or zones, as those already named earlier, if the latter happen to have gone out of stock.

The services and achievements of the Extension Organization, as far as the introduction of reliable varieties of improved grain seeds in general, and those of wheat, barley and rice referred to above are concerned have been worthy of praise and pride. Out of a total number of 2,500 demonstration plots created across the country within the last year, by the Extension Agents and Officers of the Extension and Development Corps, only 1 percent has failed to produce effective or desirable results, and that due to torrents, floods, hail storms and inadequacy of water supply etc., but the remaining 99 percent have produced successful results. More than 70 percent of our farms have produced a yield already 50 percent higher than those operated by similar neighboring farmers using only native seeds.

The diversity of climate in Iran constitutes one of the great wonders of the world, since extremities in temperature similar to those of the equator, on one hand and the Poles on the other, can easily be located in Jazmuriyan, of the south, and the Damavand, of the north, respectively. In the district of Kerman for instance and in a distance of one single mountain we find the Baft area on one side, with moderately cold weather and the Jayruft area on the opposite side with hot desert weather.

Under these diverse and adverse local climatic and geographical conditions the Extension Organization has had to operate, select, introduce and recommend seeds and varieties best suited to each climate, with only a limited stock of available varieties of improved seeds and some demonstration farms to work on. The work is by no means done and shall continue.

In concluding the first part of my lecture, I would like to recommend an interchange and exchange of reliable seed varieties and

stocks between the Member States for further full cooperation and development, subject of course to the mutual consent and approval of the respective Research Organizations of each country. This shall especially hold true if new varieties are developed by cross breeding, particularly because the Member States naturally enjoy similar climatic zones or regions. Subject to the close cooperation and consent of the concerned Research and Extension Organizations of each Member State quite useful seed-exchange programmes could be devised. Our Sho'leh, Tabassi and Rowshan varieties, for instance could be introduced into the similar climatic zones of Pakistan, while others, such as the Ommid and the Azar could equally be used in Turkey.

### Cultural Practices and Production

As far as cultural practice are concerned, in respect of summer crops and sugar beets, in particular, the Organization, has enjoyed equal success. Levelling being a vital cultural practice in row crop production, the operation cannot easily be followed on a great many local fields due to unfavorable topography. Where levelling has not been feasible, small plots have been created and row cropping under submerged irrigation methods introduced. But where local topography of land has made it possible, and the financial ability of the farmer, or the landlord, made it successful, rather bigger plots have been created, following levelling, and row cropping under border strip irrigation methods used. This has thus become the usual practice on some of the large cotton fields as well as the sugar beet fields operated under the state owned Beet Sugar Mills and Plants. These recommendations were given by our Extension Agents, now cooperating with their fellow officers serving the Extension and Development Corps.

Based on support granted by the State Sugar Beet Breeding Executive Committee, row cropping has not only been introduced into the sugar beet production enterprise, it has also proved equally successful in the production of other cultivated crops.

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HOW TO GET NEW AND IMPROVED SEEDS  
TO TURKISH FARMERS

BY

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New and improved varieties of seeds may only be grown in Turkey by Agricultural Research Institutes, Seed Improvement and Experiment Stations, or State Farms which are inspected by and under the supervision of Seed Improvement and Experiment Stations. After certification and registration of seeds they can be utilized by State Economic Enterprises, municipalities, government offices, organizations operating under the supplementary budget, private organizations, or any person either private or juridical. This control and permission is governed by Law No. 308, August 21, 1963. All control and inspection is vested in the Ministry of Agriculture by this law.

First, all improved varieties which have been found recently, by Agricultural Research Institutes and Seed Improvement and Experiment Stations are given to the head office of Regional Uniform Variety Test Organization in order to be tested in different regions of Turkey. After testing for a minimum of three years, the subject of improved varieties is brought to the National Cereal Committee with a report that states all the special qualities of these new and improved varieties. After the acceptance of these varieties by the National Cereal Committee, they are sent to an Approval Committee. The new and improved varieties are registered by the Ministry of Agriculture which lists the morphological, biological and agricultural qualities and the best methods of utilization. The new varieties are then announced in the official newspaper. After these steps, foundation seeds that are grown in Seed Improvement and Experiment

Stations and Agricultural Research Institutes are sold at a set price to state farms and contracted farmers. The certified and registered seeds that are grown by state farms and contracted farmers are delivered to the farmers either directly or by the extension service. The certified and registered seeds are delivered to the farmers in either of the following ways: (a) According to law number 5254; (b) An assurance letter by a bank; (c) Cash money; (d) A joint security and by agricultural credits.

Except in the case of cash payment farmers either as a group or alone are sent to the Agricultural Bank by the county agent with an official document sent by the head master of the village which is closely examined by the Regional Farm Bureau so that farmers may have the advantage of seed credits.

#### HOW TO TEACH FARMERS TO USE THE NEW AND IMPROVED SEEDS

While the new and improved seeds which will be delivered to the farmers are grown on state farms and with contracted farmers, field days are organized for the farmers to familiarize them with the new and improved varieties and the farmers personally see the varieties. Another way is to show the farmers the demonstration experiments which compare the old and new varieties. These experiments are conducted by the extension service in several districts of a province. Farmers are given the technical details about the farming methods for these varieties by Technical Bulletins for farmers from the extension service. Also technical information about the new and improved varieties are broadcast on the farmers' hour.

Cereals - Improved varieties which have been found recently by the Faculties of Agriculture, Agricultural Research Institutes, and Seed Improvement and Experiment Stations are given to the head office of Regional Uniform Variety Test Organization in order to be tested in different regions of Turkey for a minimum of three years. In these tests new and improved varieties that give the best result are submitted to the National Cereals Committee. After the acceptance of these varieties, they are registered by the Approval Committee and are announced in the official newspaper.

Then the foundation seeds which will be delivered to the farmers are grown by Agricultural Research Institutes, Seed Improvement and Experiment Stations or State Farms which are under the inspection

of Seed Improvement and Experiment Stations. After the field inspection and laboratory tests are completed and approved by the certification organization, the foundation seeds are treated, sealed, and labeled in special packages, and sold at a set price to state farms and to contracted farmers where certified and registered seeds are grown. The certified and registered seeds are subjected to field inspection and laboratory tests by the certification organization. The varieties that are approved by the certification organization are treated, sealed, and labeled in special packages which contain technical bulletins that give information and are sold to the farmers for cash or credit.

Vegetables - Vegetables seeds are sold to the farmers by following the same procedure as cereals.

Nursery Stock - In this case the procedure for delivering improved varieties of fruits to the farmers is a little different from the procedure which is followed in cereals and vegetables. The new varieties are planted in Horticulture Experiment Stations which are established in several regions of Turkey by taking into consideration the growth peculiarities of several kinds of fruits of the country. Farmers may buy the new varieties as nurslings and learn the technical information from the extension service and Horticulture Experiment Stations.

Cotton - New and improved cotton seeds are also sold to the farmers by following the same procedure as for cereals and vegetables.

Tobacco - In this case new and improved seeds are delivered to the farmers by the same procedure by the Ministry of the Customs and Monopolies. New and improved seeds are grown by the Tobacco Research Institute and sold to the farmers.

Sugar Beet - In Turkey growing of sugar beets is organized by the Turkish Sugar Factories Joint-Stock Company which belongs to the Ministry of Industry. Every sugar factory has an Agricultural Head Office and regional chief. These organizations contact the farmers personally, and according to the principles of the contract they inspect and give technical information from planting until the harvest. Seeds and planting equipment are given to the farmers without cost. Money needed for hoeing and upkeep is given in advance by the factory. Farmers who are bound to the company by special contracts may sell their products only to this company according to a price that is fixed and announced by the government each year.

Hazelnut - Just like Horticulture Experiment Stations, the Hazel-Nut Research Station in the province of Giresun which belongs to Ministry of Agriculture delivers the improved varieties to the farmers. New and improved seeds of peanut and oil crops are delivered to the farmers by following the same procedure as in cereals, vegetables, and cotton by related research and experiment stations which belong to Ministry of Agriculture.

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## IMPROVEMENT OF GRAIN LEGUMES

BY

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A research program for the improvement in the production of grain legumes (pulses) in the Near East South Asia and Far East Regions is in progress at two centers. These centers are located in Iran and India. More than 28 million hectares of pulses are grown in these regions. This constitutes approximately of three-fifths the world's acreage of these crops.

Grain legumes, or pulses, supply a major part of the vegetable proteins available for human diet in the developing regions of the world. For the masses of people, grain legumes often are the only source of high protein foods. Being of the legume family, they are of value also in maintaining soil fertility through nitrogen fixation.

The predominant grain legume species grown in these countries are chickpeas, pigeon peas, dry beans, broad beans, and lentils. Many, like chickpeas, are grown during the dry season without irrigation and use residual soil moisture. Substantial acreages are interplanted with other crops. Yields, however, are generally low. Low yields are largely attributable to inferior varieties, lack of fertilization, poor crop, soil and water management, and inadequate pest control.

Research at these two centers is conducted cooperatively by the host country and the U.S. Department of Agriculture by means of funds chiefly from the U.S. Agency for International Development. The host country contributes land, laboratory and greenhouse space,

and assigns a number of professional personnel to the project. The U.S. contributes four senior scientists, including a plant breeder, an agronomist, an entomologist, and a plant pathologist, and finances the costs of sub-professional assistance, field labor, equipment, and supplies. Work was initiated in Iran in 1964 and in India in 1966.

These centers serve as regional headquarters for the staff and are also the location of the most extensive research. In addition, co-operative work is being initiated with interested research institutions in other countries of the two regions.

The ultimate objective of the project is to increase production per unit area and improve quality of grain legumes for all areas in which they are grown. Concentration of the research at the two centers permits intensive work on the various problems. Objectives, however, are regional in aspect and encompass problems encountered in all areas where the crops are grown. Products and methodology developed with the intensive research are being used and adapted in various climate-soil environments.

More specifically, the research objectives include:

Plant Breeding - Collection of germ plasm of the several species of grain legumes grown in the region. Coordination of regional testing programs of available varieties. Development of a seed multiplication system to assure availability of seed of superior varieties. Initiation of breeding programs designed to develop improved varieties.

Plant Pathology - Determination of the important diseases causing production and quality losses in grain legumes and development of control measures through use of fungicides or breeding of resistant varieties.

Entomology - Determination of the importance, distribution, and natural enemies of principal insect pests, to evaluate resistance of germ plasm and to develop control measures through development of resistant varieties or use of insecticides or biological control.

Soil and Crop Management - Determination of soil and crop management practices that will maximize yields by studying the effects of moisture fertility, plant population densities, and time of planting. Determination of distribution of efficient strains of rhizobia in the soil and the introduction of such strains where necessary.

Progress in the program to date (particularly at the Iran Center) includes field testing of world-wide collections of strains and varieties of chickpeas, dry beans, lentils and cowpeas. More limited testing has been done for other species. Also, the principal diseases and insects affecting the different crops have been identified, and information regarding varietal resistance has been obtained. Research is underway to determine inter-relationships of soil moisture, fertility, and plant spacing on production of the different pulse crops.

It is anticipated that this research will be of a continuing nature. However, it is expected that the host countries will gradually assume leadership of the project as their personnel attain the required training and experience.

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## LIVESTOCK EXTENSION ACTIVITIES IN EAST PAKISTAN

BY

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Potentiality for Improvement - The potentiality for improvement of cattle in East Pakistan is considerable. Experiments show that a little care in feeding and management can double or even triple production within a short time. General malnutrition over generations is primarily responsible for the poor productivity and waste. Wherever pasturage facilities could be provided productivity has been found to be quite satisfactory and resulted in the growth of milk production. For example, from one village in the North Bengal area as much as 2,000 maunds (a maund = 40 litres) of milk is produced daily from a cattle population of nearly 40,000. If more facilities could be provided, the production would go up considerably more.

Climate and Parasitic Problems - The tropical heat, heavy rainfall and general marshiness, typical of the southeast Asia region have also contributed to increasing the difficulty in raising livestock with high productivity. Such atmosphere and topography make the area very suitable for growth and multiplication of the various types of intestinal and blood parasites. This plus extreme land scarcity subjects the livestock to parasitic infestations.

In order to meet the challenge of parasitic infestations, regular deworming has been intensified and will be further intensified with availability of more funds. As opposed to a sum of Rs. 0.25 million this year, Rs. 1 million will be spent next year to purchase essential drugs, the bulk of which will be composed to anthelmintics (deworming of medicines). Factories and chemical industries to manufacture essential drugs are increasing. It is estimated that simple parasite control would result in a considerable increase in the draught power and productivity of the animals.

Contagious Diseases and Measures Adopted - Until 1958, Rinderpest was responsible for the mass destruction of thousands of head of cattle every year, completely ruining hundreds of farming families and striking severe blows to cultivation. With the use of freeze-dried goat tissue vaccine, manufactured in the Veterinary Laboratories of the provincial government, and its wide-scale and systematic use in the field this fall, disease has been kept under complete control.

Since last year freeze-dried vaccine for Newcastle disease, manufactured by us, is being used in the field. Until then we had to depend on the wet vaccine locally prepared, but it lost its efficacy very easily, particularly under summer temperatures. Use of the freeze-dried vaccine has already shown satisfactory results. Laboratory facilities have been expanded to produce sufficient quantities of freeze-dried Newcastle vaccine for field use. It is estimated that control of this single disease in poultry in East Pakistan will triple the poultry population in two to three years.

Poultry in East Pakistan - Hardly any household in East Pakistan can be found, particularly in the rural area, where there aren't maintained at least half a dozen poultry. Thus the whole province may be regarded as a big poultry farm. The housewife maintains these birds at virtually no extra cost, and this little backyard poultry farm contributes much to the rural economy. It is not considered wise to upset this economy with a sudden introduction of quality breeds of birds which will require much more care and attention and extra maintenance cost, as this may prove to be too much for many housewives. We therefore aim at gradual improvement of the local stock through judicious introduction of improved varieties of cocks for crossing with local hens.

Field Staff - Mass vaccination programmes for protecting livestock and poultry require large field staffs. Until 1960, the Directorate of Livestock Services in East Pakistan had only 300 technical graduates, assisted by a similar number of semi-technical fieldmen called Veterinary Field Assistants, for disease control, treatment and extension activities. The technical graduates used to undergo a three-year diploma course, after the school leaving certificate. In the whole province there were only 39 veterinary hospitals and dispensaries. Today, there are over 600 technical graduates, assisted by a similar number of semi-technical field staff. Now there are for over 1,000 technical graduates 1,250 semi-technical field staff, 500 veterinary compounders and dressers and 100 poultry technicians. In each of

the 54 subdivisions of the province there has been established a veterinary hospital and in 250 Thanas (out of a total of 411) a veterinary dispensary. The remaining Thanas will each have a veterinary dispensary by 1970. (Treatment facilities at the veterinary hospitals and dispensaries are provided free of cost to the farmers). A proposal for one veterinary field assistant in each of the 4,000 Unions of the province is under active consideration by the government. The idea is that each field assistant will be responsible for protection of all livestock and poultry against known epidemics in the Union and will also be responsible for general extension activities concerning livestock under the supervision and guidance of the technicians. The technical graduates are now given a six-year course at the Veterinary Faculty of the Agricultural University. The semi-technical veterinary field assistants receive intensive training for a year after receiving a school leaving certificate. There is provision for inservice training for all categories of staff, and each individual has to undergo inservice training for a period of one to two months every five years in order to keep acquainted with modern developments in his field. There is a Veterinary Training Institute to provide both preservice and inservice training to the semi-technical field and other staff.

