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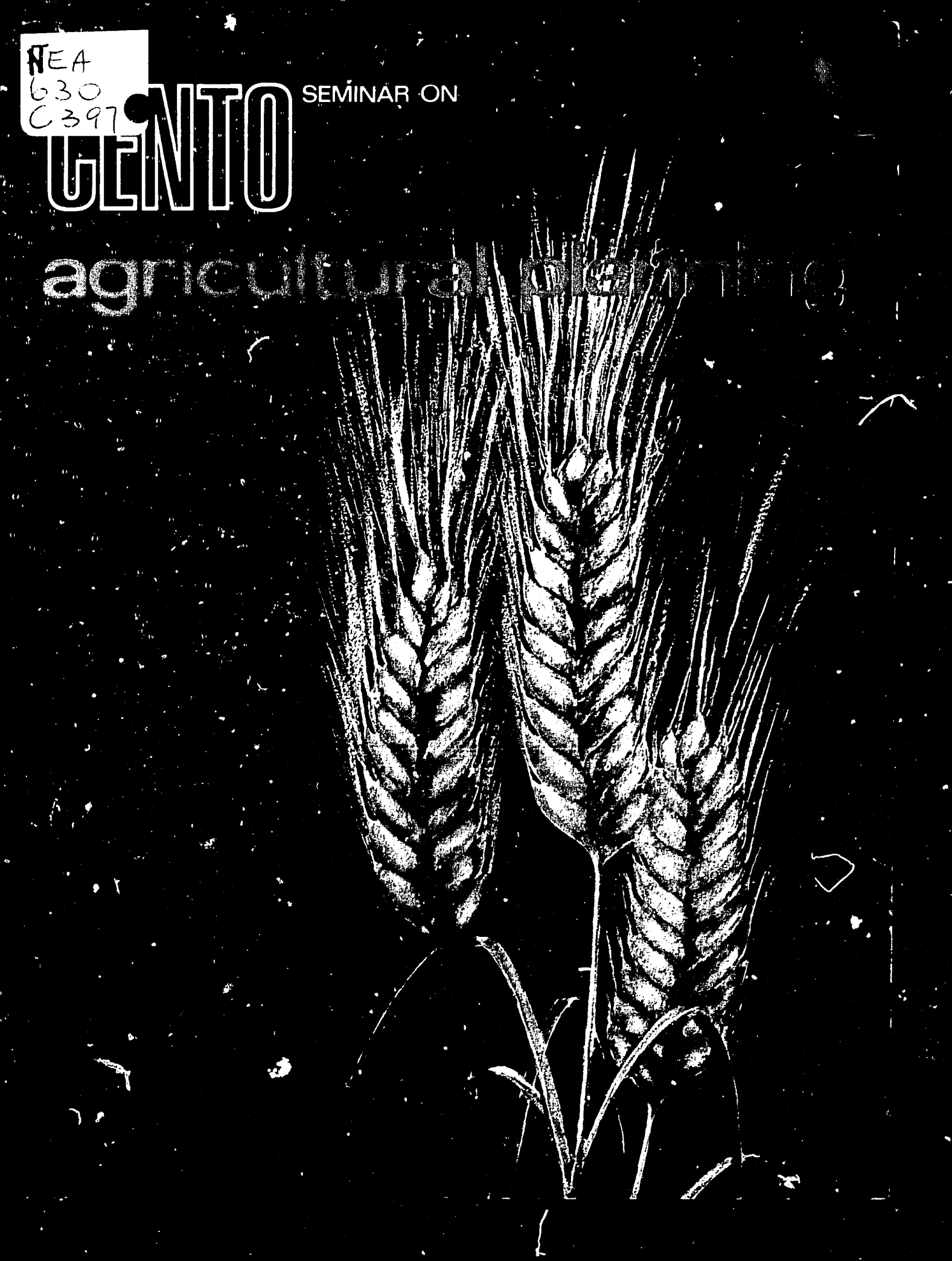

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Tehran, Iran

August 28 to

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FOREWORD

A major question that confronts the world today is whether the growth of population will continue to outpace agricultural production. Although the agriculturists have temporarily narrowed and in some instances closed the gap through the development of high yielding varieties of grain, chances are that population will begin to creep ahead again unless agricultural resources are fully mobilized to obtain optimum production. Thus it appears that the present situation in which hunger and malnutrition plague a large majority of the world's population will continue and may in fact get worse.

Over the long term it is probable that population growth rates can be significantly reduced. Over the short term significant decreases are not to be anticipated, since a very high percentage of the population today is in or below the child-bearing years. Thus even if family planning programs were fully effective no significant decreases in growth rates could be anticipated during the next generation.

If, therefore, hunger and malnutrition are to be reduced or eliminated it is incumbent upon agriculture to do the job. This cannot reasonably be expected unless the agriculture of the LDC's is developed comprehensively and not on a piecemeal basis. A comprehensive approach depends upon planning and thus on the efforts of agricultural planners. They must therefore consider all aspects of agriculture, its relative contribution to food and fiber supplies, and the best utilization for each segment of agricultural effort. Only through such planning and effective implementation of such plans can we view the future with optimism.

The member countries of the Central Treaty Organization are fully aware of the significance of agricultural planning in Iran, Pakistan and Turkey. They are aware that the problems are substantially the same in each of the three countries though they may differ in degree, and that therefore each country can learn from the others and also from the experiences of the two non-regional countries, the United Kingdom and the United States. Because of this recognition the Central Treaty Organization has given emphasis to seminars, conferences and symposia in the general field of agriculture.

In January 1971 the Government of Iran, emphasizing the need for sound planning by qualified experts, suggested that a Seminar on Agricultural Planning be held during the calender year and offered to serve as hosts. The suggestion was subsequently approved by the Economic Commitee, and the invitation of the Government of Iran was accepted. The Government of the United States agreed to provide organizational and financial support. As a result, the Seminar on Agricultural Planning was held from August 28 to September 2, 1971, at the Plant Pest and Disease Research Institute of the Ministry of Agriculture in Tehran.

This productive seminar was attended by forty-three delegates representing all five CENTO countries. Their recommendations are included in this publication as are the papers presented at the seminar.

ADDRESS OF WELCOME

by H. E. Mr. Iraj Vahidi,
Minister of Agriculture,
Tehran

It is a great pleasure for me to welcome delegates of member countries and international experts to participate in this seminar which has been convened to study the problems pertaining to agricultural planning. I am glad that Iran has been selected as the host country for this meeting. In welcoming the distinguished guests I hope the seminar will prove of assistance to all the participating countries in the planning of their agricultural development.

The need to provide food for the ever-increasing world population has never been more acute than at the present time. The population of the world, which was 2.5 billion in 1950, reached 3.6 billion in 1970 and is expected to reach 6 billion at the end of the twentieth century. Thus in spite of the control exercised over the birthrate by family planning programs, a billion people must be expected to be added to the population of the world every 5 or 6 years hereafter.

The natural resources available in the world are, certainly, limited and are scarcely adequate to meet the food requirements of the world population. If the available food in the world were to be equally distributed among the people, all of them would suffer from a food shortage. Even now, more than one billion of the world population is suffering from hunger and malnutrition. The actions so far taken on a worldwide basis to meet the nutritional requirements of the people have not met their actual needs, because the increase in production has not kept pace with the increase in population.

At the present time most of the developing countries are forced to finance their national development programs from the earnings realized from the export of agricultural and livestock products and these are often the only means of procuring foreign exchange. Lack of coordination in international trade and supporting policies usually adopted by the developed countries in favour of their own production lead to difficulties and bottlenecks. It would, therefore, be desirable to formulate a long-term comprehensive regional agricultural program, dealing, among other things, with trade between all the nations of the world in raw agricultural materials.

In many conferences and seminars attention has been paid to international trade and, particularly, in the World Food Congress held at the Hague in 1970, the delegates urged the developed countries to pledge themselves neither to raise tariffs nor reduce quotas on their imports from the developing countries, even if balance-of-payments difficulties made this necessary for imports from other developed countries.

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I therefore suggest for your consideration that the following points be given special attention by the distinguished participants :

- Estimation of increased agricultural production required in various countries
- Provision of maximum occupation in the agricultural sector and related industries
- Setting up of rational policies to establish a balance between supply and demand
- Submission of feasible plans for improving international policies with regard to export and import of agricultural products.

In Iran, His Imperial Majesty Shahenshah Aryamehr has emphasized the priority which must be given to the agricultural sector and has pointed out the need for formulating long-term plans for agricultural development of the country.

Accordingly the following points have been included in the long-term plans of the Ministry of Agriculture :

- Provision of the food requirements of our increasing population
- Provision of the raw agricultural materials required by the developing industries
- Export of certain agricultural commodities in the production of which Iran enjoys special privileges
- Increase in the per capita income of the rural population to compare more equitably with that of the urban population.

In addition to the national objectives included in the long-term plans, we also intend to benefit from the recommendations made in this seminar and wish to cooperate with the regional countries in formulating joint regional agricultural projects. I therefore suggest that this seminar study the principle of a regional coordinating plan to serve these purposes.

As you are aware, the Food and Agriculture Organization of the United Nations in its Indicative World Plan has set up a program for world agricultural development for the period of 1965-85 and has suggested guidelines which can prove useful in the preparation of such a plan of regional cooperation.

Therefore, while the delegates of each participating country will present their contributions, I hope the views and opinions of all the distinguished members of the seminar, as well as of the representatives of international agencies, will receive due consideration in formulating joint agricultural policies and regional coordinating programs. This will enable us to develop the agricultural resources of this part of the world to the utmost level possible.

In conclusion I wish you all possible success in your deliberations and hope you will enjoy your stay in Iran.

RESPONSE

by Mr. Arif Uğur,
Turkish Coordinator

On behalf of the Turkish Delegation I would like to thank the Government of Iran for their kindness in hosting this significant conference. I think it is especially interesting that the meeting is taking place here in Tehran, a big capital city with historical interest.

The subject of agricultural planning is of tremendous significance to the regional countries of CENTO. I believe that our countries possess the potential for steady, rapid and balanced development by mobilizing all our resources, physical and human, and making maximum use of them. In this way, it will be possible to attain a higher standard of living through the various measures designed to realize social justice. In fact, the aim of all development efforts is to make people happy. This is a fine and lofty aim, and one which is not easy to achieve.

Recognizing the importance that is attached to agricultural planning, feeling that there is a need for new ideas and experiences to be shared in this area, I would like to express my gratitude to CENTO and the United States Government, through whose effort this conference has been made possible. Once again, I would like to thank all participants whose contributions will be of great value in arriving at what is expected from this conference.

In closing, I wish the conference to be successful and helpful to our countries. I expect that the experiences will be shared and that constructive conclusions and recommendations will be reached.

RESPONSE

by Dr. John L. Fischer,
U. S. Coordinator

On behalf of the participants from the United States of America, I would like to say that we are pleased to be participating in this CENTO-sponsored seminar on a vital topic. Food and fiber are as important to the people in a developed country as in an undeveloped country. No nation dares to leave the development of her agricultural sector strictly to chance; therefore, there must be planning.

I am very proud to be associated with the U.S. participants. They have all had extensive experience and are leaders in their fields, but more important, they are the type of people who are still learning and growing intellectually. We are ready to share our knowledge and experience, but we believe we can learn as much from you as we can give. We come as partners to participate in a mutual learning experience.

We express our appreciation to our hosts who have been so very gracious and helpful. Your city and your land are beautiful during this season of the year. We are happy to be here, and we extend our good wishes to all who have helped make this seminar possible.

KEYNOTE ADDRESS: PLANNING FOR AGRICULTURAL DEVELOPMENT

by Mr. Robert E. Wieczorowski,
Executive Director of the World Bank,
Washington, D. C.

An ancient symbol of peace has been the beating of swords into plowshares The molding of the defensive shield of the Central Treaty Organization into a forum for cooperation in the area of agricultural planning is an appropriately modern expression of this symbol.