#### SOME DEVELOPMENT PROJECTS

Under the Third Plan period nearly two dozen development projects have been undertaken. I would like to mention a few of the most important projects.

Dairy and Cattle Breeding Farm - A modern dairy and cattle improvement farm has been established near Dacca, with over 2,000 acres of land at a total cost of nearly 20 million rupees. The main object of this farm is to breed improved varieties of cattle to supply different areas of the province with genetic improvement of local cattle. There are also research facilities to carry out breeding experiments in order to determine improved cross-breeds suitable for East Pakistan conditions. There is a similar project for breeding improved varieties of poultry and carrying out poultry breeding experiments.

Artificial Insemination - Artificial insemination has been found to be of great value in genetic improvement of local cattle. Scarcity of fodder and feeds and communication difficulties in East Pakistan, particularly during long rainy seasons, have rendered it virtually impracticable to maintain a sufficiently large number of breeding bulls

for natural service and to render them available when and where needed. Emphasis on A.I. has already removed some of these difficulties. It requires a much smaller number of bulls and the semen can be carried easily to various places from the main centers.

Until 1965 there were six main A.I. centers with four subcenters attached to each center. During the Third Plan period two to three main centers are being established every year. Each center will have about four subcenters. By 1970, each of the 17 districts of the province will have one main A.I. center and each of the subdivisions of the province will have a subcenter. The ultimate aim is to establish a main center in each of the 54 subdivisions and a subcenter in each of the 411 Thanas of the province. From each center about 5,000 cows are being inseminated annually. Average conception rate is 60 percent.

Until recently, there was some prejudice against artificial insemination, particularly among the rural people. Due to the untiring activities of the field staff and the good results achieved from the improved A.I. progenies, the prejudice has almost died out. In the areas where A.I. centers have been functioning, great enthusiasm for artificial insemination now prevails among the local people.

Training of Villagers - In order to train the villagers in scientific methods of cattle and poultry breeding and dairying, a scheme has been introduced this year. The people interested in such work will be trained in groups at the government farms. The training will be mainly practical and will extend over a period of four months. During the training period, each trainee will be given an allowance of 601 rupees per month besides being provided with travelling expenses. There will be about 25 trainees in each group, and two groups will be turned out every year. On completion of the training, they are expected to go back to their villages and undertake livestock and/or poultry farming in a bigger and better way and to teach others in the villages.

Feed Mill Plant - As previously mentioned, shortage of feeds and fodder is the biggest problem for livestock improvement in East Pakistan. In order to remove this difficulty, to some extent at least, the government has recently established a Feed Mill Plant at Dacca. Balanced rations for cattle and poultry are being produced at this plant and sold to the people at cost. It is expected that this government lead will, before long, encourage private enterprise to take over Feed Mill Plant operations in gradually increasing numbers.

HOW BASIC SERVICES OF THE VETERINARY DEPARTMENT  
HELP THE FARMER GET MORE RETURN FROM HIS LIVESTOCK

BY

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ANIMAL PRODUCTION POTENTIAL OF TURKEY

Our country is very suitable for animal production based on ecologic, social and economic factors. As a result, the animal production potential of the country is of great importance. According to 1964 statistical data, the animal population of Turkey is around 70 million, including sheep, cattle, buffaloes, Angora goats, ordinary goats, camels and singlehoofed animals (horses, mules, etc.). In spite of this high animal population, production per unit is of a very low level compared with the figures of developed countries.

The causes and factors that are the main obstacles to the development of animal production could be summarized as follows:

1. The structure of animal production is primitive.
2. The animal population is composed of the variety and breeds of animals that have low economic value.
3. The marketing services and functions related to animal production are inadequate.
4. Basic services that are needed to apply advanced technology for improving production functions are also inadequate.

To aid in removing the causes which hinder the improvement of animal production mentioned above there is a veterinary organization in the Ministry of Agriculture. This unit has been carrying out the basic services with specialized personnel throughout the country. Organization charts, responsibilities of this organization and functions are briefly shown in the attached charts.

#### RESPONSIBILITIES UNDERTAKEN BY THE GENERAL DIRECTORATE OF VETERINARY SERVICES, UNDER LAW 3203-ITEM 9

1. To control contagious diseases of animals throughout the country (there are 32 to be compulsorily combatted by the Organization).
2. To prevent zoonitic diseases, to control animals and animal products.
3. To improve breeding characteristics of animals to get increased per unit production.
4. To supervise any kind of animal product, animal housing and animal feeds, and to analyse the feeds given to animals.
5. To produce and control all kinds of vaccines, sera and like biological substances; to import some of them if necessary, and to control imported biological substances.
6. For the above mentioned functions, to establish proper institutes and quarantine facilities.
7. To improve the livestock population for increased per unit production and better work capacity, to establish State Farms, Cattle Breeding Stations, Livestock Research Institutes, Specimen Sheep Stations, Stallion Depots; and to organize animal fairs, ring-shows, etc.
8. To establish Veterinarian Helpers' Schools and Animal Hospitals; to organize proper courses and extension services for in-service training and the training of the private sector (farmers engaged in animal husbandry and related subjects).
9. To supervise technically all institutions engaged in Veterinary Medicine and Animal Husbandry.

CHART OF FIELD ORGANIZATION ATTACHED TO GENERAL  
DIRECTORATE OF VETERINARY SERVICES

Provincial Veterinary Directorates	
Bacteriological and Serological Production and Research Institutes	
State Farms	
Cattle Breeding Stations	
Stallion Depots	
Regional Diagnosis Laboratories	
Quarantine Facilities	
Regional Food Hygiene and Control Laboratories	
Livestock Research Institute	
Animal Hospitals	
Artificial Insemination Centers	
Natural Insemination Centers	
Regional Laboratories For Specific Diseases	
Specimen Ram Depots and Merino Sheep Farms	
Veterinarian Helpers' Schools	

Provincial Veterinary Directorate  
Director  
Provincial Veterinarians  
County Veterinarians  
Veterinary Helpers

ORGANIZATION CHART OF GENERAL DIRECTORATE  
OF VETERINARY SERVICES (CENTER)

MINISTER  
UNDERSECRETARY  
ASST. UNDERSECRETARY  
GENERAL DIRECTOR OF VETERINARY SERVICES

\_\_\_\_\_ Chief of Group of Sheep and Goat  
Production and Improvement

Contagious Diseases	
Quarantine Services	
Parasitic Diseases	
Animal Movements (Domestic, Imports, Exports)	
Administration and Provision (Personnel and Logistics)	
Veterinary Health Institutes	
Horse Breeding and Race Organization	
Cattle Breeding	
Artificial Insemination	
State Farms	
Fairs, Ring-Shows and Like Activities	
Herd-Blood (Pedigreed)	
Land Utilization (feed crops and other tillage)	
Veterinary Chemicals and Equipment	
Food Hygiene and Control	
Livestock Economy	
Extension Services	
Poultry Diseases	

Asst. General Directors Divisions

10. To control animal movements (domestic, export, import) and to supervise all slaughter houses; to help the private sector in organizing activities (pedigreed breeding, credits, training and demonstrations).

## THE FUNCTIONS OF THE VETERINARY ORGANIZATION

### Veterinary Health Institutes

#### Bacteriological and Serological Production and Research Institutes

There are eight Institutes located in the provinces of Ankara, Istanbul, Elazığ, Izmir, Samsun, Diyarbakır, Konya and a new Foot and Mouth Disease Institute in Ankara.

AIM: To produce needed vaccines, sera and other veterinary biological substances; to test sample materials sent to these institutes for accurate diagnosis; to carry out research work for tackling regional or country-wide problems of sporadic or contagious animal diseases; in-service training of related personnel; to cooperate in the eradication of some specific diseases with the field organization.

The production at these institutes in 1966:

<u>Vaccines</u> (doses)	<u>Sera</u> (doses)	<u>Other biological substances</u> (doses)
42,529,774	13,617	1,685,000

(chemical products of minor importance are excluded)

### Regional Laboratories

There are four labs located in the provinces of Adana, Bursa, Afyon and Denizli.

AIM: The main purpose is to cope with specific regional problems of animal diseases and human health, the latter is realized through the control of zoonotic diseases and food of animal origin. The number of cases tested at these labs between March and October 1966 is:

<u>Disease sample material</u>	<u>Food sample material</u>
46,628	24,649

### Animal Hospitals

There are 21 hospitals where sick animals are taken by owners for inspection and therapy. The number of sick animals taken to these institutes between March and November 1966 is 49,113.

### Regional Food Control Laboratories

There are 16 altogether, 12 of which are in operation and 4 are to be ready for service in 1967.

AIM: To control any kind of products of animal origin for prevention of both human and animal health from infections and intoxications; to organize improved food technology and industry; to operate conservation-storage and transportation of animal products through proper facilities (cold storage, frigorific wagons, etc.) to help in better human nutrition; to organize export of animal products in the form and quality demanded by importer countries; to establish grading standards and to help in the marketing of animal products.

### Quarantine Facilities

According to international agreements there are at present four quarantine establishments on the borders. This number is to be increased to meet the nations' needs.

AIM: To control communicable diseases that may occur through mass animal movements (exports, imports or transits).

### Livestock Production (Animal Husbandry) Functions

#### Livestock Research Institutes

For the time being, there are two main research institutes located in Lalahan-Ankara and Ereğli-Konya. These are engaged in both basic and applied research work, although the other livestock improvement and production institutes (like State Farms, Cattle Breeding Stations, etc.) also do research.

AIM: To carry out research work for getting increased per unit production dealing with the problems of breeding, feeding and management; to coordinate and cooperate with other livestock institutions for the aim mentioned above; to train related personnel for adaption of latest findings.

## State Farms

There are seven State Farms located in Karacabey-Bursa, Çifteler-Eskişehir, Konya, Sultansuyu-Malatya, Karaköy-Samsun, Altındere-Van and Çukurova-Adana, all of which are engaged in cattle, sheep, horse and poultry breeding and quality production. Exotic breeds (like Brown Swiss, Jersey, Holstein, Herefords, A. Angus) and native breeds (like Southern Red Gray Cattle, Eastern Red Merinos, Karakul, Ivesi, Karaman, Sakız, Imroz and different breeds of poultry are the subjects studied on these State Farms.

AIM: To improve native breeds through selection, to adapt and multiply exotic breeds under certain ecologic conditions; to distribute the animals of best quality to the farmers or private breeders at low prices; to train farmers and breeders in their regions through extension work (courses, demonstrations, conferences, village visits, etc.); to provide Artificial and Natural Insemination Centers with bulls of high breeding characteristics; to carry out needed applied research to solve regional problems of livestock production and research work for crossing and adaptation of exotic breeds with native breeds.

## Cattle Breeding Stations

There are eight located in Inanlı-Tekirdağ, Kumkale-Çanakkale, Boztepe, Antalya, Maraş, Göle-Kars, Kazova-Tokat and Hafik-Sivas. On these stations, cattle breeding and production are merely considered. The aims stated for State Farms are described for these Stations too.

## Stallion Depots

There are eleven Stallion Depots scattered throughout the country, considering regional ecologic conditions and geographical situations.

AIM: Using Pure-Bred Arabian, Half-Blood Arabian, Nonius and Native Donkey Stallions to improve horses and donkeys of farmers in the region for increased work (draught) and riding capacity. Stallions of high breeding quality on these Depots are provided from the State Farms mentioned before. During the breeding season of 1966 there were 431 Natural Insemination Stations attached to these Stallion Depots ready for public service. In 1966 the number of mares owned by farmers naturally inseminated on these Stations was 51,464 and 45,764 mares naturally inseminated in 1965; in this period 7,025 male, 7,106 female foals have been born. The following table shows the number of

animals of high breeding quality distributed to the farmers each year from these Livestock Institutions (average):

Sheep (head)		Cattle (head)		Angora	Goats (head)		Horses (head)	
<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>	
1,900	1,300	550	460	300	150	300	100	

#### Artificial Insemination Centers

For livestock improvement on a larger scale, in 1966 a total of 269 Artificial Insemination Centers (fixed or movable) were functioning. Of this figure 142 were for cattle insemination purposes.

AIM: Along with the animal improvement done by different livestock institutes, animals of farmers can be inseminated artificially with semen of tested bulls and rams of high yielding breeds, resulting in increased per unit production at the farmer level. Cattle artificial insemination projects are directed toward an upgrading program using Brown-Swiss bulls in the eastern, central and Thrace regions of the country, Holstein bulls in Aegean and Marmara regions, Jersey bulls in the Black Sea Coast area, depending on the regions' ecologic conditions.

In the sheep artificial insemination program only Merino rams are being used for higher and more qualified wool production. There also are projects for higher (mohair) production through enlarging of the Angora goat population, especially in Central Anatolia. In 1965, the number of artificially inseminated cows was 123,793 and of sheep 186,199.

#### Natural Insemination

Considering geographical conditions and transportation, especially in eastern Turkey and along the Black Sea Coast in the north, 15 Natural Insemination Centers of 50 bull capacity each were functioning during the breeding season of 1966. The number of these Centers will be 25 in 1967. The purpose is to upgrade native cattle with Brown-Swiss and Jersey breeds. The number of cows naturally inseminated during the breeding season in 1966 was 15,000.

## Livestock Feeding and Supervised Credits

There is a project (supervised credits) shared by USAID for increased beef production in some selected provinces as a demonstration.

### CATTLE AND SHEEP FEEDING OPERATION AND SUPERVISED CREDIT IN COOPERATION WITH USAID

#### Brief History

This Project Agreement was prepared and signed in September 1960. The first money was made available to make loans to livestock feeders in January 1961. Five million TL. was loaned to feeders during 1961 and as of January 30, 1965, TL. 1,629,067 was still not repaid from these loans. These loans were made primarily in the provinces of Erzurum and Kars.

A study was made after the first year of operation and it was determined that the Pro-Ag must be rewritten if the objectives of the project were to be realized. The Pro-Ag was rewritten and loans were again made to feeders in the following provinces: Adana, Kayseri, Konya, Afyon, Eskişehir, Balıkesir and Adapazarı.

The following information covers the period from September 1962 to May 1, 1966:

<u>Period Covered</u>	No. Loans Made	Amount Available to Loan TL.	Amount Loaned TL.	No. Cattle Purchased	No. Sheep Purchased
Sept. 1962 to April 1963	451	13,865,000	13,200,000	21,836	39,761
April 1963 to June 1964	718	14,640,000	19,565,400	24,164	60,083
Aug. 1, 1964 to Jan. 30, 1965	526	14,864,659	14,864,659	19,220	47,557
Jan. 30, 1965 to May 1, 1966	549	14,864,659	14,559,321	18,407	49,043

	<u>1962</u>	<u>1963</u>	<u>1964</u>
	TL.	TL.	TL.
Supervision	--	25,029.90	32,527.30
Demonstration	4,265.62	11,149.77	57,097.00
Education	--	62,000.00	26,502.50

Farmers also are getting credit from Agricultural Bank sources for the same operation. By this credit, in the period August 1, 1966 to January 30, 1967, 1,836 people obtained TL. 13,876,730. They were feeding 44,706 head of sheep and 32,955 cattle from the two sources. Farmers were also operating feed lots using their own sources of credit.

Recently farmers accepted and used open lot feeding operations. For that reason in 1966 we organized and demonstrated open lot feeding at Mersin, Burdur, Isparta, Eskişehir, Afyon, Balıkesir, Konya, Adana, Isparta, Kütahya, Bilecik, Sakarya, Denizli.

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## THE HOME EXTENSION PROGRAM IN IRAN

BY

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Before discussing the home extension activities in Iran, I would like to talk briefly about the duties of rural women in the village and the problems they face. This will clearly indicate the importance of the program, and the need for its execution all over the country. The extension program is fully accomplished only when the family unit is trained and instructed; not only the men, but the women and the children as well.

More than 75 percent of people in Iran live in rural areas; almost half of them are girls and women. Calculating the total population of the country as 25.5 million inhabitants, about 17 million of them live in the rural areas; they earn their living directly or indirectly from agriculture, and half the number of these people or nearly 9 million are rural girls and women. Considering the ratio of this last number to the total population of the country, we realize the importance of acquiring knowledge about rural women, their life, problems, difficulties and finding attainable solutions. Rural women have three main responsibilities:

- Housework - As a housewife, she has to do all the work about the house, which is cooking, sewing, washing, cleaning.
- Child care - As a mother she has to feed, clothe, and provide a safe and healthy environment for the family as well as maintain happy family relationships.

- Farm tasks - As a farmer's wife, she spends much of her time in the field, helping her husband with the crops and animals.

An example of the kind of work being performed by men and women in the rice-fields in Gilan is shown below:

<u>Type of Work</u>	<u>By Men</u>	<u>By Women</u>
Land preparation	X	
Planting in the nursery		X
Transplanting		X
Irrigation	X	
Weeding		X
Harvesting	X	X

Following are other specific areas of work being done mostly by the rural women.

- Poultry
- Animal husbandry
- Dairying
- Food and seed preservation and storage
- Picking and packing the fruits and vegetables

Recognizing that nine million women and girls are living and working in the rural areas it is necessary to have information about how they are performing their duties and the role they can play in the development of rural areas. Such information has been collected and it is evident that the women are not performing their duties effectively because of lack of knowledge and skills.

To help improve this situation and to speed up rural development which has become more urgent since the beginning of land reform, the government has given more support to agencies working in the rural areas.

The Home Extension Program was established as a part of the Agricultural Extension Program in December 1957. The Ministry of Agriculture then was convinced that programs in rural areas are impossible without considering women and the family unit as a whole. So the Iranian Extension Organization has developed a family approach with programs for men, for women, and a youth activity program. With the help of Agricultural agents and home agents both men and women have received training that enabled them to secure a sound life and improve their standard of living.

Home Economics extension goals are:

- Improvement of the family food supply
- Improvement of the family housing
- Improvement of the family clothing
- Improvement of the family health
- Social development of the villages with the help of other organizations.

To reach these goals, home agents are trained and appointed each year to work in villages in different Ostan (states). The agents are all local and have a high school education. In some cases they may have only three years of secondary education if they have enough practical experience in Home Economics.

Those who have lived or are willing to live in the village have priority. Agents are selected through entrance examinations and an interview in each Ostan. Those who meet the requirements are sent to Tehran, the capital city, for pre-service training. A training course is given in the Rural Girls Training School which is under the supervision of Ministry of Education.

During the training period which is about nine months the home agents are given necessary theoretical and practical training about nutrition, cooking, sewing, home improvement, sanitation, child-care, first aid, poultry, gardening, cooperatives, rural sociology, religion, handicrafts, house pest control, and philosophy of extension methods.

After passing the course, they are returned to the Ostan from which they were recruited, and are assigned to work in a village which has been selected by Ostan Home Supervisor. From then, the home agent lives in the village and makes herself part of the rural community. She lives in a typical rural home, and makes her home, and office as a demonstration media for rural families.

As soon as she is settled in her home, she works toward getting to know the village, the community condition and its resources. She gets in touch with local leaders, other government employees, and the village councils. She also makes frequent home visits to find out the number of people living in each family, the source of their income, their state of health, and their daily diet. Then with the help of village councils and the rural families a program is planned based on the needs of the people.

In developing the program she makes use of different extension teaching methods such as class meetings, home visits, individual and group discussion, demonstration methods, film strips, and posters.

As an example, to improve the family diet, a home agent works in different fields.

- Encourages rural women to establish vegetable gardens in their homes.
- Encourages the preservation of fruits and vegetables when abundant, and its use when not available.
- Teaches rural women how to cook their meals properly, so as not to lose nutrient value.
- Teaches the principles of nutrition in a simple manner.
- Teaches women to consider cleanliness when handling and cooking food.
- Encourages rural women to have an improved poultry flock.

At the present time, there are 450 home agents working in all provinces of the country. They are assisted and supervised by 29 district home supervisors and 18 Ostan home economic supervisors. Their work is supervised through visits and training classes held in the Ostan. The National Office consists of a director, and six subject matter specialists who supervise the programs.

#### A Case Study in Home Economics

The case study is a young girl of 14 named Fatemeh who lives in a village in Gilan province. She lives with her mother and a younger brother. Her father died years ago leaving them with a small house with three rooms. Fatemeh's mother spends her time working for other people and earning very little. The young boy is about seven and very eager to go to school but the family cannot afford it. Life does not look very bright and interesting for this family.

A few months later a home agent is assigned to this village. She is looking for two rooms, one for her residence and one for her office. The mayor knew Fatemeh's mother had two extra rooms though they were not in a very good condition. He thought the extra money as rent would be helpful for Fatemeh's family. Fatemeh and her mother

though very critical of having a stranger in their house agreed to rent the rooms to the home agent and earn a little extra money.

"The rooms need some repair," they said to the home agent, "we hope you don't mind." She did not mind because one of her several duties was to make a livable house out of two rooms available in the village.

The home agent started to make the changes necessary like: putting in a window, whitewashing the walls, improving cooking facilities, putting in a floor, decorating the room, providing simple means for food and other storage.

All this was very interesting for Fatemeh. She followed the changes with great interest. A great desire to copy the same things in her room was obvious. The problem was "money." The family did not have the extra money to make the kind of changes that the home agent had made in her rooms. This was very sad.

When the home agent organized her Youth Club, Fatemeh joined the club. The sense of belonging gave her a lot of satisfaction to start with. Considering different club projects, she joined the sewing project. Living in the same house with the home agent gave her the opportunity to work very closely with her and learn very quickly.

She desired to share her knowledge with others and later she was assigned as sewing project leader which gave her a lot of prestige and self confidence. Now she sewed well enough to be able to sew for others but she needed a sewing machine. She bought this on credit on the home agents recommendation. She started to sew for others and used every minute of her spare time on this. She earned more money and used it for the improvements in her room, since this was her number one goal.

Later she took a poultry project and was able to make a small but sanitary poultry house which was not very difficult when she had the money. This project brought still more income plus extra food for family consumption.

Her mother and brother helped her with her projects. The brother was able to attend school. This was what the home agent had suggested to Fatemeh as well as many people in village.

Fatemeh was married when she was 16. She left the house that had been her home for years in a much better condition and her mother and brother in a far better financial situation. She left her sewing machine for mother who could sew for others now, hoping she could afford to get another one for herself. The family had a poultry flock, a small dooryard garden, a sanitary toilet, and more important than all, a desire for better living.

Fatemeh is still attending home agent's classes; she still has to learn a lot more about home management, family feeding, child care, and other subjects to be able to provide a happy life for her husband and children, and at the same time keep her social standing as a good village leader.

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HOME ECONOMICS EXTENSION  
ACTIVITIES IN TURKEY

BY

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In Turkey the majority of farms are small family holdings. Village women play a considerable part in operating family farms in addition to their household duties. In fact tending the family garden to provide vegetables for her family and for the market, raising poultry, milking cows, cleaning the barns and certain other field work are considered more woman's work than the man's. This burden leads to physical and mental fatigue and premature old age.

The farm is an economic and social unit and it must progress as a unit. No increase in production and in farm income is likely to raise the standard of living unless the village homemaker is educated and understands how best to use her money, her time, her energy and her other material resources.

The objective of an extension program is the development of the rural family. Its purpose is the growth of that family in understanding, knowledge and ability to use and develop its natural and human resources for better living.

Therefore helping the village woman, showing her new and better ways of food preparation and preservation, working with her to develop a pattern of work in her home that will save both her time and energy; time and energy that may be used in more productive purposes not only for her family but for her community, is as important as helping her husband to learn new and better farming practices.

Home economics extension is only one part of the complete circle to which extension workers must direct their effort if this tremendous challenge of a better and richer life for all rural people is to be met successfully.

## QUALIFICATIONS AND TRAINING OF HOME ECONOMICS EXTENSION WORKERS

### 1. Home Economist Training Center

The Ministry of Agriculture set up the Home Economist Training Center in Izmir in 1954. The training period of this center was nine months. During this nine months course the trainees were equipped with practical knowledge and skills to enable them to help village homemakers in solving their everyday problems. This training center continued its functioning for nine years and had a total of 165 graduates. Most of these graduates are working in extension service now. (Table 1)

### 2. Home Economics School

The capacity and the training period of the Home Economist Training Center was considered insufficient to meet the need for Home Economists in agriculture extension service. In 1963 the Home Economics School opened in Ankara. Duration of training in this school is three years.

The objective of this school is to give further training to the graduates of Technical Agriculture and Horticulture schools to become home agents at village level.

Subjects included in the curriculum are:

- a) Home Economics subjects: nutrition and food preparation, home management, home furnishing, food preservation, child care, family clothing, gardening, poultry, family health and first aid, and extension teaching methods.
- b) Other subjects: Physics, chemistry, mathematics, biology, history, geography, sociology, Turkish, English and physical education.

TABLE 1  
NUMBER AND THE PRESENT JOBS OF GRADUATES OF HOME ECONOMIST  
TRAINING CENTER BY YEARS

<u>Training Year</u>	<u>No. of Trainees</u>	<u>Working in Central Office</u>	<u>Teaching in Schools</u>	<u>Working in Extension Service</u>	<u>Resigned</u>
1954-1955	11	1	6	1	3
1955-1956	12	-	4	6	2
1956-1957	15	-	2	12	1
1957-1958	15	-	3	11	1
<b>1958-1959</b>	27	-	6	20	1
1959-1960	26	-	4	22	-
1960-1961	22	-	6	16	-
1961-1962	25	-	5	18	2
1962-1963	12	-	4	8	-
TOTAL.....	165	1	40	114	10

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This school had its first graduates last June. At present thirty three young girls are on the job.

### 3. Home Economics Education at the University Level

A Home Economics major was established in the Faculty of Agriculture of the University of Ankara in 1961 to train home economists to carry out an educational program to help improve the standard of Turkish families in keeping with the improved standards of agriculture.

In order to reach this goal the students are trained in the basic sciences, in fields of agriculture as well as in the Home Economics subjects.

In the last two years we had thirty one university graduates holding Home Economics major degrees. At the present time half of them are working in the extension service as specialists.

Colleges of Agriculture at Atatürk and Ege Universities also have Home Economics Departments but they have not accepted students yet.

### HOW HOME ECONOMICS EXTENSION WORKERS HELP VILLAGE HOMEMAKERS

To be a successful extension worker a Home Economist should have a sympathetic understanding of the people and their problems and a good knowledge of the local traditions, social and economic factors that affect the people. To do this the home economist has to study her village before she starts to work with the village people.

Some of the information she needs is: History of the people and the village, land situation and the types of farming practices, main source of income, the family pattern, school facilities, sanitation situation, diet pattern, medical facilities available, child care, housing conditions, roads and transportation facilities available and shopping habits, etc.

She collects this information by going to the village and talking to village governor, school teacher, religious leader, members of village council, midwife and by visiting some village families.

This first visit to the village gives her a chance to introduce herself to the village people as well as to collect some firsthand information on which she builds her teaching program.

A few days later the home economics extension worker and the village homemakers get together either in the school building or in a house or even in a yard, depending on the season and the village facilities, to work on program planning. During this meeting the home economist tells the villagers, in a simple and informal way, why she came to their village and the kinds of help she can give and asks them to express their wishes. Generally speaking village homemakers are not aware of important and urgent problems that they have but are eager to learn to sew and to cook different dishes. Therefore it is the extension worker's job to explain to them that together they can solve those problems.

After this meeting the home economist prepares her work program considering the urgency of the problems, season of the year and homemakers' needs and wants.

Home economics extension workers work in four or five villages at a time. They try to visit and to give demonstrations in each village once a week, provided that transportation is available.

The Home Economics Extension worker needs to remember that learning is a slow process and is continuous. She must begin her teaching where the learner is and relate new experiences to old familiar ones. The most effective and common method that Home Economics Extension workers use in their teaching is demonstration. The following table shows the number of demonstrations given by home economists and the attendance at these demonstrations between the years of 1962 and 1966.

<u>Years</u>	<u>No. of Home Economists</u>	<u>No. of Villages</u>	<u>Demonstrations Given</u>	<u>Attendance at Demonstrations</u>
1962	92	384	15,360	11,520
1963	107	383	15,320	11,490
1964	70	219	8,760	6,570
1965	61	282	5,640	7,000
1966	51	194	3,600	4,000

Some of the subjects that extension workers have been teaching to village homemakers are: The nutritive values of foods and daily requirements for children, adults, pregnant and nursing mothers. Better ways of cooking green vegetables, eggs, and meats to improve nutritional status of village families. Food preservation subjects include better ways of drying, canning and making pickles and preserves with whatever vegetables and fruits that village families have on hand and preparing soup mixture (tarhana) and noodles.

About two years ago a community canning house joint project was started around Bilecik Province. The Food Technology Department of the College of Agriculture, the CARE organization, Peace Corp members and the Home Economics Extension worker have worked jointly and they were able to complete and operate three canning houses in that area. Last year 380 families prepared 7,500 bottles of tomato and grape juice and canned 7,500 jars of vegetables in these canning houses.

To improve living and working conditions in the village homes, home agents help village homemakers on home improvement projects such as improvement of the kitchen and living rooms by adding a shelf, making inexpensive, attractive curtains, seat covers, mattresses and comforts, etc.

The construction of sanitary toilet project has to be mentioned here. Home Economics Extension workers encourage and help village families to build sanitary toilets wherever they see the need for it. Several years ago one of the Home Economists had very successful results in this project. The whole village participated in this project and they have built a total of more than a hundred toilets (Gömeçli-Denizli).