But as an unguided plow accomplishes little, agricultural development must also be a well directed cooperative effort. Without guidance the path of agriculture can be as erratic and more destructive than the plow without a plowman. I am aware of the role that you play in your countries guiding agricultural development and respect the responsibilities this implies.

It is because agriculture plays such an important part in the process of economic development that I welcome this chance to be here for the next few days and informally discuss with you the great challenges you face.

World Bank activities speak convincingly of a sincere interest in this subject. In the year ending June 30, 1971, the World Bank loaned $419,000,000 for agriculture, and this amount will continue to increase. For the first time loans for agricultural credit exceeded irrigation loans.

You know we share a common goal: bringing together the efforts of rural, national and international populations for the improvement of all of our societies. We have here, at this conference, the opportunity to share our knowledge and outlooks on the problems which face us and I thank the Goverment of Iran for their kind hospitality.

As an Executive Director of the World Bank, I see many projects--new schools, great dams, railroads, highways and many others--and all are aimed at the elusive goal of economic development. We discuss these projects but realistically we recognize that, however important a single project may seem, economic development depends on concerted efforts in many economic sectors towards goals which capture the imagination of the whole nation.

I have read about your development efforts and I have talked with many of your countryman, and all of this seems to point to a common problem: How do we bring economic and social progress to the majority of the people? Sir Arthur Lewis, the noted West Indian economist, once characterized economic develop-

ment as a situation "where each individual sees the possibility of bettering his own well-being through hard work and initiative." Providing this opportunity is our goal.

In your countries farming is still the occupation of the majority of the people. Without a coordinated thrust from the agricultural sector, development will be something which only a few will see and feel. For many years to come the agricultural sector in your countries will be the source of this opportunity for the majority of your citizens if you, the planners and administrators, can help to structure the future in a way which will enable men to take reasonable risks leading to foreseeable gains.

A modern agricultural system will bring increased cash incomes to the rural sector and lessen the apparent income gap between the urban and rural areas. In many countries, as a recent World Bank study shows, the underemployment rate in the rural areas, while considerably less than that in the cities, is, nevertheless, significant. The study also noted that urban incomes on average range from two to ten times higher than rural incomes. If these people are given the opportunity to work to full capacity the results will benefit the whole society.

An improvement in the quality of rural life, valuable in itself, will also create demands capable of supporting industry.

If all of this can be properly executed, the potential for progress by the greatest number of people will be realized. Your people many then be able to choose lives which emphasize quality rather than subsistence. Large families may no longer be necessary to ensure that older people can live when they can no longer work, and improved health and living conditions will give parents a reasonable hope that small families will grow to maturity. This is not the only answer to rapidly growing populations, but it is one important facet.

Please do not think that I am underestimating the importance of other sectors, including industry. Adequate support for comprehensive agricultural development will require a dynamic industrial sector. Industry which can provide the essentials of a modern life will, in turn, depend on a progressive agricultural sector-- the two are clearly dependent on each other.

We need now to know how to turn our limited resources to improving the agricultural sector. We must also be able to convince the unconverted that agricultural problems must be met, and solved, at the same time as the other problems inherent to the development process are being faced.

Those of you who have visited the United States know of our widespread appreciation of the wonderful carpets made in your countries. In my home we have several, one handed down from my grandfather. But large or small, none of us can lift a carpet by one corner and have the other three rise equally. And four of us at one corner would do little better. The lifting of the carpet can be the better future we are all working for, but only one corner may be increased agricultural productivity. In the few days which follow perhaps we will better define what is at the other corners, and who should be there to lift them. In raising the fabric of your societies others can and will help. However, you and your countrymen must do most of the lifting.

The greatest effort will come from people working, on their own, to better their own lives. Modern society builds on specialization and organization. In ad-

dition to the specialization necessary to grow marketable crops--to use properly the "Green Revolution"--there will have to be other individuals largely concerned with transporting crops--both to the markets and beyond for wider distribution. More people will have to concentrate on the specific marketing aspects of grading and packaging, and on wholesale and retail distribution.

On a national scale efforts must be organized to manufacture necessary inputs such as fertilizers and pesticides, to develop modern seeds and to produce the farm tools required for effective cultivation.

The international aspects of this cooperation must include accurate analysis of present world markets and the sensitive development of potential world markets. Countries must seize market opportunities for their outputs and must also be able to use imported and, therefore, relatively expensive inputs effectively.

Memories of hunger die slowly and many countries have adopted a policy of national self-sufficiency in agriculture in order to be sure of necessary food supplies. But this can be a false goal if it ignores international realities. A nonobjective pursuit of self-sufficiency could lead to a stifling national form of subsistence farming--something scientific progress, if properly assessed, should prevent.

To take advantage of the potential offered by the Green Revolution will require an awareness of the relationship of agriculture to national growth and minds awake to the needs for innovation and change. These are characteristics peasant farmers are often said to be lacking.

But, just as we all know that we cannot ignore the farmer, neither should we misjudge his capacity for change. This capacity has been important in the United States where, over the years, per person productivity gains on the farm have greatly exceeded similar gains in the factory.

The farmer will respond to new methods if he has confidence in those necessary supporting areas which are beyond his direct control. Seeds, fertilizers, pesticides and improved equipment must be of suitable quality and available when needed. Credit must meet similar tests of reasonable cost, availability and flexibility. Markets must be accessible and reasonably predictable. Extension facilities must be responsive to the farmers' needs and must, to some extent, predict those needs. The farmer should have access to educational facilities as he sees the need to improve his own personal capacity in order to better use newly available technology.

Your farmers will be willing to take risks when the benefits are clear. In fact, I think we will all be surprised at the innovative capabilities which can result from the work of "rational revolutionaries" such as you gentlemen are.

With a ready demand for new and proven ideas the real challenge becomes one of design, one of providing the framework for the continuation of this revolution.

Can you identify and communicate to the farmer the various cropping and livestock potentials which may exist? Can you recommend appropriate expendable and capital inputs?

Can you evaluate markets, both present and future? Both domestic and foreign? Both urban and rural?

Can you weigh the alternative methods of standardization, grading and packing? Can you select appropriate methods of processing, preserving, transporting and distributing foodstuffs?

Are you sufficiently sensitive to the ingredients of a better rural life and can you distinguish proper areas for public and private participation in the provision of necessary services?

Can you relate the needs of agriculture to the other demands on your nations in such areas as industrialization, urbanization and employment?

Finally, can you avoid overplanning?

If you can do all this--or at least a good portion of it-- then you will have provided a framework within which uncountable small and independent decisions will come together in a way which is greater that the sum of all the individual actions. This greater result is that same elusive goal of economic development I referred to earlier. And it is development which fully involves the rural sector in the progress of the nation.

The rural sectors of your countries must continue to provide energy, support and even leadership to the national development efforts. One example of this is that the farm can be an important source of trained managers. Successful farming is successful management in its purest form. The farmer must bring together necessary inputs at planting time. He must schedule his work and resources over the period that the crop is growing. He must organize labor to help him harvest. He must take advantage of price fluctuations in the markets to get the best return for his efforts. He does all this under conditions which a "modern manager" might say are impossible.

To guide best this ability to adapt and change you must build on your own cultural strengths. Be alert for the possibilities of blending the old and the new. The most effective revolution retains important traditional values and strengths, but turns them to new tasks.

One of the most difficult aspects of modernization is bringing about the kind of cooperation from all citizens necessary to make the lot of the least citizen a better one. When looking at the conservatism of the peasant do not forget that bureaucracies can be even more conservative. Large agencies may be more dedicated to the authority they have than to the progress they are created to bring about. The result is a lack of confidence from the very people we are supposed to be serving.

Each of your countries has a distinct cultural identity, yet there are important elements in common. The effects of the Green Revolution are being felt in each; acceptance of modern means to improve agricultural production is becoming more widespread; the importance of better land distribution, crop diversification and export marketing are recognized widely; and each of you has seen the potential to turn your already existent resources, most notably water and land, to desired ends.

Combine these with ever-increasingly competent administrations capable of distinguishing and comparing alternatives and seeing the value of international cooperation, and I think we have the beginnings of a time which will see most of your peoples sharing in the benefits of real economic and social development.

To make all this work will take the efforts of all of us, not just the planners. But perhaps the greatest individual challenge is the challenge of planning itself. You the planners must build structures from the bricks of human capabilities, on the foundation of sound economic policies and with the mortar of time. How you arrange the first two may not matter if you haven't learned to recognize when things need to be done quickly, when slowly and when not at all. Bringing the diverse elements of a comprehensive agricultural strategy together in a future time so that efforts and resources are put to best use is a monumental job.

The Shah has underlined the importance of the task you face, and has given it clear historical perspective, in his book The White Revolution. He refers to a dialogue between Zoroaster and the Governor of the Universe: Zoroaster asks, "Who brings us the greatest joy?" and Ahuramasda responds, "He who irrigates the desert and drains the marshes to make them into fields."

These few short days here should teach us something about how to bring that joy to your citizens.

CENTO REPORT ON THE SEMINAR ON AGRICULTURAL PLANNING

Introduction and Objectives

CENTO has been involved in many seminars, conferences and symposia designed to help the member countries accelerate agricultural progress. Some of the meetings, especially in the early history of CENTO, dealt with specific technical innovations and production-increasing practices. (The 1962 Traveling Seminar on Farm Tools and Implements is an illustration.) However, the countries apparently soon realized their problems were broader gauged then merely introducing new technology, so policy considerations entered the picture. At first policy was involved in the seminars as a matter of achieving certain specific goals, such as was done in the 1964 Traveling Seminar on Increased Agricultural Production. Then a transition began with emphasis being shifted more heavily to discussions of institutions and the creation of on overall economic environment that would foster agricultural progress. Since 1967-69, attention has been focused almost entirely on development policy in agriculture (three seminars and conferences) and on general economic institution building and policy formulation.

By 1970 it was realized that a conference on the general subject of agricultural planning per se was needed, with participation by the planning organizations in the regional countries as well as the Ministries of Agriculture. The Government of Iran proposed such a conference and offered to act as hosts, and the Government of the United States agreed to provide financial and organizational support. The Seminar on Agricultural Planning was held at the Plant Pest and Disease Research Institute of the Ministry of Agriculture, Tehran, from August 28 to September 2, 1971.

Seven separate themes formed the basis for the seminar, and the discussions under each theme are described in this report. A summary of the general feeling of the meeting and the recommendations are also included.

Inaugural Session

The conference was called to order by Mr. Manouchehr Ayazi of the Iranian Ministry of Agriculture.

An address of welcome on behalf of the Imperial Government of Iran was delivered by His Excellency Mr. Iraj Vahidi, Minister of Agriculture. After opening statements on behalf of the delegations of Pakistan, Turkey and the United States, and the CENTO Secretariat, a keynote address on the theme of "Planning for Agricultural Development" was delivered by Mr. Robert E. Wieczorowski, Executive Director of the World Bank.

Discussion after Mr. Wieczorowski's paper brought out the point that such organizations as the World Bank and other donor agencies have not paid enough attention to dryland farming in the past. The delegates agreed that problems of the arid and semi-arid areas of the world needed much higher priority. One problem to which IBRD might pay special attention is financing the production of supplies of adapted farm machinery and equipment. It was noted, however, that CENTO is organizing a seminar in Tehran to discuss this subject in the near future.

It was suggested that aid donor agencies should extend more financial and technical assistance in support of livestock, dairy production and food processing activities. Mr. Wieczorowski felt that as a first step, action by FAO and donor countries on a bilateral basis would be more appropriate.

The delegates expressed general approval of IBRD's increased lending for agricultural credit purposes; however, they were concerned about follow-up and noted that the Bank's field staff may need strengthening.