Another project that extension workers are interested in is the improvement of the laundry facilities and the method of village homemakers. In 1961 one combination laundry and bathing house was built to meet the need of three village families in one of the villages of Izmir province and this place was left open once a week, for a period of one year for other villagers to see and to use it. After seeing and using it two other families from the same village have shown the desire to have a laundry and bath house for themselves.

Child care subjects include infant care, preparation of baby foods, bathing babies, prevention of diseases, making simple and inexpensive children toys at home.

Clothing is the subject that village homemakers are most interested in. Home Economists show them how to select materials, how to cut and sew blouses, skirts, simple dresses and underwear for women; shirts and pyjamas for men and clothes for boys and girls of different ages. Care of clothing is also included in this program.

In the villages where raw material is available, handicrafts demonstrations are given by extension workers to provide some constructive and productive activities for the villagers.

Home Economics Extension workers are also responsible for carrying out educational programs for rural youth. They work with the village girls of 4K clubs (4K is equivalent to the 4H clubs in the U.S.).

Work accomplished by 4K girl members under the supervision of the Home Economics Extension workers in 1965 is as follows:

<u>Project</u>	<u>Amount</u>
Canned foods	7,021 cans
Fruit juice	5,717 bottles
Jellies	1,460 kilogram
Vegetable dried	1,129 kilogram
Fruits dried	870 kilogram
Tarhana (soup mixture)	280 kilogram
Garments and baskets	20,137 pieces

Home economics extension work was transferred to the Ministry of Village Affairs in 1964. Although we are pleased with the progress and the accomplishments we have made in our home economics extension work, we still face many problems that must be solved before we can fully meet our responsibilities.

Some of these problems are as follows:

1. Lack of a home economics extension organization with qualified supervisors and subject matter specialists

2. Lack of sufficient qualified Home Economics Extension workers
3. Lack of transportation facilities
4. Shortage of demonstration facilities
5. Low salaries make it difficult to find and keep competent extension workers at all levels.

In short I would like to say that with a sound and sincere approach Home Economics Extension workers have been most welcome in villages and tremendous opportunities exist to solve the above mentioned problems and supply well trained, sincere, devoted Home Economists and the central, provincial and county level.

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# PRACTICAL APPROACHES TO HOME ECONOMICS

BY

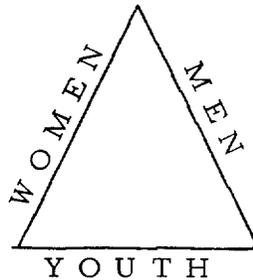
ELEANOR SOUTHERLAND

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There have been many definitions of Home Economics as it is known today, or Domestic Science as it was first called. A simple definition is: "Home Economics is a study of the arts and sciences related to the home, family and community." From this concise statement one can continue to explain all of the areas of study within home economics.

Home Economics is part of a total Cooperative Extension Program. Extension can be defined as an informal educational program for the improvement of agricultural practices that result in better and greater production along with the improvement of home, family and community living. It is evident, then, that an extension program is for the entire family.

To illustrate this a triangle is often used:



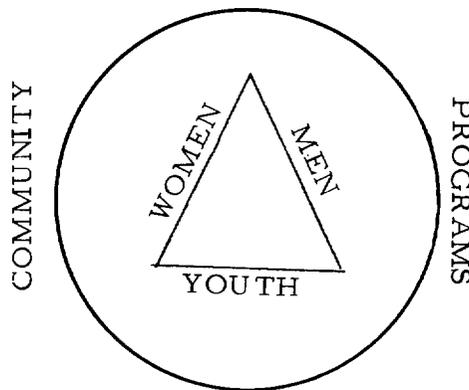
The three sides are equal. One can see that a program which includes all three segments of the population is essential.

At the 1965 International Conference of Extension Administrators held in South Dakota, USA, problems in developing a strong and effective Extension Service were discussed. Two of the problems listed are:

1. Lack of understanding as to value of a family approach in the extension program. Too often ministry officials think extension deals only with agriculture.
2. Fragmentation of extension in some countries. Agriculture in one ministry, home economics in another, and youth work in still a third.

These problems have been defined and in many countries extension today is using the family approach of working with every member of the family.

This illustration can be carried one step further by drawing a circle around the triangle to represent community programs:



Extension does not end by working with the people in the home and on the farm. It works with community improvement programs such as cooperatives--both market and consumer, farm to market roads, and sanitation projects.

## STAFF NEEDS

A strong program needs a well trained staff to plan and execute it. An effective extension program has a small national office staff with a large percent of the personnel working outside the capital city. At national, regional and/or state offices, or at both, there should be subject-matter specialists who plan and prepare materials for training, and also local field staff. Lack of specialists was another problem of extension programs discussed at the South Dakota Seminar. Many countries have been able to add specialists to their staff.

Subject-matter specialists should have responsibility for keeping agents informed of the best and latest information in their respective subject-matter fields. Agents must know how to teach, but they must also use authentic information when teaching. Supervisors are needed for administrative matters. Sometimes, in the beginning, one person has to serve as specialist and supervisor, but as organizations develop these positions are separated.

In extension local staff is very valuable. They are the ones in direct contact with the farm family and community. The selection and training of this personnel is very important. Minimum requirements should be: (1) have a rural background; (2) understand farm living; (3) have formal education as high or higher than those in the area where she is to work; and (4) have the ability to teach, to understand and work with people. As better qualified persons are available, these requirements may be raised.

The most successful home economic extension programs are conducted by agents who live in the community where they work. They are able to use their own homes as result demonstrations; they gain the confidence of the families and are available to give assistance to them when they need it.

National, regional and/or state staffs should carefully plan for induction training for new personnel and continuous inservice training for all staff. If Home Economics training is not offered in a vocational school or university, the national staff should plan for pre-service training for prospective employees. Subject-matter specialists should have considerable responsibility for this.

## PROGRAM PLANNING

Extension programs should be planned with the people, by the people, and for the people. When a program is started in a community, it is not easy to do this. People can learn to plan their programs with the help of an extension agent. The extension agent is a resource person who can guide and teach them to recognize their needs. Some needs are felt and are easy to define; others are unfelt. Here the extension agent is of real value to the people in helping them recognize these needs.

An extension program must start with the people where they are. Agents must help people to help themselves. This may mean helping people want to help themselves. People have a right to participate in decisions affecting their welfare. People will work harder on a program if they have a chance to make suggestions, raise objections, and decide for themselves what they want to do.

To know where they are the extension agent must have information about the village or the community. This can be gotten by observation, talking with the citizens of the area, reading reports from other agencies working there, or making a more formal and comprehensive study or survey. Before planning to make a study or survey the agent should check carefully to see if such a study has been made in the area recently. Often the needed information has already been collected, maybe by an agent formerly working there or by another organization or agency. If this is so, such a study should not be repeated. If not, then a careful plan should be made of the information needed and how it would be collected. Cooperation by other agencies could be very helpful in this. Once information about the area is available, it should be studied, written up to give a complete description of the village or community and used in guiding local citizens in the planning of their extension programs.

It has been emphasized that extension personnel has the responsibility of helping families plan their program according to their needs--both felt and unfelt. The home agent must help families decide on which areas of home economics emphasis will be placed.

## Food Production, Storage, Preservation, Preparation and Nutrition

Today the world's number one problem is shortage of food for its ever increasing population. SECURITY IS DEVELOPMENT AND SECURITY IS FOOD.

It has been asked if home economics extension can help with the solution of this problem. Of course it can as it helps to educate families in the areas of food production, food storage and preservation, food preparation and nutrition. At the International Conference of Extension Administrators in South Dakota, U. S., in August 1965, another problem was listed as the "lack of appreciation of the role of women in agriculture. They fail to realize her importance in agriculture production, in maintaining the health of her family."

In the peasant family of a developing country, the wife and mother is an important link in the family's food production. To bring about changes in methods all the family must be taught improved practices. Teaching only one member and hoping the knowledge will filter on to other members equally involved in production is too slow for today's needs. Any educational program designed to attack the problem of underproduction must be three-pronged with each phase planned and carried out using methods most applicable to the audience. Women know how to teach women. Home economics extension women know how to reach women, how to influence them, encourage them, and see them through to the end objective better than any other similar group. The same is true of the extension staff members who carry major responsibilities for 4-H club work when it comes to influencing boys and girls to make desirable changes.

While home economics extension women are essential in any agricultural extension program for improving food production, in a Muslim society where only the men of the family talk to their women, it is doomed to failure unless extension agriculture and home economics agents work together to carry out an educational program.

A program to increase food production involves more than the operations carried on in the field such as planting, cultivating and harvesting. Many other activities are not only equally important, but are mostly handled by the women of the family. These include storage and care of food crops, selection and preparation of food for family consumption and preparation of fruits, vegetables, grains, etc., for the market, as well as selling them.

In many village homes the basic food, be it rice, millet, wheat or corn, is stored in the house. It is the family's most precious possession, yet each year a large proportion is lost due to insects and rodents. Cereal stored in the house is under the direct care of the women. Seeing that all the cereal crop harvested reaches the mouths of the family, instead of one-fourth of it going to feed rats or weevils, is the same as increasing the total crop harvested. Home economics extension women can work with village women to help them devise safe ways to store foods and thus prevent the "hungry months" that plague subsistence farmers in many parts of the world.

Food that is already available can be stretched in still another way--better utilization of foods the family usually eats. For example, use of home pounded rice in place of highly polished rice, or cooking rice in a small amount of water instead of cooking in a large amount and then pouring off the surplus water with its' soluble nutrients, will result in the family having a better diet. It must be remembered that in the home kitchen the people of the world are fed. Women are the preparers of the food. A well-fed, strong, healthy family is essential for improved farming.

Harvesting food crops at the correct time and using when just ripe saves food and makes for better diets. Too often foods such as tomatoes, are picked green or over-ripe and handled in such a manner that they become bruised and rot quickly. Home economics extension women can teach village women how to select food at the best time for harvesting, how to handle it in the home and in the markets, thus preventing loss of food now being produced.

The wife and mother in each rural family is the custodian of the traditions, customs and beliefs of the society. She is the person who teaches children how to behave and what to believe; many of the present customs regarding food production, handling and use are tied up with age-old rituals and beliefs. Because food has always been so important, and often in short supply, at certain times of the year taboos, superstitions and rituals are considered essential to guarantee that the family will eat twelve months of the year. When the superstitions or beliefs that may block increased food production are ferreted out, it is women extension workers who will be able sympathetically to help village women make the needed adjustments.

A massive food production program in a country aimed at providing enough so that all of the population will have adequate diets may ulti-

mately require shifts in eating habits. Here home economists have a leading role to play. For example, in a corn eating country a new variety may produce much better than the traditional variety. The home economist must find out if it makes as good tortillas or porridge, or whatever the people eat, as the old variety. If it doesn't, she must find new ways to handle it to give the desired taste or the new variety will be rejected by the people. The Home Economics Extension woman working with village women is the key to making this essential change.

Changes may be required that are even greater than this. For example, new foods may need to be added to the diet. This is very difficult and will require a strong food and nutrition education program to bring about desired changes. Here the home economics extension worker is indispensable with her experience in teaching women through a variety of methods, in the home and in informal groups everywhere.

The mother is the parent who carries major responsibility for training small children. Studies have shown that it is the early influence on a child that counts. If the next generation is to move easily into new methods of farming, mothers of today's children need to understand what is taking place. It is the home economics extension worker, who serving as a friend to village women, can help them in this phase of preparing their children to be modern farmers and homemakers.

Women often more readily accept change than do their husbands, particularly if they can see that the change will benefit their children. However, for this to happen the women must be dealt with directly.

Agents should have facts about local food habits, nutritional needs of families and help families plan a program for all members of the family.

## HEALTH AND SANITATION

The second most important home economics subject for families is health and sanitation, including improvement of the interior and exterior of the home. Women are concerned about the health of their families, but often do not know how to improve it. Sanitary conditions of the home and community contribute to the health of family members.

Child Care and Family Relations - Information on child care and family relationships is very helpful to families. Knowledge about the growth and development of a human being helps a mother and father to understand their family members and be better able to help them.

Clothing - Instruction on the selection, construction and use of clothing is often requested by women. They all seem to feel this need. Sometimes agents have to begin by teaching clothing and then move into programs dealing with the unfelt needs. In planning to teach clothing, agents should study local acceptable styles and know available fabrics and patterns. She should teach the method of construction that the women can use with the equipment they have or can easily get.

Home Management - Work in home management is useful to women. This includes use of human resources such as time, abilities and energy, as well as such material resources as tools, equipment and money. Families need to keep records of their incomes and expenditures so they can determine whether they are successful in their enterprises.

Community Improvement - Community improvement projects should interest all families. Improved schools, churches, roads, water supplies, and recreational facilities, as well as beautification of the area and making it more sanitary, add pride and joy for all citizens.

#### AN IRAN HOME ECONOMICS EXTENSION STUDY

When the speaker worked in Iran—1964-65—as Home Economics Extension Advisor, she was told that in 1963 the National Extension Director stressed the importance of programs being planned to meet the specific needs of the rural people.

The Iranian Extension Service had home agents in eighteen states. The agents were women with six to nine years of elementary education, plus six-months' training in home economics extension. They lived in the rural village where they were assigned to work with the women and girls.

In order to develop programs to meet the specific needs of the rural people more information was needed about the population with which agents were working. The Iranian National Extension Staff

developed two questionnaires which the agents used. One was entitled, "Statistics of the Rural Household, " and the other "Statistics on the General Condition of the Village. " The completed questionnaires were reviewed by the State and National Supervisors with the home agents, who then helped families plan programs based on this information about local conditions.

In 1964 each home agent was asked to give special assistance to ten families who would agree to cooperate in making home improvements in addition to her work in groups, clubs and in the community. Some of the families were selected by the villagers at group or club meetings; some volunteered to cooperate, and the home agent selected others. These families were guided by the agents in making a plan of action for their work during the year. The agent gave them technical advice and encouragement, helped them get needed materials, and supervised their work. Some of the projects served as result demonstrations for teaching other families how to do the same work and for getting records of time and money needed for certain projects.

All of the families lived in one of the rural villages where a home agent was living and working in 1964. They farmed the lands of the village landowner and worked for very low wages, or a small percent of the farm products. They were families with very limited resources to devote to the projects, and the agents helped them to use what they had.

The speaker in 1965 planned with the Iranian National Extension Staff to examine how the Home Economics Extension Program assisted these selected Iranian families to increase their income in 1964. A study was also made of the cost of the program to the Iranian Government in relation to the income increase of the families assisted. Two hundred twenty-nine agents in as many villages assisted 1,828 families to complete the questionnaires. The information collected shows the results of a program planned on the needs of the people.

#### Improvements Made by Selected Families

It is interesting to note that 62 percent of the families reported they had accepted and put into practice some of the recommendations given by the home agent. Twenty-four percent had utilized all of the recommendations. Only 3.6 percent had failed to use any of the recommendations.

The families reported various reasons for not accepting all the recommendations made by the home agent.

REASONS RECOMMENDATIONS WERE NOT ACCEPTED AND USED  
BY THE 1,828 FAMILIES

Reasons	Families Reporting	Percentage
Lack of interest	50	2.7
Lack of confidence in agent	35	1.9
Lack of funds	947	50.0
Lack of time	522	28.0
Lack of materials	280	15.0
Illness	79	4.3

Since the per capita income in Iran in 1964 was only \$130 per year (rural income was less), it is not surprising that lack of funds accounted for 50 percent, and lack of materials for 15 percent, of the reasons why recommendations were not accepted and used. Farms and homes had almost no labor-saving or mechanical equipment, thus the work was done by hand, which is time and energy consuming. Lack of time to make improvements was a real problem and was reported as a reason for not accepting and using the recommendations.

Seven hundred eighty-nine, or 43 percent, families reported an increase in family cash income for 1964 over 1963; four hundred and thirty, or 23.5 percent, families reported no increase; 488, or 26.6 percent, did not know whether there had been an increase or not; and 121, or 6.6 percent, did not respond. The 789 families reported a total increase equivalent to \$17,484 increase or \$22.15 per family. Based on the per capita income in Iran a family of six would have in income of \$780. The increase of \$22.15 for the year was a 3 percent income increase per family.

The families were asked if their income increased in 1964 over that of 1963, what activities had brought about the increase and whether the activity had been included in the plan the family had made. A variety of activities had helped to increase their income.

ACTIVITIES REPORTED BY THE 789 FAMILIES SHOWING INCREASE  
IN INCOME IN 1964

Activity Used	Number of Respondents
Selling more chickens	276
Selling more eggs	211
Selling more vegetables	231
Selling more cheese	123
Selling more yogurt	177
Selling more milk	148
Selling more butter	182
Selling more fruit	134
Making clothes for others	345
Selling handicraft articles	343

Each of these activities had been included in the plan for improvement which the families had made with the help of the home agent. Eighteen percent of the families reported they had completed all of the work planned. It is evident that the activities listed were productive ones.

The families reported the amounts of vegetables they produced and conserved.

COMPARISON OF PRODUCTION AND CONSERVATION OF  
VEGETABLES IN 1963 AND 1964

Item	1963	1964	Percentage Increase
Number of families with garden	370	929	151.0
Total linear feet planted in garden	257,084	1,063,486	313.0
Number of different kinds of vegetables planted	7	9	28.5
Pounds of vegetables harvested	169,699	719,899	324.0
Pounds of vegetables sold	146,456	279,985	91.0
Income received from the sale of vegetables	3,653	9,735	166.0
Pounds of vegetables dried	23,551	12,243	48.0
Pounds of vegetables stored	86,383	272,780	215.0
Pounds of vegetables pickled	27,940	386,364	1,282.0
Pounds of vegetables salted	754	2,464	226.0

Family flocks were small, yet an increase was shown in each category of poultry production and sale. The greatest increase was the production and sale of eggs.

COMPARISON OF PRODUCTION AND SALE  
OF POULTRY AND POULTRY PRODUCTS

Item	1963	1964	Percentage Increase
Families raising chickens	1,785	2,820	63
Layers owned	1,526	7,976	422
Baby chicks owned	995	4,969	399
Layers sold	381	1,482	288
Baby chicks sold	499	3,271	555
Eggs collected daily	5,313	58,674	1,004
Eggs sold weekly	5,843	69,760	1,093

This table shows an increase in the production of all dairy products; the largest increase was butter and cheese; the least was amount of butter sold.

COMPARISON OF WEEKLY PRODUCTION AND SALE OF  
MILK AND MILK PRODUCTS

Items by Pounds	1963	1964	Percentage Increase
Milk	2,314	6,443	178
Cheese	2,065	6,705	224
Yogurt	1,924	3,567	137
Butter	4,151	11,924	187
Milk sold weekly	1,474	3,766	155
Cheese sold weekly	653	1,203	84
Yogurt sold weekly	1,586	2,921	84
Butter sold weekly	437	801	83

In addition to projects in food production and conservation, sewing and handicrafts, home agents worked with families in making improvements in their homes. This, too, was easily measured.

COMPARISON IN TOTAL PRODUCTION  
OF HOME CRAFT ARTICLES

Item	1963	1964	Percentage Increase
Women's dresses made	1,303	5,711	338
Girl's dresses made	1,143	5,216	356
Boy's shirts made	357	2,805	685
Boy's pants made	466	2,595	456
Men's shirts made	360	1,545	329
Men's pants made	289	2,285	690
Baby clothes made	509	2,827	455
Child's coats made	253	1,366	439
Adult's coats made	68	586	761
Mothers and daughters who sewed for others	120	2,103	1,652
Dollars earned	5	4,590	9,170
Mothers and daughters making handicraft articles	128	1,699	123
Dollars earned	663	3,815	475

TOTAL STRUCTURAL HOME IMPROVEMENTS MADE IN 1964  
BY THE 1,828 SELECTED FAMILIES

Item	Number
Families who increased the number of rooms for household use	667
New rooms built	1,012
Windows added to the home	1,583
Steps improved	530
Room walls improved	2,243
Room floors improved	1,240

TOTAL INTERIOR HOME IMPROVEMENTS MADE IN 1964  
BY THE 1,828 SELECTED FAMILIES

Item	Number
Tables added to the home	214
Chairs added to the home	696
Beds added to the home	646
Radios added to the home	533
Families improving clothes storage	887
Clothes bags made	439
Closets built	417
Drawers added	448
Hooks put on the wall	765
Kitchen improved	679
Work space added	461
Stoves placed at a better working height	329
Storage added to the kitchen	665

TOTAL HOME SANITATION IMPROVEMENTS MADE IN 1964  
BY THE 1,828 SELECTED FAMILIES

Item	Number
Wells covered	764
Drainage of waste water improved	588
New toilets added	748
Old toilets made more sanitary	520
Garbage disposal improved	1,339
Piped water into the house	151
Courtyard cleaned	2,171
Preventive action taken against insects:	1,578
Used spray	1,494
Breeding places of insects destroyed	234
Screens used	622
Nets used	286
Used iron and oven (to kill lice and bedbugs)	418
Boiled clothes	850

Improvements made in homes did not contribute to family income directly but it did made a strong contribution to the health, welfare, and happiness of each individual family. Generally, well and happy people produce more regardless of the type of work. Income is in turn increased.

#### Other Improvements Made

The 229 home agents reported they worked with 4,086 non-selected families in the villages during 1964, and that 2,000 additional families had made improvements in their homes as a result of observation of improvements being made by the selected families.

#### IMPROVEMENTS MADE BY 4,086 NON-SELECTED FAMILIES

Improvements	Number
Started or increased vegetable garden	1,456
Started or increased poultry raising	1,113
Made family clothes	3,023
Improved the kitchen	946
Improved other rooms in the home	1,376
Added furniture	1,220
Made the home more sanitary	626

Collection of information about the work done by non-selected families was not planned in such a way that the increase of income could be determined. It does reveal that while the study was made of ten selected families who received special assistance from the home agent in 1964, other families benefit from her work in the village. Their progress will also contribute to the gross national product, as well as to the betterment of the village and the health, welfare, and happiness of family members.

#### Increased Income

Seven hundred eighty-nine families reported an income increase of \$17,484 in 1964. However, they also had an increase in production in their gardens, poultry and dairy products. Some of the increase was sold and accounted for. The remainder was used at home and has not been reported as income increase.

A monetary value was placed on the increase in production of vegetables, layers, baby chicks, eggs and dairy products used at home as well as the family clothing made. The total value of production income increase of the 1,828 families is shown in the following table.

TOTAL VALUE OF PRODUCTION INCOME INCREASE  
OF 1,828 FAMILIES

Item	Value
Income (Cash)	\$ 17,484
Vegetables	12,500
Layers	4,012
Baby chicks	300
Eggs	133,238
Dairy products	111,167
Clothing	100,915
TOTAL	\$ 379,616

There is evidence that the families receiving special assistance from the home agents in 1964 have a total income increase of \$379,616, which is an average of \$207 per family. This will be reflected in an increase in the Gross National Product.

COST OF PROJECT

How did the cost to the Iranian Government of a Home Economics Extension program compare with the income increase of the 1,828 families selected to receive special assistance in 1964? The Iranian Ministry of Agriculture had an annual budget of \$3,739,932 for 1,000 extension agents. It can be assumed that \$2,000 was the cost per home agent. The cost for the 229 agents full time was therefore \$458,000. The agents spent approximately one-half of their time working with the selected families at a cost of only \$229,000.

The income increase of the selected families was \$379,616, or an average of \$1,657 per agent. The total income increase was \$150,616 more than the program cost the Iranian Government.

## DIFFUSION

The effect of the assistance given these village families is expected to continue over a period of several years; thus a report of one year is not complete. It is predicted that the program will produce a chain reaction. Children and neighbors of the selected families will benefit from it. According to the typical diffusion pattern it will take three to five years for this program to make its full impact.

No effort was made to measure the value of the nutrition education given to families by the home agents. Emphasis was given to teaching nutrition and food preparation. When a family has more information about the importance of a good diet for good health, and it produces food at home, it also consumes it. Availability of food is a big problem in many villages. Production of food for sale not only helped to increase income of the producer families. It also helped to improve the diet of the consuming families in the village. This resulted in better nutrition and therefore more energetic individuals.

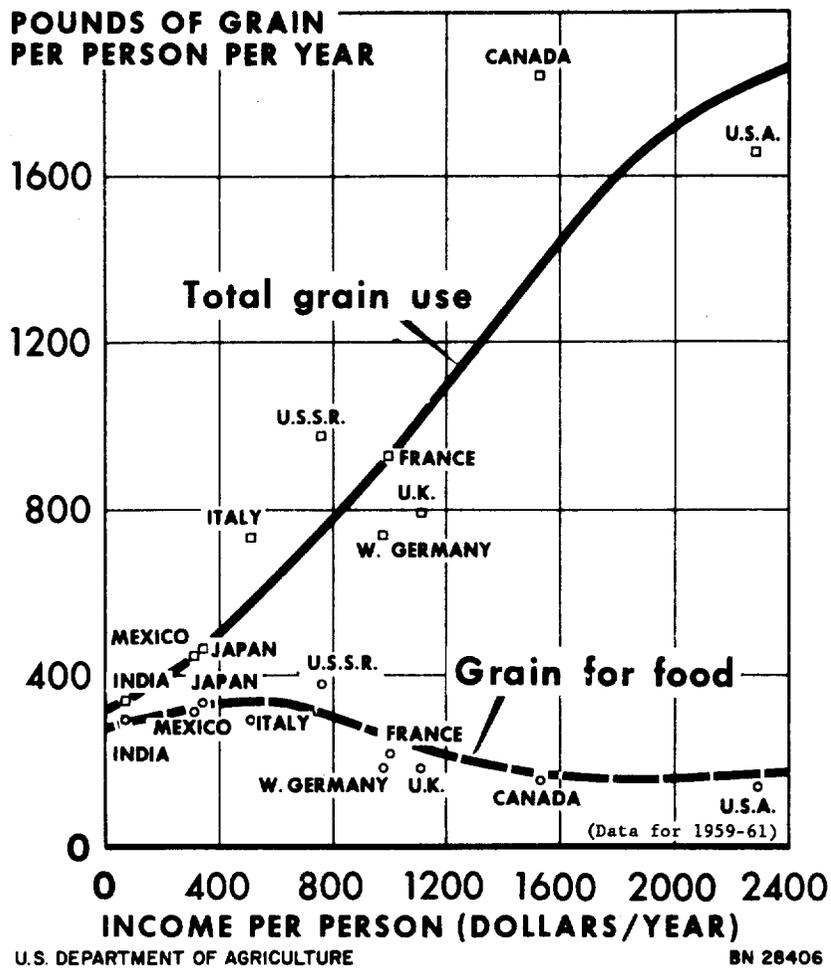
This is only one example of a successful practical Home Economics Extension program based on the needs of the people. There are many others.

The need for increased food supply due to increased population has been discussed. One must also consider increased demand for food due to increased income. Certainly in Iran those families with increased incomes will demand more and better foods, and they will have cash to pay for it.

The use of all grains can be considered as a yardstick for measuring food needs and how people meet these needs. Grains occupy more 70 percent of the world's cropland. In terms of calories they provide more than half of man's total food energy when consumed directly and a sizable part of the remainder when consumed indirectly in the form of meat, milk and eggs. In less developed countries the annual availability of grain per person is 400 lbs. This is little more than one pound per person per day. In the U.S. 1,600 pounds of grain per person per day is required for his high protein diet. All societies desire more animal protein in their diet and as their income increases they consume more animal protein.

When families increase their incomes, there is an even greater need to increase food production.

# INCOME AND PER CAPITA GRAIN CONSUMPTION, TOTAL AND FOR FOOD



Home Economics Extension has proved its ability to help families improve their diets, their homes, their family life and their community.

Dr. Seaman A. Knapp, the father of extension service in the United States, said "What a man hears, he may doubt; what he sees, he may possibly doubt; but what he does himself, he cannot doubt."

Families who participate in extension programs do not doubt what they do themselves.

A nation is only as strong as it's smallest unit - THE FAMILY. Home economics programs must be included and emphasized in Extension and other types of educational programs for a beeter world.

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## MARKETING AND EXTENSION WORKERS

BY

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### EXISTING SITUATION IN MARKETING

The farmers can increase their income in three ways: By improving the quantity and quality of their products, by reducing production and distribution costs, by starting new productive activities. The following statistics of crop production in Iran, is worthwhile to note:

<u>Crop Cultivated</u>	<u>Hectares Under Cultivation</u>	<u>Tons of Crops Produced</u>
Citrus Fruit	12,733	35,786
Apricots	28,742	50,951
Dates	54,895	145,651
Grapes	81,587	337,418
Apples	13,332	22,910
Potatoes	25,604	98,319
Other Fruits	290,923	840,764
Vegetables	301,949	785,270

Dates with 140,000 tons, and raisins with 60,000 tons produced annually are the two major exports of Iran. Our daily exports of vegetables and fruits to Kuwait amount to 10,059 kilos and 3,800 kilos respectively. There are many problems connected with the transport, processing, and packing operations of these products.

Harvesting techniques in Iran, are very primitive as all kinds of strains and varieties are harvested, mixed and packed together. Some of the marketed fruits like citrus and apples, are usually pledged before harvest and the growers have to look after the crop, at their own expense until fully ripened and delivered to the purchaser.

Transportation from village to village is usually done by draught animals and is very poor. At present inter-village roads and by-roads are under construction. Sometimes the villages are too far from the market and because of weather conditions, waste in fruits and vegetables is very high. The average transportation fee is one or two rials per ton per kilometer.

Storage does not exist on a large systematic scale and the crop is sold immediately or piled under trees. High quality fruits and vegetables are usually packed at the top of local baskets and crates and the poor quality ones are packed underneath.