The proposal in the Pearson Report that IBRD should shift emphasis to program lending rather than project lending was discussed. Mr. Wieczorowski indicated that the Bank was moving slowly in the recommended direction, and that guidelines for program type loans had been prepared. However, caution was in order until both the Bank and recipient countries had more experience to guide them.

Theme A: The State of Agriculture in the CENTO Region

His Excellency Mr. Hossein Sepehry, Undersecretary of the Iranian Ministry of Agriculture, assumed the chair for the remainder of the meeting.

The Iranian Country Report was presented by Mr. M.B. Kamaly. During the discussion that followed, the Pakistan Delegation referred to the bottlenecks which tend to exist in food processing industries in developing countries. For example, inexpensive containers are not available. Reference was made to previous recommendations of CENTO conferences towards centralization of tinplate production within the CENTO region, in which some progress had been made.

In reply to a question about the impact of land reform production in Iran Mr. Kamaly stated that it was extremely difficult to assess, particularly in view of the bad weather conditions in the years immediately following implementation of land reform. It was certainly true that more fruit trees had been planted, and the overall effect was positive; however, livestock had not improved.

The role cooperatives have played in the past and could play in the future in encouraging agricultural progress was discussed. The general conclusion was that cooperatives have made a major contribution and are an excellent method of organizing farmers for more effective extension of credit, provision of inputs, and improved marketing. The farmers respond favorably and have benefitted from the formation of cooperatives.

The Turkish Country Report was presented by Mr. Arif Uğur. Returning to the question of land reform, the delegates felt that it was important that a country contemplating land reforms should first of all obtain all possible data from other countries in order to profit by their experiences and mistakes. It was pointed out that

there is a definition problem with land reform and a first essential is to define exactly what is meant in terms relevant to a particular country. The human element must always receive vital consideration along with political and economic factors.

The United States Country Report was presented by Dr. John L. Fischer and the United Kingdom Country Report was presented by Dr. E. S. Clayton.

Theme B: Applying the Process of Economic Development to the Agricultural Sector

Dr. A. T. Mosher presented a paper on "Agricultural Planning." A central theme in Dr. Mosher's paper was that the countries which were at the level of development of the CENTO regional countries should at this time be concentrating their attention on institutional development, including the provision of services and the improvement of marketing, educational and research activities. The delegates observed that in CENTO countries much attention was currently being given to the development of institutions supporting agriculture. However, the ratio of emphasis on commodity and other planning in relation to that given to institutional development was not in accordance with Dr. Mosher's views, and reviews of emphasis in the light of the points he made were appropriate. Dr. Mosher's analysis, in which he indicated that regions within countries may be classified into areas of immediate, future, and little potential growth, was discussed at length, and it was agreed that these classifications are a useful tool for the planners. However, it was recognized by the delegates that social and other objectives were also of high importance, and must be considered in allocating limited resources.

The delegates discussed at length the suggestion in Dr. Mosher's paper that methods of evaluation other than economic benefit-cost analysis should be involved in many aspects of agricultural planning. They agreed that the long-run nature of many agricultural processes, variations in weather, uncertainities involved in research and education, and other phenomena unique to agriculture such as involving hundreds and often as high as millions of management units make direct application of simple economic feasibilty analyses difficult.

Mr. Arif Uğur presented a paper on "Agricultural Sector Planning: the Turkish Experience." In the ensuing discussion, the delegates generally agreed that coordination between the State Planning Organizations and the agencies responsible for implementation of plans and policies was a problem in all the regional countries. Better coordination was required, not only between the planning and implementing agencies, but also in the actual implementation of projects by the different agencies. A further problem involved the timely allocation of finance for the plan projects. The delegates noted that it is unrealistic to expect projects to be effective if they receive only a portion of the funds originally considered to be necessary, or if funds are delayed or released to the executive agency erratically.

Dr. John L. Fischer presented a paper on "Why Projects Fall Short of Expectations." The discussion indicated the reasons listed had often been problems in the CENTO region. Progress was being made, but improvement was still needed.

Theme C: Establishing Priorities for Activities

Mr. A.M. Ahmad presented a paper entitled "Constraints on Agricultural Planning." The delegates took note of Mr. Ahmad's comments concerning the low status accorded to farming and agricultural professions. Agriculture is the major industry in all CENTO regional countries and has a high potential for contributing to future growth if proper technical assistance is offered to the farmer, proper policies are followed and inputs are made available. However, if the full potential of the agricultural sector is to be brought to fruition, agriculturists from the farmer to the most highly trained scientists must be accorded proper respect and given status at least equal to others involved in economic activity. Agriculture cannot progress if agriculturists are viewed as people who cannot fit into any other sector of the economy.

A paper entitled "Development of Big Soil and Water Resources Schemes" by Mr. Şerafettin Özgül and Mr. Samim Öztek was presented by Mr. Öztek. The delegates took note of the need for higher levels of coordination among the many agencies which of necessity must be involved in implementing large schemes. The falling groundwater tables in many areas, and the possibilty that other areas in the CENTO region may soon be facing the same situation, was recognized as a problem needing immediate attention. A review of potential solutions and the possibility of a future seminar on the topic may be in order.

A paper entitled "Integrating Economic, Social and Other Goals into a Workable System--the Issues and Problems" was presented by Dr. E.S. Clayton. One point brought out by the delegates in discussion was that the increasing problem of employment for people displaced from the agricultural sector is likely to become even more acute in the future, thus increasing attention should be given to the problem by planners and policy makers.

Theme D: Improving Agricultural Development Projects

Mr. M. Azhar presented a paper entitled "Pakistan's Experience in Package Programs." The delegates expressed much interest in the package program concept and discussions revealed that package program type projects may be the best approach to increasing productivity and incomes in many areas in the CENTO region. The delegates suggested that member governments give serious consideration to establishing in the near future pilot or experimental projects in all areas representative of the major type of farming districts. The pilot and on-going projects in all countries should be evaluated on a continuing basis with conclusions being communicated promptly to planning organizations and implementing agencies in all member countries.

Mr. S. Mossadeghi presented a paper entitled "Planning for the Conservation of Iran's Natural Resources." His paper raised the question of duplication in work among various agencies of government, resulting in underutilization of limited resources. Dr. Mosher raised the possibility of ensuring better coordination of agricultural planning in general by having broad organizational responsibilities in one ministry or division for all aspects of agricultural development programs. For example, livestock is such an integral part of agriculture that to have livestock and agronomic pursuits in separate ministries or highly limited agencies will create unnecessary problems. In addition, package programs will probably be more suc-

cessful if only one ministry or division is responsible for all functions. Coordination will be easier and budgeting and planning can be conducted concurrently.

The question was raised as to what can be done for millions of rural people living in or near forests when forest development projects were undertaken. The Iranian Delegate indicated that the proportion of people living in forests in Iran is fairly small as compared to Turkey and that cultivated lands in forest areas were not nationalized at the time the forests were nationalized.A forest guard is provided to prevent owners of this cultivated land from cutting down trees and enlarging their own properties.

The delegates agreed that attention should be given to the many problems created by goats in the CENTO regional countries. The Turkish Delegate presented an alternative based on experience. The idea was to supply other means of livelihood to the goat owners, such as poultry, dairying and apiculture. The Turkish Delegate explained that the idea had been well accepted by goat owners in one region near Ankara and the project had met with considerable success.The delegates were generally agreed that this idea should be extended to the whole region, and that some type of CENTO-assisted project could be very helpful.

Mr. Mustafa Epikman of Turkey presented a paper entitled "On-Farm Water Development and Soil Conservation." The Iranian Delegate requested more information from Mr. Epikman regarding soil surveys, government policy on land consolidation and costs of conservation practices. The Turkish Delegate indicated that more detailed surveys were carried out for irrigated land than for dryland since precision in fertilizer recommendations is more critical if economical results are to be obtained. A government decree encourages land consolidation. Costs of specific land development practices were not available; however, the delegate indicated that TL 1,500 ($100) per hectare would be the approximate average cost. He indicated a need for carrying out economic analyses of land leveling, irrigation installations, etc.. in order to arrive at more accurate indications of benefits.

Theme E: Cracking the Inputs Barrier

Dr. Nazmi Demir presented a paper on "Employment Interdependency among Sectors of the Turkish Economy." The United States Delegate asked if Dr. Demir's analysis could be extended to study the structure of income distribution and what effects on demand and employment this might indicate.

Dr. Demir indicated that such analysis, while possible, had not been considered in his paper. The State Planning Organization is aware of the potential of this type of analysis and is planning studies in this area.

Upon a question by the Iranian Delegate on rural-urban migration, the Turkish Delegate agreed that social and economic problems would occur and cited some figures for Turkey. The Third Plan hopes to alleviate the problem in Turkey by establishing projects in the rural areas which required considerable labor such as processing plants, irrigation (to promote more intensive cropping) livestock and public works. There also is still some room to absorb employment in the manufacturing sector. Dr. Demir noted that his model does not give answers per se to the problem but does provide an analytical tool that planners can use in predicting not only employment levels but also what occupations will be needed under varying sets of conditions.

The Delegate from USAID/Pakistan noted the increasing concern regarding underutilization of human resources in Asia. In East Pakistan, for example, data indicate that currently each farm worker farms one acre. Even under optimistic projections of population growth and industrial growth this acreage will be reduced to one-quarter acre per farm worker by the end of this century.

Mr. Mete Başci presented a paper entitled "Programs for Factors Contributing to Increased Agricultural Production."

Mr. Manouchehr Ayazi presented a paper entitled "The Role of Timely Provision of Agricultural Inputs in the Progress of Agricultural Projects."

Mr. Bahram Mehrad presented a paper entitled "Agricultural Credit in Iran."

Dr. Riaz Ahmad Khan presented a paper entitled "Maximizing Economic Returns to Public Resources in Agricultural Development." The Pakistani Delegate clarified input distribution in Pakistan, especially fertilizers. It was pointed out that the Government shifted to private distribution after fertilizer sales became too much of an administrative burden.

The self-interest of the private distributor was cited as working towards encouraging fertilizer dealers to make ample supplies of fertilizers available and provide farmers with agronomic advice regarding its use.

The United States Delegate discussed the appropriateness of alternative roles of government during the inital stages of introducing new inputs. One role is educational and promotional, and prior to the time when the quantities used are adequate to encourage private enterprise to meet the need, it may be necessary for the government to handle distribution. However, after a new idea is well established the government may turn the distribution of services over to private enterprise in order to relieve it of excessive administrative problems and to enable it to use its limited resources for other causes.

The Iranian Delegate requested any information regarding the government's role in subsidies. Dr. Khan pointed out that while subsidies (as well as price supports) have a definite role, serious consequences may result if they are allowed to become "locked in." Once their purpose has been met, they should be eliminated.

Theme F: Progress Through Policy

H.E.Mr. Hossein Sepehri presented a paper entitled "Long-term Policy for the Agricultural Sector of Iran."

A United States delegate requested comments regarding what criteria have been used for investment. It was pointed out that, since water is the major limiting factor, this is the number one criterion. Also land is classified in different categories with a minimum of 5,000 hectares as economic units.

The Delegate from Pakistan requested additional information on how the national law regarding land reform and the Muslim law on inheritance were reconciled. Under the Corporation, which is only three years old, no land is fragmented.

Legal coverage is given to the fact that the land should not be fragmented. Only shares can be sold to cooperatives or corporations in order to reduce the number of farmers to make them available for industrial sectors. The efficiency of these farms has been considerably higher than traditional ones.

Mr. N. Yazdan-Panah presented a paper entitled "Agricultural Planning from the Standpoint of Marketing and Pricing Policies." The paper was complementary to Dr. Fischer's comments on why projects short fall of expectations. Dr. Fischer noted that marketing problems are worldwide, and he suggested that there are no ready-made solutions to offer. Too often the problem is just shifted around. For example, in the field of credit we complain about excessive interest rates in the private sector; however, when we shift to government credit, the default rate may run so high that the effective interest cost if more governmental losses are considered may be as high as the rates charged by private moneylenders or marketing agencies.