Grading is done by hand and no mechanical devices are available. Sometimes the fruits are so badly and heavily packed that most of them become rotten. This wastage reaches 7 percent for tomatoes and 5 percent for oranges if immediately shipped and 10 percent if sold and shipped after two to three months storage. But 80 to 90 percent of the preharvest sales are made three times in spring; once before blooming, once upon blooming and then again immediately before picking is done.

The producer's share of returns in the sales made have been found to be 26 percent, 40 percent and 53 percent respectively. The maximum credit granted to each individual farmer or grower is not more than 5,000 rials.

The farmers usually are not aware of market prices. Illiteracy, lack of up to date information and distances between markets make it really difficult or perhaps impossible for the farmer to know market prices. They are forced to sell their crops to the big middlemen, brokers and wholesalers before the harvest. Out of each ten rials the consumer pays, the producer gets only one or two rials for all his work. Preservation has not been developed fully yet. Cooperatives, however, have done a lot to improve the situation. They have been extending member farmers credit, seeds, fertilizer, cotton piece goods, oil, sugar, tea etc. Several cooperative societies have now formed cooperative federations. These federations supervise

the member cooperative societies. There are now twenty-five federations in the country. Before the creation of these cooperatives, the farmers received only one-tenth of the total value of their produce.

#### KHARV COOPERATIVE MARKETING SOCIETY

Khorassan comprises one-fifth of Iran with 2.5 million population. Preharvest sales and low profit was a serious problem. The Ministry of Agriculture recognized the fact that proper marketing would solve the problem. The Ministry of Agriculture and USAID specialists discussed the problem with special attention given to the apple crop.

The purpose was to find a way to market the Khorassan apple crop. After a thorough study of the situation Kharv village was selected for the experiment. This village is situated 28 kilometers off the Meshed Neshaboor road, 50 percent of their income comes from apple production which amounts to 1,500 tons. This crop was estimated to sell for 15 million rials which amounts to 1,250 rials per capita. It was assumed that marketing of this crop could have a tremendous impact on the social and economic development of this village.

The annual apple shipment amounted to 1.5 million kilos. The crop was shipped in 30 kilo boxes, and 450,000 boxes were thus used for the shipment. If through cooperation 5 rials could be saved the total saving would amount to 2,250,000 rials. Many problems existed in Kharv. The local price of apples was 10 rials per kilo at harvest, 30 rials at Now-Rooz and preharvesting sales price was 10 to 15 rials. The local price was 10 rials per kilo for grade 3, 12 rials for grade 2 and 15 rials for grade 1. In the village of Kharv 50 to 60 people receive advance money from barforoush (retailers).

The transportation cost was 1,200 to 1,400 rials per ton to Tehran. The grade 3 apple was sold immediately but grades 1 and 2 could be stored. The villagers had to accept cash from wholesale dealers in 1961 but a small number had agreed to establish a marketing cooperative and success depended on the increase of their annual income. Method demonstration and result demonstration on marketing of apples was given and was successful.

This result was obtained after three of the growers furnished 71 kilos of apples which were sent to the market and the income returned to them. The various stages of the demonstration were as follows:

- Buying the apple from growers
- Marketing high quality apples through retail outlets
- Returning cash to the individual in proportion to the number of kilos consigned.

Thus an apple marketing cooperative was organized.

The Kharve fruit marketing association received a loan of 300,000 rials from the Agricultural Bank and made it possible to pay the price of 15 tons of apple to 117 members of the cooperatives. Wrapping and packing methods were demonstrated by USAID specialists. The lower grades were marketed through the cooperatives and the rest were stored in commercial cold storage to be shipped to Now-Rooz when the prices are high.

#### CONCLUSION AND SUMMARY

It should be mentioned that at present the marketing problem has received thorough attention with emphasis on export crops. The marketing demonstration in Kharve has proved without question that waste can be reduced tremendously. Training in grading and shipping is still needed. It has been proved that Iranian shoppers will pay extra money for undamaged and properly packed apples. Improved marketing methods must be adopted. Last year a number of short courses for training agents and farmers were conducted in various parts of Iran.

#### RECOMMENDATIONS

The cooperatives should be closely connected with extension workers and both should be paid well. Technical assistance is the job of the extension agent but granting loans and supervising the cooperative is the responsibility of cooperative managers. Therefore the plan of work should be made jointly. The cooperative manager should follow extension recommendations in giving credit and supervising marketing steps.

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## MARKETING AND THE EXTENSION WORKER

BY

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### INTRODUCTION

The two-fold requirement of increased production through improved agricultural practices is 1) the meeting of food deficit or more appropriately the meeting of the increasing demand of the ever-growing population for food and fibre and 2) increasing income of the farmers to thereby raise the standard of living. Increased production alone, however, will not be sufficient to achieve the desired result unless proper marketing of the agriculture produce is ensured. The benefit of increased production will be lost to the farmer unless he is ensured a fair price for his produce. Unfair prices will serve to discourage the farmer from growing more. Also wastage, rottage and shortage due to improper packing, storing and processing, and transporting may result in the increased yield being too costly compared to inputs and investment. Efficiency in production as well as in marketing are thus equally important for the economy, agricultural or industrial. They may be very appropriately compared with the two blades of scissors, one being ineffective without the other.

It is very rightly asserted that on the efficient and successful functioning of the marketing system depends the freeing of the agricultural population from poverty and distress, and making life more tolerable in developing countries where a large majority of the population live at below subsistence level. This is of critical importance to a country at each stage of its development. Mr. I. C. Abbott, Chief of the Marketing Section, Economics Division, F. A. O. in his treatise on "Marketing-- its Role in Increasing Productivity" observed:

"Effective marketing is also critical for the success of development progress designed to uplift a population as a whole. In spite of the studies in industrialization being made in many less developed countries to break through the "Circle of Poverty," a large section of the population must continue to depend for their living on agriculture. The plan of economic development that aims at diminishing the poverty of the agricultural population, reducing consumer goods' prices, earning more foreign exchange or eliminating economic waste has, therefore, to pay special attention to the development of efficient marketing of food and agricultural products. "

The above observation is of great significance to a developing country like Pakistan, particularly to East Pakistan. The economy of East Pakistan, which constitutes the greater part of the country from the point of view of population, is predominantly agricultural and it will continue to remain so for a time to come.

#### PROBLEMS OF MARKETING IN EAST PAKISTAN

Economic pressure compels the farmer to dispose of his produce immediately after harvest when prices are at the lowest level. In some cases standing crops are sold to meet his pressing needs. Thus in East Pakistan the price spread between what the producer gets and what the consumer pays is very wide and the agencies providing the marketing usurp much more than their legitimate share of the price. The services rendered by the marketing agencies can hardly be said to be satisfactory and fair either to the producer or to the consumer. The marketing system prevailing in the province of East Pakistan may be said to be at a low level of efficiency.

The pattern of agricultural economy is an important factor in developing a marketing system. Agricultural holdings in East Pakistan being small and mostly uneconomic do not favour large-scale farming and mechanisation to obtain increase in output, reduction in cost of production and better return on the production. No doubt increase in yield and reduction in production cost have been affected to a certain extent through improved agricultural practices. Agricultural production in East Pakistan is still low compared to many developing countries and the farmer is left with very small or little marketable surplus.

Because of limited employment opportunities in the urban areas and increase in population, the pressure on agriculture is increasing

tremendously. The farmer carries on his work regardless of whether cultivation is profitable or not. The psychological reaction to his profession is that he remains content with whatever inputs he applies and return he gets.

There is very little incentive for the farmer in East Pakistan either to lower his cost of production or to increase yield as the marketing functionaries do not offer him remuneration commensurate with his investments in land, labour and capital. He always faces a buyer's market where farmers are dictated to and only in exceptional cases is the market such that producers, as sellers, dominate.

A large percentage of cultivators raise crops which sustain them till the next crop or for a portion of the period between the two harvests. The middle class farmers who are left with a small marketable surplus are forced, by pressing wants, to sell their crops at peak harvest season when the prices are at rock-bottom. The big farmers, whose production represents only a fraction of the total income, may wait for a better market. On occasion he too has to part with his produce after harvest to meet his immediate demand for cash.

The buyer, who in many cases is the agent of the big merchant, trader or other intermediary, never considers the reasonableness of the prices he offers to the grower-seller who does not possess the technical knowledge to price his produce to cover even his cost of production. The cultivator is thus in a vicious circle of poverty and ignorance. The producer and the ultimate consumer are widely separate and the intermediaries are taking the lion's share of the price differential between the price paid to the consumer and the price received by the grower.

Marketing services in East Pakistan are more or less limited for most commodities to the transportation from the grower to the consumer. Very little or no processing or packaging is done. There is a long chain of middlemen doing the work of assembling, storing and distribution. Every link in the chain retains some margin as profit and in the process the commodity reaches the ultimate consumer almost in the original form at a higher cost.

East Pakistan depends mostly on water-craft for communication and has few facilities for mechanically propelled crafts. Movement of the bulk of agricultural produce from up country is done by manually propelled country boats, which is costly, time-consuming, and

responsible for deterioration of perishable commodities. The railway and road communications are generally available from the assembly centers (secondary market) to the terminal markets. The land communication facilities are also inadequate compared to the area population of the province which is divided by numerous rivers and tributaries. As efficiency of the marketing operation depends largely on transport, transportation cost is one of the major items in the commodity prices in East Pakistan.

Storage facilities are mostly the storehouses (godowns) in the primary and secondary markets owned by the landlords, traders and businessmen. These storehouses are places for assembling and stockpiling commodities awaiting dispatch to the terminal markets. The system of sorting, grading and packing leaves much room for improvement.

#### DEVELOPMENT OF MARKETING SERVICES IN EAST PAKISTAN

Under various development schemes construction of all-weather roads has been undertaken. All the districts of the province have now been linked with the capital by macadam roads. Construction of more such roads are in progress and it is expected that all the sub-districts will be connected with the district within a few years.

The Inland Water Transport Authority has begun a number of projects for improvement of the inland water transport system. The railway authorities are fast increasing the number of vans and carriers. The Directorate of Agricultural Marketing is encouraging installation of cold storages in the private sector. There are about 6,000 primary markets in the villages, 500 secondary markets and 100 terminal markets. A program for physical improvement of about 100 important secondary markets, construction of 75 storage godowns at the market level and 2,000 godowns at the producer level is being carried out under the aegis of the Agricultural Marketing Directorate. The East Pakistan Industrial Development Corporation has undertaken construction of numerous processing plants, sugar mills, rice mills, etc.

The Agricultural Marketing Directorate has extension workers of different cadres stationed at various levels of marketing centers. These offices advise the farmers in the preliminary processing of their produce, impart knowledge of grading, storing and marketing techniques. They collect market intelligence and disseminate the information to

the farmers. The daily market prices of agricultural commodities are broadcast over the radio every day. Feature articles on agricultural marketing are also broadcast on a special radio program. The extension workers of the Marketing Directorate regularly visit the market places to advise the traders and dealers in improved methods of marketing and costing. They supervise the quality of agricultural produce offered for sale, regulate the market, exercise regulatory functions governing marketing of agriculture commodities such as standardization of weights and measures, quality, grade, etc. They also exercise supervisory control over unfair dealing and malpractices in the trade.

### COOPERATIVE MARKETING OF AGRICULTURAL PRODUCE

To solve the various problems of marketing in East Pakistan and ensure fair price to the growers, a development scheme named "Development of Cooperative Credit and Marketing Structure in East Pakistan" has been used since 1960-61. The main objects of the scheme are (a) linking agricultural credit with marketing services, (b) streamlining the structure organization of cooperatives, (c) improving the working and financial position of credit and marketing cooperatives by providing loans and grants from the government, (d) providing storage facilities to marketing cooperatives in the form of grants for construction of godowns, (e) installing processing plants. The cost of the scheme was Rs. 43.96 million under the Second National Plan and the cost of the present scheme under the present Third Plan is Rs. 97.18 million for a total of Rs. 141.14 million.

Under the Development of Cooperative Credit Marketing scheme, the target for development of 1,250 primary societies, 60 central marketing societies at (Mondi) towns and one provincial apex marketing society has been fixed. Construction of one storehouse for each primary and central society and five for the provincial society has also been provided for.

The primary societies are members of the center societies and the center ones of the provincial society. The primary society grants production loans to the individual farmer on condition of repayment in kind. The farmer member, under the terms of the agreement entered into with the society, deposits his produce with the society in repayment of his loan. The primary society only routes the members' produce to the central marketing society for sale. The

central society also sends the stock to the provincial society for disposal in a fair market. The provincial society in turn collects market information and supplies the same to the central societies. It also coordinates the activities of the central societies and the latter that of the primaries in supplying the surplus produce to deficient areas.

In the agricultural sector of the cooperatives, there are five more schemes costing Rs. 46.07 million for marketing of sugarcane, milk, fish, and salt products by the farmers in the coastal belt of the Chittagong district. A program for development has been undertaken of 280 primary, 15 central and one provincial sugarcane growers' cooperative; 100 primary fishermens' cooperatives and one provincial apex of fishermens' cooperatives, 200 primary milk producers cooperatives and one provincial union of milk producers' cooperative, and 10 salt producers' cooperatives.

Under the scheme, provisions for both supervisory and extension staff of the government and operations staff for the marketing cooperatives and for their training have been made. This staff undergoes technical training in the Cooperative College and also in the Zonal Cooperative Training Institute and practical training with the marketing cooperatives and commercial firms like jute mills, for assortment, grading, packaging, etc. In the colleges as well as in the institutes, seminars, group discussions, etc. are held periodically. The provincial Cooperative Union and the District Cooperative Union, which are the organizations of non-official cooperators, hold conventions, seminars, etc. in collaboration with the International Cooperative Alliance, London, for the benefit of the extension workers. Two development schemes costing Rs. 13.11 million are also under execution. One for government officers, members, directors, chairman, secretaries, managers, etc. of the cooperatives, for the purposes of cooperative education, training and extension. In addition a scheme for compilation of statistics and research at a cost of Rs. 1.61 million is being implemented. The statisticians and research workers make case studies and produce brochures and pamphlets for the information and use of the extension workers and cooperative societies.

#### THE COMILLA APPROACH

A very excellent job has been done in extension work by the Central Cooperative Association of the village-based cooperatives

now known as the "Comilla Approach." It was originally started in 1960-61 as an experiment of the Pakistan Academy of Rural Development, Comilla, and has since grown through evolution into an ideal cooperative venture. The project was initiated on the basis of the fundamental concept of the group cohesion necessary for the success of a developmental programme, where people learn by doing and are benefitted by group action. In East Pakistan village life is a community life. In the village the people get together and discuss topics of common interest under the shade of a tree in their free time or in the farm yard or in a tea shop. Hence given the need for group cohesion, mutual understanding, mutual help and self-help, the village was taken to be the ideal unit for group and cooperative action.

The villages are thus organized into groups through informal discussions and group meetings and then these groups are registered as cooperative societies with by-laws for their administration. To support these primary cooperatives, the Central Association has been set up. The crucial problem of East Pakistan is the low standard of living, and there is no magic wand to solve the problem overnight. Through research and experiments the Academy decided that the project should be started with five basic assumptions.