Theme G: Looking Ahead

Mr. M. Koopahi of Iran presented a paper entitled "Application of Econometric Models in Agricultural Planning." The delegates commented that in general econometric models are useful tools in planning but limitations related both to models and to statistics should be borne in mind.

Mr. Clyde Adams presented a paper entitled "The Role of Livestock in CENTO." The Iranian Delegate noted the problems in obtaining accurate data and statistics on livestock numbers. With regard to importing foreign breeds for use in Iran, he noted that meat produced from these animals often does not meet local consumer preferences. He also emphasized Mr. Adams' point about the soil conservation value of livestock. Mr. Adams was asked to comment about the role of imported animals and also discuss the importance of breeding versus feeding. With regard to imports Mr. Adams cautioned the delegates about the problems involved. Among these are disease resistance, environmental differences and differing managerial levels. Prior to imports of exotic breeds every effort should be made to determine the potential of native breeds under conditions of improved management. With regard to the relative importance of breeding viz-a-viz feeding, both are extremely important. However, breeding is very slow whereas results from feeding are quickly apparent. Thus breeding programs are dependent upon feeding and culling.

Mr. M. Vakilzadeh presented a paper entitled "Development Planning: the Comprehensive Regional Development Approach, Ghazvin Development Project Case Study." The delegates agreed that such regional development plans should be encouraged by CENTO and local governments, and extended to other regions.

Dr. Charles K. Mann presented a paper entitled "Planning and Decision Making: Advantages and Disadvantages of a 'Floating Plan.'" The discussion of the paper was long and intense, with all aspects receiving serious attention. No uniform conclusions were reached concerning which was best; however, it was concluded that planning and decision making for implementation need to be integrated, and that flexibility is required because of the unpredictability of agricultural output, the number of entrepreneural units involved, and year-to-year changes in resources allocated. All implementing agencies should be integrally involved in the planning process.

Dr. Leon Hesser presented a paper entitled "Obtaining the Data Needed at Reasonable Cost." A delegate from Iran commented that the lack of data was always a problem and that with livestock it has not been possible to find a solution. A sample survey had proved very inaccurate and he felt that 10 percent was too low a figure. He wondered if it would be possible to hold another seminar to discuss practical statistics gathering in agriculture, following the very valuable Seminar on Agricultural Statistics held in 1967. Dr. Hesser agreed that a 10 percent sample required accurate past data to be worthwhile. The delegates discussed the possibility of assistance from remote sensors in making agricultural surveys, and noted that CENTO was holding a seminar on the subject of remote sensors in Ankara in November.

General Feeling and Conclusions of the Meeting

The seminar assembled amid a sense of urgency, and with the feeling that all of the CENTO regional countries were at a crossroads in agricultural planning and policy. The regional countries are fully aware that the inevitable population explosion they face will place even greater pressure on their agricultural sectors than they have experienced in the past. However, all three have tasted success and are equally aware that if they plan properly and use their resources wisely, there need be no fear of hunger; in fact, a healthy aggressiveness leading to rapid growth in the agricultural sector can be the engine that pulls all three nations up the long hard hill of economic development. Parts of Pakistan and Turkey have gone through the first generation of the Green Revolution, and Iran has mastered the first-stage problems of land reform. All three countries can properly be proud of their accomplishments, but they face a new set of problems-- second generation problems, equally severe and difficult to solve.

During the seminar it became abundantly clear that the 1970 decade will require new priorities being assigned to various problems. Emerging candidates for being the more critical problems during the 1970's were:

1) Inadequate effective demand for farm products, as this leads to low prices, which kill the farmers' incentive to produce.

2) Marketing--who will buy the increased production? What do consumers want? Where are the consumers? Can the job be done efficiently? Who will invest in and manage the distribution systems required?

3) Inputs--as farming becomes more commercial in orientation, from whom and at what prices will the farmer buy his inputs?

4) Credit--as the farmers' needs for capital inevitably increase, who will make it available, at what rates, and under what conditions?

5) Supporting services--as the needs for supporting institutions such as extension, research, transportation, communications and regulatory agencies become more sophisticated and greater in number, who will provide them?

6) Displaced farm people--agricultural production cannot be efficient and contribute to a rising level of living for the regional countries if it must utilize the rapidly increasing numbers of people born in the rural areas;

therefore, what can be done to provide for the orderly transfer of at least the net national increase to other sectors at increased real incomes?

7) Livestock and dryland--two areas that hold great potential and have received relatively little emphasis are now ripe for development, but how can the multitude of special problems each faces be overcome?

The seminar participants looked to the past for insights into the future. Some of the lessons from the past are that while simple, single-purpose thrusts at agricultural modernization may solve some problems, they also often create other problems almost as severe. While the national thrusts that have come to be called the Green Revolution increased the food supply, the displaced laborers and small farmers face more serious social problems than ever, and acceleration of unmodified programs without coordinated efforts to solve the new problems would lead to social and political instability of unmanageable proportions. Therefore, planning for agriculture must be part of a sound, overall national development plan in which all of the pieces of the puzzle have a place. Closer cooperation and coordination than ever between planning agencies and executing ministries and agencies is therefore mandatory.

An increasing concern for the overall environment was in evidence in the seminar. Falling water tables, disastrously damaged timber stands, overgrazed ranges, and air-polluted, unemployment-laden cities are but some of the long-run problems of proper concern to agriculturalists as well as the balance of any nation. Farmers and rural people standing alone cannot solve these problems.

Past experience has demonstrated the folly of paying too little attention to the role of people in the development process. Increased yields and better livestock are great achievements only in the manner in which they contribute to the welfare of the people. The agricultural planners' concern for people must be multi-sided; people, both urban and rural, are consumers of food and fiber and have interests that must be served; farmers who invest in agriculture and manage farms are entitled to reasonable returns, and those who work (laborers) have the right to dignified, rewarding lives. Proper agricultural planning calls for a people orientation.

To scatter development effort in agriculture too thinly is to waste it, history teaches. Therefore, package program projects, area development schemes and other means which give increased leverage to the limited resources available to governments are those with the greatest promise. All areas and resources do not respond identically, and proper ordering of activities--determining what to do first, then second, etc., is an extremely important aspect of good planning.

All nations face limiting factors or restraints that must be taken into account, and it is recognized that in the past errors have been made. The more limited factors must be allocated so that the greatest return can be achieved with them. Capital and highly technical and managerial talent are scarce in all areas; and in many areas water borders on being an absolute limitation. Projects must be planned so as to relieve the restraints, or to obtain maximum return from the limited factors utilized.

The delegates concluded their sessions by turning inward--looking at the tools of their trade. New techniques and methods are emerging which hold great promise. The regional country delegates realize they and their colleagues must become more familiar with them. However, in the end it was recognized that tools and techniques cannot replace human judgment. Planning is now, and will remain for

many years, an exercise in good judgment and common sense, and those nations that get personnel with the needed qualities into the strategic positions in planning are those most likely to make the greatest progress.

General Recommendations

The following is a summary of the seminar's main recommendations.

1) CENTO should sponsor or otherwise arrange for a workshop of one month or more duration for agricultural and agriculturally related ministries and agency personnel involved in planning, and preparations for such a workshop should be launched at an early date.

2) CENTO should consider a symposium on planning data needs and methods of obtaining them at reasonable cost, with attention focused on livestock, crops, farm management and marketing.

3) Planning agencies and agricultural executing ministries involved in agricultural development activity in the CENTO region are urged to review the priorities given to livestock production, processing and marketing, and if changes are in order, to take appropriate action in forthcoming plans.

4) Marketing and price policy problems are recognized as being very serious and are blocks to more rapid modernization of agriculture in all CENTO regional countries; therefore, planning organizations, executing ministries and agencies are encouraged to devote greater attention to them in the future.

5) The importance of credit as a strategic productivity increasing tool in the member countries is recognized and the need for both increases in capital flows to agriculture and improvement in credit systems noted; therefore, CENTO and the member governments, the World Bank group and aid donors are urged to increase their emphasis on strengthening the financial institutions serving agriculture.

6) The increasing rural population amid limited opportunities for efficiently utilizing very many more people in agriculture poses crisis conditions for CENTO regional countries in the near future, and therefore requires attention, including the development of industry in rural areas and increasing productivity per unit of land.

7) The many problems arising from inadequate coordination among the numerous executing ministries and agencies, and the planning agencies in implementing projects are called to the attention of CENTO and member governments, and they are urged to take corrective action.

8) The delegates take note of the forthcoming Seminar on Arid and Semi-Arid Zones and urge CENTO and the regional countries to give greater stress to their development.

9) The critical need for better basic data and knowledge is noted, and the high cost of research and the limited number of scientists available in the CENTO region recognized; therefore, member countries are encouraged

to strengthen their research efforts, and CENTO is encouraged to investigate ways for improving the coordination of research activities and the exchange of information.

10) The serious nature of falling water tables in some areas and the possibility that other areas may be seriously overdrawing annual recharge merits immediate attention by the regional government, and a CENTO seminar on the topic is encouraged.

11) Planning agencies in the regional countries are urged to study the area approach, and to consider the possibility that at their current level of development greater emphasis should be placed on institutional development.

12) It is recognized that certain projects have not increased agricultural production as much as expected; therefore, it is recommended that priority be given to determining the reasons for this and to improving the quality of existing projects before embarking on additional large irrigation and other projects.

13) The desirability of increased trade among the regional countries is noted, and it is recommended that member governments actively explore ways to increase trade among themselves and to develop wider markets for regionally produced commodities in other parts of the world.

14) The formation of pilot projects involving package type programs in areas representative of the major type of farming areas in each member country, and detailed evaluation of on-going projects on a continuing basis with dissemination of conclusions to all countries is encouraged.

15) Information on World Bank group activities and policies should be made more readily available to the executing ministries and agencies in the member countries.

16) CENTO and the member countries are urged to encourage aid donor agencies to provide more financial and technical assistance to livestock, and food processing activities.

17) The desirability of providing higher levels of protein and vitamins to improve diets is noted and member governments are encouraged to adopt policies to increase production of the higher food value crops and livestock.

18) The delegates took note of the efforts of member countries to achieve greater social justice and a better standard of living for people in rural areas. Accordingly, in designing projects and programs, special attention should be paid both to increasing productivity and means to extend the benefits of these projects and programs widely so as to raise per capita incomes of people in the area affected. This will not only serve social justice, but also will increase effective demand for agricultural products.

CLOSURE OF MEETING

The Secretary General of CENTO, His Excellency Mr. Turgut Menemencioğlu, and the Minister of Agriculture of the Imperial Government of Iran, His Excellency Mr. Iraj Vahidi, attended the closing session of the seminar. The Head of

the United States Delegation, Dr. John L. Fischer, gave a summary of the work undertaken in the last few days and Mr. Menemencioğlu congratulated the participants and organizers on the great success of the seminar.

In their closing speeches the heads of visiting delegations paid tribute to the Chairman for his excellent handling of the meeting, to the Iranian Government for the good facilities provided and their kind hospitality, to the Government of the United States for their organizational and financial support, and to the Secretariat for its efficient servicing.

IRAN'S EXPERIENCE IN AGRICULTURAL PLANNING

by Mr. M. B. Kamaly,
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The need for a social and economic development program had already been felt in Iran before the outbreak of the Second World War. The idea of reconstructing and developing the economy through government initiatives gained further ground after the extensive economic dislocation caused by the war.

In 1325 (1946) major efforts were directed towards: 1) reorganization of government-owned industries established during the previous two decades and 2) formulation of a comprehensive development plan. Upon the reactivation of necessary administrative and financial arrangements, the Government of Iran embarked upon its First Seven-Year Development Plan in 1328 (1949).

The first two years of the First Plan (1328-34) were devoted to: 1) establishment of an organization to carry out the plan and 2) reorganization of the state-owned industries which were brought under the supervision of the Plan Organization. During the remaining years of the First Plan, Iran was faced with severe financial hardships caused by the nationalization of the oil industry.

As a result, development programs were curtailed. For instance, of 7.3 billion rials originally allocated for agriculture (more than 27 percent of the total plan budget) only one billion rials were actually made available.

TABLE I

FUND ALLOCATIONS UNDER THE FIRST PLAN
(Unit: Billion Rials)

	Planned Expenditure	Actual Expenditure
Agriculture	7.3	1.0
Transport	7.0	1.5
Industries and mines	4.3	1.2
Communications	0.7	0.0
Oil development	1.0	0.2
Social welfare	6.0	0.2
TOTAL	26.3	4.1

In the Second Seven-Year Plan (1334-40) agricultural programs were rather heavily weighted towards long-term investments such as large-scale irrigation structures. However, considerable progress was also achieved in laying the foundations of expanded programs for seed improvement, fertilizer use and pest control.

TABLE 2

ALLOCATIONS UNDER REVISED SECOND SEVEN-YEAR PLAN
(Unit: Billion Rials)

	Final Approved Allocations
Agriculture and water	25,100
Communications	34,000
Industries and mines	9,400
Social affairs, etc.	15,500
TOTAL	84,000

TABLE 3

AGRICULTURE AND IRRIGATION ALLOCATIONS IN THE SECOND PLAN (REVISED PROGRAM)
(Unit: Million Rials)

	Estimated Disbursements
Irrigation surveys and dam construction	15,628
Agricultural and irrigation training	266
Farming and crop improvement	553
Animal husbandry	976
Plant pest control	915
Forestry and pastures	1,098
Development of villages and barren lands	565
Agricultural extension	362
Silos	264
Agricultural machinery	459
Meteorology	95
Rural economy and agricultural engineering	265
Agricultural industry	154
Loans for qanats and deep wells	1,000
Credit for other programs including establishment of a chemical fertilizer plant	2,500
TOTAL	25,100

The main shortcomings of agricultural programs undertaken in the Second Plan were identified as: 1) inadequate specification of priorities of the different projects in the program, 2) insufficient coordination among the various government agencies involved in the programming and execution of development activities, 3) lack of reliable data and 4) neglect of institutional factors such as land tenure, marketing and credit.

In response to the above considerations, the Third Plan (1341-46) envisaged major efforts for institutional reforms in agriculture. The implementation of land reform together with the nationalization of water, forest and rangeland resources carried out under the White Revolution introduced a progressive institutional order in Iran's rural economy, based on social justice and protection of individual effort and incentive.

Further impetus for agricultural development was furnished by rapid establishment and acceptance of rural cooperatives. A convincing though partial indication of the positive response of Iranian farmers to these reforms can be found in the rapid rise in the demand for chemical fertilizers from 39,000 tons per year in 1340, to about 230,000 tons per year in 1349, an increase in the area under cultivation, and greater production of high value crops, e.g. sugarbeets, tea, oil seeds, cotton and fruits.

TABLE 4

DEVELOPMENT EXPENDITURES IN AGRICULTURE AND WATER DURING THE THIRD PLAN
(Unit: Billion Rials)

Agriculture	
Land reform	6.5
Agricultural credit	6.6
Research and studies	1.3
Production support programs	3.1
Protection of natural resources	1.0
Livestock	1.1
Marketing	0.7
Establishment of large agricultural units and regional development	4.3
Total	24.6
Water	
Development funds	22.7
Total agriculture and water	47.3

Between 1341 and 1346 (1962-63 to 1967-68) agricultural output increased at about 3.4 percent per year. While this rate of growth was below the Third Plan target, there were a number of factors which adversely affected the growth of agricultural output in that period. Most important of these were:

1) The short-term disruptive effects of land reform
2) Extensive reorganization of government agencies dealing with agriculture
3) The inadequacy of the distribution network supplying inputs (fertilizers and improved seeds)

4) Weakness of the marketing system

5) Lack of a vigorous extension service and supporting research program.

The Fourth Plan (1347-51) has followed a strategy for agricultural development similar to that of the preceding plan. It has aimed basically at increasing farm incomes and producing as much of the domestic food and raw material requirements as possible.

The overall objectives have been:

1) To increase agricultural productivity through the introduction of modern techniques
2) To raise rural employment by diversifying occupations, introducing cottage industries, and expanding other economic activities
3) To conserve, develop, improve and better exploit Iran's natural resources
4) To transform rural society into a self-help cooperative community.

TABLE 5

PROJECTED DEVELOPMENT EXPENDITURES IN AGRICULTURE AND WATER SECTORS IN THE FOURTH PLAN
(Unit: Billion Rials)

Agriculture	
Land reform	4.0
Agricultural credit	14.0
Research and studies	4.0
Production support programs	13.0
Protection of natural resources	6.0
Livestock	7.0
Marketing	5.5
Regional development	11.5
Total	65.0
Water	
Development funds	48.5
Water board funds	4.6
Total	53.1
Total agriculture and water	118.1

The following is a brief appraisal of the approach and some of the main problems and accomplishments of the agricultural development programs of Iran:

1) In the last two decades or so, during which Iran had been involved in the process of economic development planning, much concern has been expressed about the efficiency of policy decision making, program preparation and implementation of various projects.

Complexities of Iran's agriculture have lead us to make some revision in our original programs. The approved projects in the course of their execution have had different degrees of success which often paved the way for further adjustment to be made on such and other related projects.

During this period we have fervently striven to apply the principles of sound economic planning in our development programs.

Despite shortcomings and deficiencies, the progress so far achieved in our economy, in such a short span of time, is a clear indication of the important role which planning played in our national development.

2) The success of economic planning, according to our experience, depends as much on the directives of the leadership, the loyalty of planners, administrators, technicians, etc., as on the support of the people. Iran's experience in the successful implementation of its Land Reform Program is a case in point which shows what can be accomplished when progressive leadership is backed with the support of the people.

3) Iran's experience during this period clearly indicates that both agricultural and industrial development are vital factors for the development of the Iranian economy. They should not be considered as alternatives. Neglect in the development of one sector will harm the development of the other sector and consequently will limit the whole economic growth of the nation.

   In Iran population is growing very rapidly. Per capita income is also rising. As a consequence the demand for food will be expanding faster than ever before. Agricultural development is to be pressed not only to meet the increasing demand for food for the population, but also to provide the necessary raw materials for the agriculturally based industries as well as to secure for the farming population a satisfactory level of income. Only a prosperous and healthy farming community will have the necessary purchasing power to buy the manufactured products of the industrial sector. The development of the industrial sector will create the employment opportunities which will absorb the excess rural population and facilitate their orderly transfer to the urban centers. A prosperous industrial community will in turn provide an expanding market for the agricultural products.

   In the formulation of our development programs we have become increasingly aware of the interdependence of agriculture and industry in the development of our national economy.

4) In a vast country with something like 80,000 farm communities such as villages or groups of farms, widely dispersed over 165 million hectares of land and where climatic and socio-economic conditions vary considerably from one region to another, agricultural planning becomes a delicate undertaking. A great amount of basic facts and information will be required before the planners can make rational decisions. Iran, however, has been determined to develop and progress in a hurry. In cases where reliable information was scarce, whatever data were available were used. However, caution, patience and prudence were used by all parties concerned with agricultural development in order to avoid serious mistakes. Even though reliable data were lacking, Iran has been willing to promote development programs, choosing to make mistakes rather than remain idle awaiting the collection of more reliable information.

5) Although reliable data are essential for sound agricultural planning, our experience clearly indicates that more often than not well defined policies and strategies can influence the success of programs more than ordinary data.

6) When it became apparent that there was a shortage of reliable information the authorities decided to do something about the problem. Already the Government has engaged several consulting firms for the purpose of fact finding, has established more than a dozen research centers in the concerned ministries as well as in the universities, and is planning to undertake a comprehensive agricultural census next year.

7) Since factors beyond the power of planners will bring about changes which could not have been anticipated, programs often were not implemented exactly as they were originally designed. This was a cause of great frustration to the administration. Since the Third Plan period we have made considerable progress in creating the administrative procedures necessary to introduce more flexibility into our approved development programs.

8) In the course of national progress in the past three development plans, Iran has benefitted from contributions made by international agencies of the United Nations, assistance programs of the friendly nations, as well as from foreign investment in Iran's economic activities.

   Our experience has convinced us that foreign technology and capital if properly applied will have a major impact on our growth and can be advantageous to all parties concerned. The unique political stability which Iran enjoys under the wise leadership of His Imperial Majesty, the Shahenshah Aryamehr, together with the attractive laws and regulations which give protection to foreign investment, have created an ideal environment for private investors who wish to take part in development activities in this part of the world. There are unique opportunities for the private investors who are willing to participate in our economic development.

   While we are aware of the benefits of foreign participation and will continue to give our wholehearted support to sound foreign investment in our country, we have also become aware of its possible shortcomings. It is relevent to point out here that while we have benefitted from the services of many foreign consulting firms we have also had some trying experiences with a few consulting engineers of different nations who have tried to take advantage of the country's eagerness to progress rapidly, to push us into economic ventures.

9) By the Second Plan period only the Plan Organization had a well staffed technical bureau, but since then we have become fully aware of the importance of equipping all the governmental agencies with the necessary qualified personnel. Already the Government has established plan and project bureaus within the different ministries concerned with agriculture, with competent personnel in program formulation to carry out feasibility studies in the execution of the projects. We have come to know that big physical projects are not to be confused with economic devlopment. In some cases where local conditions and prevailing institutions have not been studied with care, such big projects may become an obstacle to development.

10) Iran, in its determination to accelerate economic progress, will require more imports of capital goods and services for all economic sectors including agriculture. In this field we have learned that the lowest priced goods are not necessarily the cheapest. In the long run, low priced machinery and equipment have often turned out to be the most expensive.

In this field we have also learned that physical structures, machinery and equipment are not an end in themselves. Unless they are coordinated with and made a part of an overall program, they will often remain unused or at best underutilized.

The establishment of a food processing industry or building of a modern slaughterhouse will not be effective unless the necessary personnel is trained, credit and marketing institutions improved and reorganized, and the habits and customs of the people taken seriously into consideration. The building of a modern silo has to be coordinated with improving grain production, marketing facilities, training of personnel, and a complete change in our agricultural credit system.

11) Through our past experience we have come to know the importance of research to agricultural development. The limited research of the past was largely ineffective because of the great variations in the environmental conditions which exist between the different regions of Iran. It is hoped that the multiplication of agricultural research centers in different parts of the country will greatly help to fill this vacuum.

Achievements obtained in the centers, however, are of little use unless they are made available to the local farmers. The development of the Extension Service, as well as other institutions, should go hand in hand with the development of agricultural research centers.

Only through a coordinated approach of all these services will the local farmers become able to make effective use of the directives received, and persuaded to become active agents for the fulfillment of the production targets. It is relevant to point out here that during the last three years there has been a great response on the part of the Iranian farmers to the new technical information received from the agricultural research centers. Considerable production of certain crops under special projects carried out by the Ministry of Agriculture has been recorded in many parts of the country. The role of supervised credit has been particularly important in promoting the receptiveness of the farmers to the new technologies and improved methods of production.

12) Finally we would like to point out that our experience in the field of agricultural planning and development has shown the importance of creating a sound follow-up system to review past achievements and coordinate development.

Agricultural programs have a great impact on the lives of a large segment of the population. Established laws, regulations, government organizations, newly introduced technologies and institutions will constantly influence attitudes, behaviour, and actions of the farmers. Therefore, planners as well as executors of the agricultural programs should be willing to review past performance in order to identify existing problems and initiate action to remove obstacles to agricultural development.