1. Capital formation is necessary in the village through the practice of thrift and compulsory saving necessary for capital investment in building infrastructure to develop agriculture.
2. Freeing villagers from indebtedness.
3. Fair price for agricultural produce.
4. Increase production.
5. Utilization of human resources by creating more employment.

Keeping the above objectives in view, the Central Association performs the following functions:

- Banking, credit, savings deposits
- Processing and marketing
- Machine stockpile and maintenance
- Agricultural extension and training
- Water development and rural electrification in coordination with the Water and Power Development Authority
- Women's programs
- Youth programs.

## Marketing Facilities Under the Comilla Project

The small producer, poor as he is, is very much in need of cash. So he sells his produce immediately after harvest. In so doing he and fellow producers glut the market which results in low prices. The disorganized producers are unable to bargain with the well-organized buyers, who command capital and control trade and industry. This deprives the producers of a fair return on their investment. This position has been reversed by the village cooperatives in Comilla. The farmer deposits his produce with his cooperative and receives 60 percent of the market value of his produce immediately. After disposal of the stock the cooperative pays him the sale price after deducting the marketing charges and deducting the earlier payments. This marketing operation brings him three-fourths more rupees per maund for his produce.

## Comilla Training Program and Extension Activities

The training programme of the Association aims at training the chairman, office clerks, managers, model farmers and technicians from among the villages, who should stay in the village and work for the farmers. Development of technical skills at the village level is a precondition for launching any programme to improve agriculture. The Association's training center arranges for training the farmers by the technical staff of the various development programs of the government. The organizers, model farmers, leaders, managers, and accountants attend classes at the center one day every week. There is no prescribed syllabus. A copy of the lecture sheet is given to each trainee after class for discussion in the weekly meeting of the members of the village cooperative. The members discuss day-to-day problems, review the previous week's performances, examine the present situation and decide the future plan of action. The village leader takes the problems to the training centre for discussion with leaders of other villages and the teaching staff of the training centre and on return takes back to the village the instructions, recommendations and new knowledge that emerge from the discussion at the training centre. The village meetings are also training classes and the leaders thus become teachers and extension workers. In this manner training activities are multiplied. These village leaders work in various capacities such as managers, accountants, model farmers, Imams (priests), school teachers, pump operators, tractor drivers, woman organizers and village midwives. Very encouraging results have been achieved from this type of training.

The training centre has simplified extension work. The extension worker finds the centre a platform to disseminate new ideas, hear the problems of the farmers, recommend approved practices, and give suggestions to solve problems. However, above the level of village leaders there is a group of well trained extension workers and subject matter specialists. The extension workers supervise the activity of an average 10 to 12 village groups, assist them to adopt recommended practices and to improve projects in homes, on farms and in weekly meetings. The extension workers again work under the direction and supervision the Project Director, who is in charge of the project.

As a result of a continuous process of education and training of the farmers in the village group meetings and of the village leaders in the training centre, there has been a cumulative effect of the farmers being receptive and aware of improved recommended practices and large-scale improvement in the use of fertilizers, better seeds, irrigation, adoption of improved agricultural practices and better return for produce through cooperative marketing. Joint efforts of extension workers and trained village leaders through group action, as in the case of the "Comilla Approach," appear to be the right approach to solve the agrarian problems of a developing country like Pakistan. In the field of agricultural marketing, the improved methods adopted so far by the farmers of Comilla Project are bearing fruit. The farmers have been able to get about Rs. 31 to Rs. 41 for every maund of their produce by selling through their own cooperatives.

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## EXTENSION WORK IN AGRICULTURAL MARKETING

BY

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Agricultural Marketing, which starts with the farmers' decision to produce a salable farm commodity, covers all aspects of the marketing system both functional and institutional, marketing institutions and their work with technical and economic considerations, and distribution of the product to the final consumer.

According to this definition marketing extension work may be defined as an organized educational program in which information is made available to producers, middlemen, consumers, officials and other technical persons to help solve their marketing problems.

The aim of this extension work will be to ascertain:

1. What market needs are
2. What quantity is wanted
3. What quality is wanted
4. What price should be
5. Where and when the markets are best
6. How the products are distributed to the final consumer at a good price and in good condition.

Farmers always think of these questions. The agricultural marketing extension worker makes a program to give answers to the questions to help and to take action which will:

1. Result in better marketing decisions by farmers concerning what to produce, where, when and how to sell;
2. Improve harvesting, handling, preparing products for markets, processing, storing, transportation by the farmer and middlemen in the marketing channel;
3. Expand the markets present and future for farm products for farmer and middlemen;
4. Try to speed up adjustments, and to make the farmers, consumers, and market institutions understand changes in technology and the supply and demand in a marketing system.

Agricultural marketing extension workers prepare the program at the national, regional and provincial level based on a product. This program should begin with the farmer. The program should be designed to solve the problems which farmers face as to what to produce for the market, and when, where and how to market their products to the greatest advantage.

The agricultural marketing extension workers who will be assigned to the program have to know the most important agricultural production and the people living in the area. In the program their responsibility and authority will be clearly defined at all levels.

The responsible people who have authority and responsibility for these programs, and the extension specialist should be highly trained in the economic and technical aspects of marketing, business and marketing technology.

A commodity program for extension work should influence the farmer, middleman, and consumer. The extension worker should prepare a program to teach the farmer that:

- there is demand for a product
- he must want to plant and grow that product
- there must be a standard, high quality
- there are correct procedures for harvesting, for preparing the product for market
- he must clean and grade properly
- there are proper boxes and boxing methods which can create a greater demand

- there is a proper time for marketing.

The farmer also must learn how to attend livestock in order to find a better market. He must learn how to feed to supply quality meats. The extension worker must provide the information to the farmer on the best and most profitable time for selling. He must show the farmer through demonstration how to prepare livestock to reach the best quality, for instance demonstrating that cattle should be marketed after three months of feeding and sheep after four months. Agricultural marketing extension workers give the kind of information to the farmers to make good markets for their products.

This program can help the middleman and consumer in this way.

- products can be found where needed and wanted
- the quality of products is good
- the quantity of products is enough
- the prices of products are better
- there are farmer organizations
- assure good packing and preparing of products for markets.

There is a great need for an expanded market research program on which to base the extension program. Most of the research should help toward the solution of marketing problems faced by farmers, middlemen and consumers.

Research and extension are the most important factors needed to provide detailed information on marketing problems to farmer, middleman and consumer.

## AGRICULTURAL MARKETING EXTENSION WORK IN TURKEY

Today in Turkey, agricultural marketing extension is not of first importance in the agricultural extension service. The extension worker is carrying on training programs on production problems and production economies and technology. However, the Agricultural Marketing Department of the Ministry of Agriculture has been established and assigned extension work in agricultural marketing.

The marketing organizations which are cooperatives and market firms are not doing extension work.

The Department of Agricultural Marketing worked on eight projects in 1966, and prepared fifteen projects to put into operation in 1967. These projects are for preparing fruits and vegetables for market.

The extension worker in preparing the program of extension work will consider the most important fruits and vegetables in the area. For example: The Marketing Department prepared a program for tomato products in Honaz County, Denizli in 1966. Before preparing the program, marketing specialists of Denizli province did research on the tomatoes in the Honaz area which covered the quantity, quality, variety and market situation.

Farmers had many problems where they needed help in determining: (1) harvesting time, (2) choice of harvest boxes, (3) packing boxes for market, (4) transportation of products.

As a result of marketing research on these problems the extension worker and the Marketing Department of the Ministry of Agriculture prepared an extension program for tomatoes.

The program included information on: (1) harvesting time of tomatoes, (2) harvesting boxes, (3) different kinds of packing and market boxes, (4) grading by machine, (5) transportation from garden to assembling area, from assembling area to market. The agricultural section for the province allocated money in its budget for this work in 1966 and put it into operation. According to the program, they had 20 boxes for harvesting and 200 boxes for market and 2 grading machines. The boxes were prepared under the OECD standards.

The extension worker then contacted the farmer leaders and other appropriate persons in Honaz county. The extension worker took all equipment to Honaz and put the project into operation.

The result of the program showed that the Edremit variety of tomato cannot be graded by that machine because the shape is not round. But W. C. 156 variety is good in quality and fits the machine. The extension worker took the products after harvesting, grading and packing to the Izmir market. The W. C. 156 variety of tomato sold for 70 kuruş per kilo, but others which were not harvested, graded and packed in the proper way according to the extension program sold for 40 kuruş. We found also that harvesting was heavy work for women workers.

This extension program will be carried on in Honaz county again this year. We already have established a new farmer coop and we will distribute about 7.5 kilogram W. C. 156 variety seeds to the members to produce for this coming season.

We are not insisting that the marketing extension service is not good. However we are interested in preparing a good program based on a product and to solve the when, where, and how of marketing products for the greatest return and also to help solve the marketing firms' and consumers' problems.

We are facing some problems in the agricultural marketing extension service.

1. We do not have many extension staff with specialist training in agricultural marketing.
2. The government and private sector do not have much money in their budget, if they have any.
3. There is no organization established by law with responsibility for extension work in agricultural marketing.
4. We do not have a full organization at the national, regional and provincial level.
5. Cooperatives and market firms do not have agricultural marketing extension service programs.

Today in Turkey there are 25 government and semi-government and private sector agencies dealing with marketing problems. But which one is responsible for marketing agricultural extension service is not clear. For that reason, the Ministry of Agriculture thought that the agricultural marketing extension service should be organized and to review the scope of extension work. According to this study, we have already established a Marketing Department in the Ministry of Agriculture. We are going to establish a national training, research and demonstration marketing institute in Turkey. Training and research will be improved.

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## MARKETING and THE EXTENSION MAN

BY

MARION F. WARD

Marketing and Food Processing Adviser  
Office of the U.S. Economic Coordinator  
for CENTO Affairs, Ankara, Turkey

The meetings all this week have discussed the production side of extension work and how it helps the farmer. Now we come to the final stage and probably one of the most important stages - the marketing of the product that has been produced. We have talked about the inputs to the crops that will increase the production - how the proper land preparation, proper planting of good seeds, good irrigation, proper fertilizers and the best cultivation brings on the best harvest. But even before the producer plants his first seed, he must think of what he must plant so that it can be sold at a price that pays for all the inputs. This work and thinking done before planting is called production planning and is possibly one of the extension man's greatest contributions to assistance to the farmer.

If the producer knows how, when, where and at what price he can sell his product, getting him to use the inputs that increase production will be a smaller task and a real encouragement to do a good job in all the stages of good production.

Here is an example of what has happened in this respect in one of the region countries. The extension man in the area investigated

the future sale of tomatoes to a processor and how much the local market might pay. He then went to the farmers and suggested that they contact the processor as to the amount that would be needed, what might be paid for tomatoes and what variety quality would be needed to get the best price. When the information had been obtained, it was passed on to the many farmers in the area and those that took advantage of the information had a much higher return for their product. Thus the first steps in production planning were taken and they paid off to the producer. Such production planning may be carried out for any agriculture product, providing that the necessary information is available to the extension man. It makes the producer's task surer and the extension man's task easier.

After the production planning has taken place and the product has been brought up to harvest, a new marketing problem arises. At what stage do you harvest the product to meet the requirements of marketing in all its channels?

Here, the extension man should know when and how to harvest the product and be able to pass this information on to the producer either by spoken word or written instruction. When the product is harvested at the wrong time or in an improper manner it is the beginning of the first loss of income to the farmer. It is also the beginning of the loss of food to the people, which to-day is the worst thing that can happen. Harvesting techniques vary according to each product and the extension man must have a well rounded knowledge of time and method of harvest.

Handling of the product by the harvesters, storers and others involved at the producing level is a vital action that must be watched by the extension people in marketing. This stage of marketing can greatly effect the marketing of the product if it is a perishable product, dry product, animal product or in fact any product. Much money has been invested in the particular product by this time, and the handling process must be geared to save the product and keep it at its best quality. A good example of this is the handling of live-stock from producer to market. This must be done by the gentlest method and with the greatest care to prevent injury to the animals, getting them to the selling point in the best condition and prime quality.

Grading and standardization of products play a very important role in the marketing channel and should be the basis of establishing

a market price. The extension man should be the producer's best source of information as to what grades and standards are and how they effect the producer and the consumer. Standards and grades are made for and are used for the protection of both producer and consumer. It is the business of the extension man to use the established grades and standards to the best advantage of all concerned.

It is the responsibility of the central government to furnish standards that give protection to all concerned, and that are useable by all parties. This use of grades and standards will assure the producer that he is getting paid for what he sells and that the consumer is getting what is paid for. It is the business of the extension man to help the farmer use grades and standards to assure him of a better income and as a great incentive to increase production to meet the market demand.

The use of grading to standard by the producer will do much to reduce waste and he will receive more money for his product because the risk from loss in the marketing channel is greatly reduced.

The next step in marketing a product is the proper packing with the proper packing material. This is a part of marketing that can be done by the farmer, but it must be done right. Instructions on how to pack and in what to pack is a duty of the extension agent. This information on packing must be easy for the extension agent to obtain.

The extension men must know how to pack the product to stop damage loss. The extension men must know what package must be used to fit the product, what package will handle well for transportation and storage, what package is clean and sanitary, and above all what package has a cost and appearance that is best for the producer and will appeal to the consumer.

The proper placing of the product in the package will both enhance the appearance and reduce the waste caused by damage. A good example of this in Turkey was the reduction of the size of a crate for grapes and the proper packing of the grapes in the crate both meeting set standards. The farmer received twice as much for grapes packed this way as for grapes packed in the usual manner.

After the product has been packed properly it must get to the consumer in good condition. Good transportation should take care of this marketing procedure. Transportation is the most costly and time consuming factor in the marketing channel.

Let us take one product, the potato for example, to see how many times it might be transported and by what methods, before it reaches the consumer. It must be remembered that each time a product moves it takes energy and energy costs money. First the seed of the potato is removed from its storage place and transported by man, beast, or machine to the field where it is removed from a container and cut, then moved to the row for planting. After the potato is mature it is dug, moved by hand to a container that is then moved and loaded to some conveyance to be hauled to an assembling area where it is removed from the conveyance by manpower and transported to a pile.

After enough potatoes have been assembled for shipping to a distribution point, the potatoes are moved, usually by hand, from the pile to a conveyance for transportation to the next distribution point or to storage. If the product goes to storage it is moved from the conveyance to storage, but if it goes to a market, it is moved from the conveyance to the wholesaler's place of business. The wholesaler then sells the product to the retailer or peddler and it is again transported by hand or by some conveyance and moved to another place of business where it is again unloaded and moved to the retail shop. Here the product is moved by hand from its large container to a smaller container for the consumer who transports it to the home. The potatoes are then moved from the small container to the cooking pot. From the cooking pot, it is moved to the table and from there to the plate and finally to the consumer's mouth.

In some cases there may be more transportation involved than has just been stated but this will give an idea of how many times a simple product might be moved from one place to another; in this case it is about twenty times.