In the course of our economic development we have tried various procedures and we are in the process of establishing a comprehensive follow-up system. Our experience may or may not be applicable to other societies, but one important point which should be made clear is the fact that follow-up or even supervision of development work should not be confused with ordinary inspection.

In other words, the mission of the authorities engaged in the supervision of development activities is fact finding, but not in order to blame any individual or a given organization. The purpose and function of the follow-up system or committee is much more important than that. The follow-up system will attempt to bring about greater coordination and better cooperation between the different parties involved in order to facilitate and accelerate development activities.

THE AGRICULTURAL ECONOMY OF TURKEY

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Agriculture in the Turkish Economy [1]

Despite the fact that the relative share of agriculture in the national income has been declining, this sector continues to be a crucial sector in the economy of Turkey. The relative share was 35.7 percent in 1963, and dropped down to 27.2 percent in 1969. At the end of the Second Plan period, 1972, this percentage is expected to be around 26 percent.

Agricultural exports, mainly cotton, tobacco, fruits and nuts, were U.S. $ 403 million, which constituted 75 percent of the total export earnings. The level of agricultural export earnings is largely affected by the volume of cotton, hazelnuts and tobacco exports. Export earnings declined in 1969 with respect to the level realized in 1967. The level realized in 1970 is 10 percent higher than that of 1969.

The agricultural sector provides some 66 percent of the employment in the total labour force. The rural-urban ratio in the 1970 census was 61.3 percent.

The main objective set in the plan is that the total demand for agricultural products will be met by domestic production.

Some Characteristics of Turkish Agriculture

LAND USE PATTERN AND DISTRIBUTION

LAND USE PATTERN

About one-third of Turkey's total land area is used for the production of crops--area sown to crops, fallow land, vineyards, orchards and vegetables. The remaining two-thirds is in meadow and pasture, forest, wasteland, water areas, or it is used for communication, urban uses or for recreation. The pattern of land use is shown in Table 1.

1. Agriculture includes crops, livestock, forestry and fishing.

TABLE 1

PATTERN OF LAND USE
(Unit: Thousand Hectares)

Years	Area Sown	Fallow	Grazing Area	Vineyards and Olive Groves	Fruits and Vegetables[1]	Forest Area	Nonagricultural Land[2]
1951	10,600	4,672	36,978	945	620	10,418	13,465
1957	14,392	7,769	29,748	1,219	690	10,418	13,462
1963	15,276	8,547	28,257	1,401	806	10,584	13,097
1967	15,513	8,383	26,075[3]	1,514	900	12,578[4]	13,095
1969	15,907	8,824	18,947[3]	1,561	951	18,273[4]	13,095

1) Includes tea.

2) Includes wasteland, lakes, marshes, rivers, roads, cities, parks, etc.

3) Reduction is due to increase in forest area.

4) The new surveys, based on more accurate aerial photographs and inventory, indicate that the total forest area is around 18.3 million hectares.

Source : Computed from Summary of Agricultural Statistics, 1969, State Institute of Statistics.

The area in cultivated fields, area sown and fallow land, increased during the 1950's with the increase in the use of tractors to expand the area of grain production to meadow and pasture lands. The area in cultivated fields will likely diminish in the future as lands submarginal for cropping are returned to other uses. Approximately 10 percent decrease in fallow land is envisaged during the Second Five-Year Plan period which means the area sown annually may be increased.

However, this provision of the Plan has not been and will not be realized. In the Second Plan the total agricultural land (grazing, forest and nonagricultural land excluded) is assumed to be 10 percent less than the available statistical data and the production estimates are based on the reduced area.

OWNERSHIP DISTRIBUTION

Today there is much uncertainty concerning the ownership of many tracts of land due to the lack of surveying and because of faulty registration. Data derived from the 1963 agricultural sample survey results on the number and size of agricultural holdings are shown in Table 2.

TABLE 2

LAND DISTRIBUTION NUMBER AND SIZE OF AGRICULTURAL HOLDINGS

Size of Holdings Ha.	No. of Holdings Total	Percent	Land Area Total Ha.	Percent
0.1 - 5.0	2,132,291	68.8	5,219,248	25.0
5.1 - 20.0	853,425	27.5	8,775,146	42.0
20.1 - 100.0	110,764	3.6	4,932,427	23.0
100.1 - 500.0	3,832	0.1	1,632,655	7.7
Over 500.0	491	-	513,072	2.3
	3,100,803	100.0	21,072,548	100.0

Source : Derived from Agricultural Census, Sample Survey Results, 1963, State Institute of Statistics.

As can be observed in Table 2, 68.8 percent of the farmers at the lower end of the distribution scale own 25.0 percent of the farm land. On the other hand, about one percent of the landowners hold 10 percent of the total area cultivated.

The average farm size is almost 7 hectares. The extent of fragmentation is 6 to 7 per farm in Turkey.

TABLE 3

SEASONAL LABOUR FORCE REQUIREMENTS AND UNEMPLOYMENT LEVELS IN THE AGRICULTURAL SECTOR

(Unit: Thousands)

Seasons	December-February		March - May - June				July - August		September-November	
	1967	1972	1967	1972	1967	1972	1967	1972	1967	1972
Product	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Crops	520	558	2,410	2,442	2,428	2,829	7,435	8,095	3,195	3,601
Livestock	1,763	1,894	2,015	2,184	2,001	2,180	1,738	1,930	1,530	1,651
Total manpower requirements[1]	2,283	2,452	4,425	4,626	4,429	5,009	9,173	10,025	4,725	5,252
Unutilized manpower	7,800	7,686	5,658	5,513	5,654	5,129	910	113	5,358	4,886
Manpower supply	10,083	10,138								
Percentage of disguised unemployment	77.4	75.8	56.1	54.4	56.1	50.6	9.0	1.1	53.1	48.2

1. The analysis essential for manpower demand is made separately for the different agricultural regions. Calculations are based on a 45-hour work week.

Source : State Planning Organization.

MANPOWER AND EMPLOYMENT IN AGRICULTURE

The seasonal changes in manpower requirements and unemployment are summarized in Table 3. In the peak season the percentage of disguised unemployment is estimated to be 9 percent in 1967, 1.1 percent in 1972, while in the slack seasons over 75 percent in both years.

CAPITAL STRUCTURE AND FINANCE IN AGRICULTURE

One of the effective methods of increasing agricultural production is to use modern rather than traditional machinery and equipment. Imbalance in the capital structure is the main bottleneck blocking efficient operation within the agricultural sector. This also impedes intensification.

According to the studies conducted by Ankara University land capital in the Central Plateau varies between 63 and 77 percent, and in exceptional cases drops down to 46 to 49 percent. Capital invested in building ranges between 5 and 14 percent in machinery and implements between 2 and 9 percent, in livestock 4 and 14 percent, and all current assets range between 9 and 24 percent. It will be realized that the highest proportion of the farm capital is invested in land and plantings. So this indicates that on an average an extensive type of farming is practiced in the country.

The main source of finance is the Agricultural Bank and the agricultural credit cooperatives. It should be kept in mind that these institutional sources are not capable of providing the amount of credit needed by the country's farmers. This would imply that there are some other sources of financing, which might be named noninstitutional credit markets, composed of landlords, merchants, moneylenders, and relatives. Evidently it is difficult to ascertain the relative importance of these alternatives. It is anticipated that some 50 to 70 percent of the farmers' credit is obtained from institutional sources.

ORGANIZATIONS INVOLVING AGRICULTURAL ACTIVITIES

The agricultural functions and services are scattered among different government agencies so as to create interdisciplinary conflicts. Large-scale water development works are under the Ministry of Energy and Natural Resources, while on-farm development and soil conservation activities are the responsibility of the Ministry of Rural Affairs. In fact, there is no definite limit between these two sectors in final utilization of water. The responsibilities might interchange, depending upon the circumstances.

Preservation, development, control and management of forest resources are under the Ministry of Forestry.

Agricultural research and extension activities have been performed by the Ministries of Agriculture, and Industry and Commerce. The agricultural credit institution-- the Agricultural Bank-- is under the Ministry of Industry and Commerce.

The services related to the processing and marketing of agricultural products are performed by the Ministries of Agriculture, Industry and Commerce.

Such a spread in the public responsibility would appear to be more a result of historical accident than deliberate policy. This has resulted in considerable confusion, overlapping and uncertainty. This situation makes it difficult for the planners and policy makers to observe the whole picture and to formulate sound policy.

In fact, Turkish planners are faced with two main problems: first, the large number of farmers--over three million decision-making units, the second is wide diffusion of the responsibilities throughout the different government agencies.

PRODUCTION STRUCTURE OF THE AGRICULTURAL SECTOR

The production structure of the agricultural sector in different years is shown in Table 4.

TABLE 4

PRODUCTION STRUCTURE OF THE AGRICULTURAL SECTOR

(in Percent)

Subsectors	1962	1967	1970
Crops	61.0	58.5	63.9
Livestock products	35.3	37.1	31.5
Sea and water products	0.6	0.7	0.4
Forestry	3.1	3.7	4.2
	100.0	100.0	100.0

It will be observed in Table 4 that the relative share of crop production is almost two-thirds of the total.

The fluctuation in the relative share of the livestock section is mainly due to the fluctuations in the livestock numbers reported by the State Institute of Statistics.

Agricultural Sector in the Development Plans

GENERAL FEATURES

Turkey's development plans assume central and macro-plan character. The general economic policy to be followed in accordance with the plans is imperative for the public sector and indicative for the private. The annual average growth rate in GNP is set at 7 percent in the First and Second Plans.

The main agricultural provisions of the plans might be summarized as follows:

- Self-sufficiency in food production
- Attainment of a balanced diet
- Provision of the raw material requirements of the industrial sector
- Increasing foreign exchange earnings
- Creation of additional employment.

In order to meet the total demand for agricultural products and to provide maximum support for the realization of an overall growth rate without creating inflationary pressures, a 4.2 percent average annual growth rate is envisaged for the agricultural sector both in the First (1963-67) and in the Second (1968-72) Plans.

During the planned period the realizations of growth rates in two main sectors-- agriculture and industry--are summarized in Table 5.

TABLE 5

TARGET AND REALIZATION OF GROWTH RATES OF AGRICULTURE, INDUSTRY AND TOTAL
(Percent in Value-Added)

Sectors	First Five-Year Plan							Second Five-Year Plan			
		Realized					Average per		Realized		
	Target	1963	1964	1965	1966	1967	Year	Target	1968	1969	1970
Agriculture	4.2	7.6	-	-3.3	11.4	0.9	3.2	4.2	1.9	-0.1	1.1
Industry	12.3	8.0	8.6	8.9	10.6	12.3	9.7	12.0	10.0	9.4	2.5
GNP	7.0	7.7	4.9	4.6	10.3	6.1	6.7	7.0	6.7	6.3	5.7

Source : 1971 Annual Programme

Among the five years of the First Plan period two years' growth rate exceeded the target, while the remaining three years' growth rate lagged behind.

The performance of agriculture during the first three years of the Second Five-Year Plan is even poorer than that of First Plan. The failure in the crop production, which dominates the agricultural sector, has been the main factor responsible for the low rates of growth in these three years.

The significant phenomenon is that the slow development in the agricultural sector plays a major role in the failure to attain the 7 percent target rate of overall growth in GNP.

INVESTMENTS

The investment policy adopted in the First and Second Plans with respect to public and private sectors is that two-thirds of the total investment will be made by the public sector, the remaining one-third by the private sector.

Table 6 shows the relative shares of investment by main sectors in the First and Second Plans.

TABLE 6

RELATIVE SHARES OF INVESTMENT BY MAIN SECTORS
(in Percent)

Sectors	First Five-Year Plan (1963-67)		Second Five-Year Plan (1968-72)
	Planned Investment	Realized	Planned Investment
Agriculture	17.7	15.4	15.2
Industry, mining, transportation	44.6	46.0	50.2
Services	37.7	38.6	34.6
TOTAL	100.0	100.0	100.0

In relative terms there has been a decrease in the investment devoted to agriculture in the Second Plan with respect to the First Plan. In absolute terms, however, there has been some 40 percent increase, from 12.1 billion TL up to 16.9 billion TL at constant prices.

The distribution of investment devoted to agriculture by main areas in agriculture is shown in Table 7.

TABLE 7

RELATIVE DISTRIBUTION OF AGRICULTURAL INVESTMENTS
(in Percent)

Investment Area	1963-67	1968-72
New irrigation projects	45.1	28.9
On-farm development and soil conservation	8.8	25.5
Machinery and equipment	14.9	21.4
Seed, fruit trees, research	8.9	6.6
Forestry	8.7	9.8
Fishery	2.7	3.0
Others	10.9	4.8
TOTAL	100.0	100.0

As shown in Table 7, there has been a shift in the investment policy by which on-farm development work is given emphasis in the Second Plan, recognizing the fact that the large irrigation schemes completed are heavily underutilized.

Investment fell short of the First Plan targets. The shortfall in investment took place in the public sector, while the private sector investment exceeded the plan

targets. The realization rate in the First Plan was 90 percent of total investment. Realization in the investments remained 78 percent of the total devoted to agriculture.

Slow Growth

In recent years the sector has lagged behind the rest of the economy and generally fallen short of the targets of the plans. As noted earlier, in the First Plan period agricultural value-added expanded at 3.2 percent per year, compared with a target of 4.2 percent. Considering the performance of the sector in the first three-year period of the Second Plan period, it would be optimistic to expect the same level of growth realized in the First Plan period.

LOW TECHNOLOGY LEVEL AND DEPENDENCE UPON WEATHER

IRRIGATION

Since the limit of cultivable land has been reached the subsequent growth has had to rely largely on improving technology such as irrigation, fertilizer, and machinery.

Irrigation is vital to the development of Turkish agriculture, since much of the country has a low and variable rainfall.

Taking the water resource potential, land suitable for irrigation constitutes some one-third of the total agricultural land. The area under irrigation, however, makes up about one-fourth of the land suitable for irrigation. Despite the fact that investments in irrigation have been large, their contribution to overall agricultural growth has not been satisfactory. Such underutilization is due principally to failure to complete the irrigation network required throughout the project, construct drainage, and do on-farm development. In fact, it is estimated that no more than one-half of the area in government schemes is actually irrigated.

FERTILIZER

Despite the fact that fertilizer consumption has shown tremendous increases over the years, Turkey is still far down the list of countries in the amount of fertilizer applied per hectare of agricultural land. In the neighbouring countries, for instance, Bulgarian consumption is some 14 times, and Greek consumption almost 10 times higher than that of Turkey. It appears that the low rate of fertilizer usage has very likely retarded the achievement of the target in agriculture.

MACHINERY AND IMPLEMENTS

Despite the fact that the number of tractors and other implements has grown markedly, the area cultivated by tractors constitutes some 30 percent of the farm land. The heaviest concentration of tractors is in the areas where cotton and other commercial cash crops are grown. In the dry farming areas--the Central Plateau and the Southeast--it is still the case that most tillage and seeding operations are done by animal drawn ploughs and drags, including primitive wooden ploughs. In the traditional dry farming areas, however, there is urgent need to ensure ancillary equipment suitable for moisture conservation to a maximum extent.

DEPENDENCE UPON WEATHER

One of the main objectives of the Turkish development plans has been to diminish dependence upon weather through improvement in technology. Weather conditions, however, are still a major determinant of agricultural production and were largely responsible for the low output in the period 1968-70. Cereal, which constitutes about one-fourth of the total value of agricultural production, accounts for much of the vulnerability to weather. It is estimated that the effects of the changes in rainfall on grain yield ranges between 15 and 25 percent. On the other hand, a 20 percent change in the cereal production brings about a 5 percent change in the total and almost 3 percent change in GNP.

The situation described above implies that a concentrated effort has to be spent on improving technology in order to be able to achieve a sustained growth rate. One should keep in mind that it would not be easy to introduce to millions of scattered farmers, improved methods of farming or new patterns of farm production.

SLOW EXPANSION OF LIVESTOCK SECTOR

The livestock sector, which provides some 25 percent of the total value of agricultural production per year is one of the most important subsectors. The livestock sector is relatively unimproved due to the fact that modern animal management and proper feeding practices are not at such a level as to achieve a highly productive livestock industry. In general, animals are grazed on communal pasture and meadows, crop residuals and stubble. Not much progress has been made in the irrigated fodder crops. Thus milk yields, weight gains and fertility rates are low in the indigenous breeds. The diet is even poorer for young and growing animals, which gives rise to a high rate of calf and lamb mortalities.

Livestock and livestock marketing are other obstacles to rapid development in this section. The main livestock areas, particularly in the eastern part of the country areote from the main markets.

The growth rate target for the value of livestock products in the First Plan was 5.6 percent per annum. The realization remained at 2.8 percent per year. The same rate of growth has been planned in the Second Plan for the livestock sector.

The Government has embarked upon a general livestock development programme which includes fattening, dairy production, breed improvement, and the establishment of modern livestock markets and slaughterhouses in the main producing areas of the country. A special livestock development project has been prepared for this sector.

UNDERUTILIZED FOREST RESOURCES

Turkey has large forest resources which are still greatly underexploited. The reason for this underutilization lies mainly in a forest policy which is concerned principally with conservation and protection. This policy is changing gradually.

The UNDP/FAO estimates that present forests could form an excellent basis for a forest industry of international size. Removal operations and the provison of infrastructure, particularly access roads, are the areas to which particular attention has to be paid in order to exploit forest resources and to make a contribution to the general economic growth.

AGRICULTURE IN PAKISTAN

by Mr. M. A Bajwa, T. Pk.,
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Land Resources

The total geographical area of Pakistan is approximately 234 million acres. West Pakistan has an area of about 199 millon acres of which 48 million acres are cultivated. About 31 million additional acres are potentially suitable for cultivation and 5.5 million acres are under forests.

East Pakistan has an area of about 35.5 million acres of which 22.5 million acres are under cultivation; about one million additional acres are potentially suitable for cultivation and 5.6 million acres are under forests.

Waterlogging and salinity reign supreme in West Pakistan. About 17.2 million acres of the irrigated or potentially irrigable land are adversely affected by salinity and inadequate drainage and each year abut one lakh acres go out of cultivation on this account. To meet this situation, the Government launched salinity control and reclamation projects as a result of which 3.5 million acres have been practically reclaimed in Rachna and Chhaj Doabs. This work is being followed up vigorously in other parts of the country.

Production

The index of agricultural production in Pakistan registered a steep rise during the past decade. With the base year as 1959-60, the index of agricultural production stood at 158 for the year 1969-70, for food crops at 153, for non-food. crops at 187 and for fibre crops at 155. Thus, Pakistan's economy has undergone a remarkable transformation in the recent past.

Agriculture is the basic industry in Pakistan. The importance of agriculture from the point of view of its share in production, consumption, exports and employment warrants its development so that it may remain as the focal issue in planning. Agriculture vitally affects the outlook for progress in other sectors of the economy as well. In the course of development it has achieved a fair measure of diversification but it still remains the largest industry in Pakistan. Forty-five percent of the total GNP comes from agriculture and on it depends the livelihood and well-being of the vast majority of our rural population. The important feature of the agricultural planning philosophy is, therefore, the recognition of the importance of the man behind the plough.

The earnest development of agriculture in the post-independence period was taken up in the mid-1950's. The First Five-Year Plan was launched in the year 1955-56. This plan did not make much headway in the agricultural sector. The growth rate achieved was only 1.3 percent, which fell far short of the population growth. This does not mean that no substantial benefits were gained during this plan. During this period about 1.8 million acres of land were provided with new irrigation facilities and an additional 2.6 million acres were provided improved irrigation water supplies.

The Second Five-Year Plan began in the year 1960-61 and brought about a growth rate of 3.4 percent per annum. This was achieved through improvement in agricultural policy, development of institutional framework and an appreciable increase in the supplies of physical inputs.

The Third Five-Year Plan was launched in the year 1965-66 in the light of the experience gained from the Second Five-Year Plan. It envisaged a growth rate of 5 percent. But for the unfavourable circumstances, viz. war with India, in 1965 and adverse weather conditions in both parts of the country, the target growth rate would have been surpassed. During this plan period, the country witnessed what is known as the "Green Revolution." The introduction of Mexican wheat and IRRI* rice resulted in near self-sufficiency in the case of food production.

The following paragraphs give a brief resumé of agricultural production.

FOODGRAINS

The acreage and production of foodgrains in Pakistan during the three plan periods are shown below:

AVERAGE OF FIVE YEARS

	Area	Production
	000 acres	000 tons
1950-55	38,693	12,637
First Plan	39,413	13,216
Second Plan	42,417	16,211
Third Plan	47,256	19,506

The acreage and production during the Third Five-Year Plan increased considerably as compared to the Second Plan. The acreage rose by about 4.8 million acres and the production by about 3.3 million tons. The production increased from 12.69 million tons during 1954-55 to 22.80 million tons during 1969-70.

RICE

Rice is the largest crop of Pakistan and its cultivation is mostly concentrated in the eastern wing of the country where about 80 percent of the cropped area is under rice.

* High yielding varieties of rice developed at the International Rice Research Institute.

During the First Plan, the production of rice in Pakistan was 8.4 million tons, increased to 10.8 million tons during the Second Plan and to 12.4 million tons during the Third Plan. The production of rice during the Second Five-Year Plan in West Pakistan averaged 1.1 million tons. It increased to 2.3 million tons in the final year of the Third Plan, primarily due to introduction of IRRI rice during the year 1967-68 with the initial area of only 10,000 acres, increasing to 1.2 million acres during the year 1969-70. In East Pakistan, the area under IRRI varieties was 166 thousand acres during the year 1967-68. It increased to 652 thousand acres during the year 1969-70. The area and production of rice during the various plan periods in the country are shown below :

AVERAGE OF FIVE YEARS

	Area	Production
	000 acres	000 tons
1950-55	23,226	8,333
First Plan	22,767	8,409
Second Plan	24,955	10,842
Third Plan	27,538	12,439

WHEAT

Wheat is the second largest crop of Pakistan. Its area and production during the plan periods were :

AVERAGE OF FIVE YEARS

	Area	Production
	000 acres	000 tons
1950-55	10,363	3,219
First Plan	11,741	3,644
Second Plan	12,464	4,124
Third Plan	14,487	5,695

The cultivation of wheat is mostly concentrated in the western wing of the country. Acreage and production of this crop have risen tremendously in recent years. By the end of the Third Five-Year Plan, the acreage under crop rose by about 50 percent over the preplan period. The production increased from 3.13 million tons in 1954-55 to 7.18 million tons in 1969-70.

The first real jump in production took place in the year 1967-68 due to the introduction of Mexican varieties. During this year, the production of wheat rose to 6.4 million tons against 4.3 million tons of the previous year. The highest production of 7.3 million tons was obtained in the year 1969-70. The Mexican varieties during the year 1967-68 were cultivated on an area of 2.4 million acres. During 1969-70 this acreage rose to 6.6 million acres.

OTHER FOODGRAINS

Other foodgrains, namely maize, millet and barley are mainly grown in West Pakistan. Maize is the only important crop. The acreage and production of this crop also increased appreciably. While the average area under this crop during

the preplan period, i.e. 1950-55, was one million acres; it rose to 1.5 million acres during the Third Plan period. Likewise, the production rose from 389 thousand tons to 635 thousand tons in the above period. Again, an appreciable increase in acreage and production took place during the Third Plan period. The area rose from 1.2 to 1.5 million acres and the production from 491 to 635 thousand tons during this period. The highest production of 782 thousand tons was obtained during the year 1967-68 as a result of the increased cultivation of synthetic varieties.