There are many methods of transporting fresh fruit and vegetables used in the developing countries: man, animal, cart, motor vehicle, train, boat, ship, and airplane, but the principles of good transportation are the same in each instance.

It is the extension agent's business to know which of these methods does the best job at a cost that will fit pocketbook of the producer.

At this point the extension agent's services have been completed on products that are leaving the farmer's hands. The products that are to remain in the farmer's hands for future sale must be properly stored. The extension agent must know how this can be done.

Storage must be started immediately after harvest to maintain quality and to reduce loss. The extension agent can pass on these methods of simple storage to the farmer even though more difficult storage problems begin when the product arrives at the accumulation points.

Each product has its own storage time and temperature and this information should be available to the extension agent for passing on to the farmer. Many plans for the farm storage are available and should be in the hands of the extension man.

All production planning, harvesting, grading, packing, transporting, in fact the marketing of all individual products vary to some degree, but basically the principles are the same. Each product should be carefully looked into and its own merits established. It should be remembered that when a product is harvested and prepared for market, one is dealing with possibly the entire income of the producer. There is no return or no way to replace these items once they are sold. The money received for the product will be needed to pay for all that has been invested in the product. The sale of the product is the only source of money for many of the farmers.

Marketing of a farmer's product at a good price is one of the highest incentive factors to increase production. If a farmer makes money on the products he grows, very little encouragement is needed to cause him to use better methods to increase his production.

All producers seem to have two hearts - one in the usual place and one in the pocketbook. If the extension man satisfies both hearts his problems are solved.

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APPENDIX A  
LIST OF DELEGATES

IRAN

Dr. Jafar Rassi (Leader of Delegation) Director General, Extension Service Tehran, Iran	Eng. Esmail Hashemi Esphahani Assistant Director of Extension Tehran, Iran
Mrs. Ezzat Aghevli Director, Home Economics Extension Service Programs, Tehran, Iran	Eng. Pouholah Jaffari Director, Extension Development Corps Tehran, Iran
Eng. Kazem Daneshyar Farm Machinery Development Dept. Tehran, Iran	Eng. Shemshoon Maghsoodpour Director, Rural Youth Department, Agricultural Extension Organization Tehran, Iran
Eng. Gholam-Ali Faghih Extension Agronomist, Tehran, Iran	

PAKISTAN

Mr. Ashrafuddin Ahmed Secretary, Central Jute Committee Jute Research Institute, Tejgaon, Dacca, East Pakistan	Mr. Fazal Ilahi Chaudhry Deputy Director, Agriculture Salinity Control and Reclamation Lahore, West Pakistan
Mr. S. A. A. Iftikharuddin Ahmad Joint Registrar, Cooperative Societies (Credit), Dacca, East Pakistan	Mr. Abdul Mannan Khan Deputy Director of Agriculture, Dera Ismail Khan, West Pakistan
Mr. Syed Mohammad Ali Director of Livestock Services, Dacca, East Pakistan	Mr. Mohammad Hussain Vains Extra Assistant Director of Agriculture, Sahiwal, West Pakistan
Mr. Abdul Mubin Chowdhury Joint Director of Agriculture, Dacca, East Pakistan	

## TURKEY

- Mr. Nejat Erkenci (Leader of Delegation) Mr. Ibrahim Sarıcalı  
Deputy General Director, Directorate of Technical  
General Directorate of Plant Agriculture,  
Protection and Quarantine, Hatay, Turkey  
Ankara, Turkey
- Mr. Kemal Bedestenci Professor Reşit Sönmez  
Section Chief, Directorate of Ege University,  
Marketing of Agriculture Products, Izmir, Turkey  
Ankara, Turkey
- Mr. Doğan Dinçer Dr. Cafer Togay  
Director, Soil and Water Section Director, Animal  
Conservation Station, Feeding and Marketing,  
Ankara, Turkey Ministry of Agriculture,  
Ankara, Turkey
- Mr. Selâhattin Ecikoğlu Mr. Doğan Yalım  
Director, Agriculture Research Assistant Section Director,  
Institute, Agricultural Bank,  
Ankara, Turkey Ankara, Turkey
- Dr. Nevzat Karacahisarlı Mr. Mehmet Zorlu  
Chief, Planning and Economic Assistant Head, Agricultural  
Research Group, Extension Division,  
Ankara, Turkey Ministry of Agriculture,  
Ankara, Turkey
- Dr. Mehmet Kıroğlu  
Director, Plant Nutrition Section  
General Directorate of Agriculture,  
Ankara, Turkey
- Miss Suat Kundak, (Ph. D.)  
Director, Home Economics School,  
Ankara, Turkey

UNITED KINGDOM

Mr. Maurice John Rolls  
Agricultural Extension Centre,  
Reading University,  
Reading, England

Mr. John Hubert Neville  
Lecturer in Agricultural Eng.  
CENTO Agricultural Machinery  
and Soil Conservation Training  
Centre,  
Karaj, Iran

UNITED STATES

Mr. Ben R. Ferguson  
Agriculture Adviser,  
USAID/Dacca, East Pakistan

Dr. Glenn M. Horner  
Soil Scientist,  
USAID/Tehran, Iran

Dr. Homer V. Judge  
Agriculture Extension and  
Education Adviser,  
East Pakistan Agricultural University  
Mymensingh, East Pakistan

Mr. Ralph Lewis  
Water Resources Adviser,  
USAID/Ankara, Turkey

Mr. Curry C. Brookshier  
Chief, Agriculture Field Operations,  
USAID/Lahore, West Pakistan

Miss Eleanor Southerland  
Home Economics Extension  
Specialist,  
U. S. Department of Agriculture,  
Washington, D. C.

Mr. A. E. Duke  
U. S. Department of Agriculture,  
Washington, D. C.  
U. S. A.

Mr. Marion F. Ward  
Agriculture Adviser,  
Office of the U. S. Economic  
Coordinator for CENTO Affairs,  
USAID/CENTO, Ankara, Turkey

Mr. Marvin Cernik  
Vocational Agriculture Education  
Adviser,  
USAID/Ankara, Turkey

Mr. Harvey Johnson  
Deputy Chief, Agriculture Division,  
USAID/Ankara, Turkey

United States (Continued)

Mr. Parker Fitzhugh  
Livestock Adviser,  
USAID/Tehran, Iran

Mr. Addison H. Maunder  
Agriculture Extension Adviser,  
USAID/Cairo, Egypt

Mr. John Hill  
Fertilizer Adviser,  
USAID/Ankara, Turkey

Mr. Ward Taylor  
Agricultural Credit Adviser,  
USAID/Denizli, Turkey

Mr. George Knierim  
Agriculture Adviser,  
USAID/Izmir, Turkey

CENTO SECRETARIAT

Mr. LeRoy Makepeace  
Economic Secretary,  
Ankara, Turkey

OFFICE OF THE U.S. ECONOMIC COORDINATOR  
FOR CENTO AFFAIRS

Mr. E. M. Gilbert  
USAID/CENTO Coordinator,  
Ankara, Turkey

Mrs. Eva R. Fuller  
Conference Secretary  
USAID/CENTO  
Ankara, Turkey

Mr. Okan Elgin  
Administrative Assistant  
USAID/CENTO,  
Ankara, Turkey

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APPENDIX B

AGENDA AND PROGRAM

Ankara, April 12

OPENING CEREMONIES

- 1000      Opening Remarks by Secretary General of CENTO,  
His Excellency Dr. A. A. Khalatbary
- Address of Welcome by Assistant Under Secretary  
of Agriculture, His Excellency Mustafa Durusoy
- Election of Conference Chairman, Mr. Nejat Erkenci,  
Leader of the Turkish Delegation, and his Acceptance Speech
- Statements by Delegation Leaders of Iran, Pakistan and  
United Kingdom and by United States Economic Coordinator  
for CENTO Affairs
- Keynote Speech, "Emphasis on the Extension Worker and  
the Farmer," by Mr. Ralph N. Gleason, Chief of the Food  
and Agriculture Division, USAID/Ankara (read in Mr.  
Gleason's absence by Mr. Harvey Johnson, Deputy Chief)
- 1300      Lunch at Orman Çiftlik Restaurant, Atatürk Farm

SESSION ON ORGANIZATION AND ADMINISTRATION  
OF EXTENSION PROGRAMS

- 1500      Presentations by Leaders of Delegations
- 1830      Reception for Delegates given by Ministry of Agriculture,  
Kent Hotel

Ankara to Denizli, April 13

- 0800      Depart for Denizli by chartered bus
- 1200      Lunch at Ikbal Restaurant, Afyon
- 1800      Arrive at Hotel Koru, Denizli

Denizli, April 14

SESSION ON DENIZLI AGRICULTURAL DEVELOPMENT PROJECT

- 0830 Leaders call on Governor of Denizli
- 0900 Conference convenes at Local Administration Building
- Address by Governor
- Denizli Agricultural Development Project -  
Speech by Dr. Nevzat Karacahisarlı

OPEN DISCUSSION OF DENIZLI PROJECT

- Afternoon Field Trip: visit to youth group (4K) and home economics project; commercial poultry and livestock feeding demonstrations

Denizli, April 15

SESSION ON SUPERVISED AGRICULTURAL CREDIT

- 0900 Role of Extension Workers in Agricultural Credit  
Speech by Mr. Doğan Yalın
- 1100 Panel Discussion on Role of Extension in Agricultural Credit
- Afternoon Field Trip to olive plantation, land levelling, irrigation and draining projects
- Visit to Pamukkale
- Dinner at Koru Hotel, Pamukkale, given by General Directorate of the Agricultural Bank of Turkey

Denizli to Izmir, April 16

- 0830 Leave Denizli by bus for Selçuk
- Lunch and sightseeing at Ephesus
- 1800 Arrive at Büyük Efes Hotel, Izmir

Izmir, April 17

SESSION ON EXTENSION PROGRAMS UNDERWAY

- 0830 Delegation Leaders call on Acting Governor of Izmir,  
His Excellency Zekeriya Çelikkilekli
- 0900 Conference convenes in conference hall of Efes Hotel
- Address of Welcome by the Acting Governor
- Extension Programs Underway in the regional countries -  
presentations by Iran, Pakistan and Turkey
- Afternoon Field Trip to olive experimental station and Faculty of  
Agricultural at Ege University
- 1830 Reception for Delegates given by American Consul  
General and Mrs. Guy Lee, and by United States  
Economic Coordinator for CENTO Affairs and  
Mrs. Scott L. Behoteguy, at the Consul General's  
Residence

Izmir, April 18

SESSION ON WATER MANAGEMENT

- 0900 Water Management - presentations by Mr. Neville  
(United Kingdom), Eng. Daneshyar (Iran), Mr. Mohammad  
Hussain Vains (Pakistan), Mr. Dinçer (Turkey),  
Dr. Horner (United States), and Mr. Lewis (United States)
- 1200 Program Building in East Pakistan - Mr. Ferguson  
and discussion. (Note: This topic was presented out  
of sequence because Mr. Ferguson was unable to  
remain at the conference beyond this date.)

SESSION ON FERTILIZERS AND THEIR USE

- 1400 Fertilizers and Their Use - presentations by Eng.  
Faghih (Iran), Mr. Mohammad Hussain Vains (Pakistan),  
Mr. A.M. Chowdhury (Pakistan), Dr. Kiroğlu (Turkey),  
and Mr. Marion F. Ward (United States).

- 1900 Dinner for Delegation Leaders given by the Economic Secretary of CENTO, Mr. LeRoy Makepeace, at Efes Hotel
- 2100 Meeting of Delegation Leaders and Economic Secretary

Izmir, April 19

SESSION ON NEW AND IMPROVED SEEDS

- 0800 Presentations by Eng. Faghieh (Iran), Mr. Abdul Mannan Khan (Pakistan), Mr. Ecikoğlu (Turkey), Dr. Horner (United States)

SESSION ON LIVESTOCK EXTENSION WORK

- 1030 Presentations by Eng. Esphahani (Iran), Mr. Ali (Pakistan), Dr. Togay (Turkey), Prof. Sönmez (Turkey)
- 1300 Luncheon for the Delegates given by the Ministry of Agriculture at Ada Gazino, International Fair Grounds

Afternoon Open

- 2030 Meeting of Topic Chairmen and Rapporteurs

Izmir, April 20

SESSION ON FARM TOOLS AND IMPLEMENTS

- 0830 Presentation of CENTO Report on Farm Tools and Equipment by Mr. Ward (United States) and panel discussion

SESSION ON HOME ECONOMICS

- 1015 Presentations and discussion by panel consisting of Mrs. Aghevli (Iran), Miss Kundak (Turkey), and Miss Southerland (United States)
- Afternoon Field Trip to Balcova village early vegetables and greenhouses; olive plantation demonstration training project; and private poultry farm

1430-1800 Meeting of Committee to prepare Draft Recommendations  
(Chairman: Dr. Rassi)

Izmir, April 21

SESSION ON MARKETING AND THE EXTENSION WORKER

0900 Panel discussion and papers by Eng. Maghsoodpour (Iran)  
and Mr. Bedestenci (Turkey)

1400 Sightseeing in Izmir, arranged by Ministry of Agriculture

1500 Meeting of Committee on Draft Recommendations

1830 Reception for Delegates given by the Economic Secretary  
of CENFO

Izmir, April 22

RECOMMENDATIONS

0900 Presentation, discussion and approval of Recommendations

Closing Ceremonies; statements by Leaders of Delegations  
and the Chairman.

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Minerals, December 1959  
Development Programming, June 1960  
Chrome Ore, September 1960  
Teaching of Preventive Medicine, May 1961  
Industrial Development Banking, June 1961  
Coal, December 1961  
Progress Report, "Coordinating U.S. Action for CENTO", 1959-1960  
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Increased Agricultural Production, May 1962  
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National Scientific Organizations, June 1962  
Industrial Development Banking(2), June 1962  
Development Planning, June 1962  
Rocks and Minerals, 1962  
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Cost and Return Ratios for Major Agricultural Products, 1963  
Teaching of Science, 1963  
Rural Development, 1963  
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Consumers' Expenditures, 1963  
Agricultural Development Policy, 1963  
Management Training in Public Administration, 1964  
Nursing Education, 1964  
Hospital Administration, 1964  
Teaching of Chemistry, 1964  
Manpower Needs and Training of Environmental Sanitation Personnel, 1964  
Mining Geology and Base Metals, 1964  
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Capital Markets, 1965  
Local Government, 1965  
Veterinary Education and Animal Health, 1965  
Field Techniques for Mineral Investigation, 1965  
Veterinary Pathology, 1965  
Progress Report, "Coordinating U.S. Economic Action for CENTO", 1962-1965  
Hydrology and Water Resources Development, 1966  
Land Classification for Non-Irrigated Lands, 1966  
Household Surveys, 1966  
Mine Health and Safety, 1967

Copies of the above publications may be obtained by writing to:  
The Office of U.S. Economic Coordinator for CENTO Affairs,  
c/o The American Embassy,  
Ankara, Turkey

or requests from Pakistan or Iran, by writing to:  
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Karachi, Pakistan  
or  
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c/o American Embassy  
Tehran, Iran