CASH CROPS

JUTE

Jute is the principal foreign exchange earner of Pakistan. Its cultivation is confined to the eastern wing of the country. The highest ever production of this crop was obtained in the year 1969-70. This is also true for the acreage. The area and production of jute during the plan period and preplan periods were :

AVERAGE OF FIVE YEARS

	1950-55	First Plan	Second Plan	Third Plan
Area (000 acres)	1,521	1,466	1,732	2,315
Production (000 bales)	5,487	5,954	6,019	6,667

The acreage under the crop during the Third Five-Year Plan increased by about 54 percent and production by 23 percent over an average during the preplan period. However, the area increased from 1.2 million acres in 1954-55 to 2.5 million acres in 1969-70 and the production rose from 4.66 million bales to 7.39 million bales during the same period.

COTTON

Next to jute, cotton is the main foreign exchange earner of Pakistan. Its cultivation, particularly of the Pak-Upland types, is concentrated in West Pakistan. As will be seen from the following table, the increase in production of this crop has outpaced the increase in acreage. While the area increased by about 30 percent during the Third Five-Year Plan over the preplan average, the production increased by about 83 percent. The major increase in production was experienced from 1966-67 onwards. The production increased from 1.60 million bales in 1954-55 to 3.02 million bales in 1969-70.

AVERAGE OF FIVE YEARS

	Area	Production
	000 acres	000 bales
1950-55	3,209	1,519
First Plan	3,494	1,664
Second Plan	3,499	2,010
Third Plan	4,220	2,740

SUGARCANE

The most phenomenal increase has been observed in both acreage and production of sugarcane. As will be seen from the following table, the average acreage

during the Third Five-Year Plan increased by more than 100 percent over the preplan average, i.e. 854 thousand acres, to 1,841 thousand acres. The highest acreage under crop took place during the year 1966-67 when it reached a mark of 2 million acres. The average production during the preplan period was 10.7 million tons. It rose to 29.5 million tons during the Third Five-Year Plan. The highest production was recorded during the year 1969-70 when it reached the peak of 33.4 million tons. Both the wings shared this increase. It was, however, more marked in West Pakistan than in East Pakistan.

AVERAGE OF FIVE YEARS

	Area	Production
	000 acres	000 tons
1950-55	854	10,699
First Plan	1,161	13,975
Second Plan	1,476	20,542
Third Plan	1,841	29,489

TEA

Tea is grown in the eastern wing of the country only. Its acreage and production continued to rise as is evident from the following data:

AVERAGE OF FIVE YEARS

	Area	Production
	000 acres	Million lbs.
1950-55	74	48.5
First Plan	77	52.4
Second Plan	84	54.2
Third Plan	101	63.4

Production of tea on an average during the Third Five-Year Plan was the highest when compared with the previous quinquennial periods. The highest production as well as acreage was experienced during the last year of the Third Five-Year Plan, i.e. 1969-70, when the area approached 107 thousand acres and production 66.8 million lbs. against 74 thousand acres and 54 million lbs. during 1954-55.

TOBACCO

Tobacco is another important cash crop and is grown in both wings of the country. Expansion of the tobacco industry has resulted in a continuous increase in acreage and production as will be seen from the following data:

AVERAGE OF FIVE YEARS

	Area	Production
	000 acres	Million lbs.
1950-55	194	197.0
First Plan	195	202.3
Second Plan	214	221.1
Third Plan	271	358.8

The area under this crop during the Third Five-Year Plan was on an average 271 thousand acres and the production was 359 million lbs. as against 194 thousand acres and 196.6 million lbs. in the 1950-55 period.

OIL SEEDS

Rapes and mustard are important edible oil seeds grown in Pakistan. The acreage under rapes and mustard during the three plan periods remained somewhat stagnant. During 1950-55 the area averaged 1.7 million acres; during the First Plan period it rose to 1.9 million acres, but during the Second Plan period it decreased to 1.7 million acres. During the Third Plan period it remained at the same level. Sesamum followed suit. In fact its acreage has slightly declined over the years. The area under this crop averaged 208 thousand acres for the 1950-55 period; it rose to 214 thousand acres during the Second Plan but fell to 195 thousand acres during the Third Plan.

The production of these crops also followed the same trend. The production of rapes and mustard averaged 278 thousand tons for the 1950-55 period; it rose to 325 thousand tons during the First Plan, but came down to 314 thousand tons during the Second Plan. During the Third Plan, the average production is estimated to be 328 thousand tons. Sesamum proved no exception. During 1950-55, its production stood at 36 thousand tons and it fell to 35 thousand tons during the Third Plan. Accelerated programmes have been launched during the Fourth Plan to increase production of oil seeds in the country.

PULSES

The area under three important pulses, namely lentil, mung and mash, registered a decline throughout the period. During the period 1950-55, the total area under these pulses was 979 thousand acres; it decreased to 783 thousand acres during the Third Plan. The production, however, increased from 137 thousand to 176 thousand tons during the two periods. To improve production, research programmes have been strengthened.

VEGETABLES

POTATOES

Cultivation of potatoes has gained importance during the past two plan periods. The acreage under this crop during the First Five-Year Plan was 112 thousand acres; it rose to 178 thousand acres during the Second Plan and 227 thousand acres during the Third Plan on an average. Likewise, its production increased from 285 thousand tons during the First Plan period to 815 thousand tons during the Third Plan on an average. In order to increase production, schemes for supervised production of seed and its certification are in progress.

OTHER VEGETABLES

The area under other vegetables has shown a somewhat downward trend. During the period 1950-55 the average area was reported to be 780 thousand acres which went down to 557 thousand acres during the end of the Second Five-Year Plan. During the Third Five-Year Plan, it exhibited a slight increase and is expected to be around 575 thousand acres on an average. The production also followed the same trend. To increase production of vegetables six agricultural development estates, four in East Pakistan and two in West Pakistan are being established.

Factors Contributing Towards Increased Agricultural Production

The increased agricultural production has resulted from the accumulative effect of a bold policy vigorously followed by the Government consisting of economic incentives and greater supplies of inputs. The factors leading to increased agricultural production may be categorized as follows :

1) New farming technology
2) Package deal of inputs
3) Economic factors.

NEW FARMING TECHNOLOGY

Technological innovations in agriculture through the application of fertilizers, introduction of high yielding and disease-resistant crop varieties, plant protection measures, improved farm machinery and appliances, etc. have greatly contributed towards increased agricultural production.

FERTILIZERS

The use of fertilizers was insignificant in the early fifties. Following an intensive extension drive to popularize their use, the consumption rose from 17.6 thousand nutrient tons in 1954-55 to 30.6 thousand nutrient tons on an average during the First Plan, 130.2 thousand nutrient tons during the Second Plan and 437.1 thousand nutrient tons during the Third Plan. The Government has been subsidizing the sale of chemical fertilizers to the extent of 35 to 50 percent during this period. As a result the intensity of fertilizer consumption in relation to arable lands rose to 12 lbs. per acre during the year 1968-69 against 0.9 per acre in 1957-58. The consumption is hardly 25 percent of the average rate of application prevailing in developed countries. The consumption ratio of N:P approaches about 7:1 and is too wide. The use of potash is still uncommon. Efforts are being made to promote balanced application of fertilizers. For this purpose, soil testing laboratories have been set up and a Rapid Soil Fertility Scheme is being pushed through. Large-scale fertilizer demonstrations are laid out by the agriculture departments.

IMPROVED SEEDS

The Third Five-Year Plan witnessed the introduction of high yielding varieties of wheat and rice. The production of improved seeds was also increased by streamlining large seed farms under the agricultural development corporations and establishing seed testing seed certification laboratories throughout the length and breadth of the country. Seed laws are now being enacted to make these arrangements more effective. The seeds of IRRI rice, Mexican wheat and potatoes were also imported in large quantities and distributed for cultivation on a large scale.

PLANT PROTECTION

Pests and diseases take a heavy toll of the crop, causing an annual loss of Rs. 2,000 million. Prior to 1953 there was no large-scale pest control organization in the country. It was only from 1953 onwards that this work was undertaken on an expanded level. As a result of these efforts the area covered by plant protection measures increased from 600 thousand acres during 1957-58 to 13 million acres by the year 1968-69. The treated area in 1968-69 approximates 23 percent of the total area sown. To cope with the problems of standardization of pesticides, equipment, toxicology, pest management, residues, etc., the Plant Protection Institute has been set up in the Punjab and a National Institute is being planned.

MECHANIZATION

Mechanized farming has been encouraged by the Government to bring to the farmer the benefit of modern technology. In East Pakistan where holdings are small, 3,614 hand operated tillers and 2,072 tractors are being used. In West Pakistan where the size of holdings is substantial, the pace of mechanization has been greater and 23,000 tractors are at work. The I.D.A. credit greatly helped in this regard. Locally manufactured stationary threshers are in common use. Some of the private companies are also operating fleets of harvester combines on hire charges. In the public sector 1,786 bulldozers and 4,000 blade mounted tractors are in use for development of land.

WATER DEVELOPMENT

About 55 percent of the total cultivated area in West Pakistan is irrigated from canals. Forty-three principal canal systems convey 250,000 cusecs in a total length of 40, 000 miles. Out of total river diversion of 95.7 million acre feet, the net field delivery mounts to 48.0 million acre feet. Farm deliveries thus supply 1.6 acre feet per crop acre as compared to the optimum requirements of 2.7 acre feet during the summer months and 2.4 acre feet during the winter months.

Mangla Dam, a replacement work under the Indus Basin Treaty, was completed in 1967 and is now in operation. The reservoir has a gross storage capacity of 5.88 million acre feet of which 5.35 million acre feet is live storage. The construction of Tarbela Dam on the Indus River is in progress and is scheduled to be completed by 1975. The Tarbela reservoir will have a gross storage capacity of 11.1 million acre feet of which 9.3 million acre feet will be the live storage.

Rawal Dam and Tanda Dam have been completed. They have a storage capacity of 47,500 and 78,400 acre feet and command an area of 13,700 and 32,100 acres respectively. Khanpur Dam, Hub Dam and Gomal Zam Dam are in various stages of construction and when completed are expected to command an additional area of 334,000 acres.

In West Pakistan 95,000 tubewells discharging 18.0 million acre feet of water annually for the purpose of irrigation have also been installed, 10,000 in the public sector and 85,000 in the private sector. The rate of increase of tubewells ranges from 5,000 to 8,000 annually.

In East Pakistan 1,230 tubewells of 2-cusec discharge capacity each were installed in the Third Plan period. During the Fourth Plan period, 21,000 tubewells of the same discharge capacity will be installed. These tubewells, when completed, will discharge 60,000 cusecs of water for irrigation. The tubewells are expected to irrigate a total cropped area of 12 lakh acres. By the end of 1969-70, 18,603 low

lift pumps were also installed, irrigating a total area of about 6.5 lakh acres. By the end of the Fourth Plan the number of low lift pumps will grow to 40,000, thus irrigating a cropped area of 21.5 lakh acres. The total area irrigated from both the sources in East Pakistan will thus approximate 33.5 lakh acres, equivalent to 15 percent of the total cultivated area in this wing.

PACKAGE DEAL OF INPUTS THROUGH EXTENSION SERVICES CENTERS

The Food and Agriculture Commission recommended extensive use of "five firsts" (good tillage, improved seed, application of fertilizers, plant protection measures and agricultural credit) in a package deal for increasing agricultural production in the country. This meant preparation of a good seed bed followed by sowing of registered seed of an improved variety at the correct time, application of correct doses and kinds of fertilizers at the proper time and freedom of crops from pests and diseases for achieving a breakthrough in production. The Commission also recommended the creation of agricultural development corporations to do this job. Agricultural development corporations came into being in October 1961. This body in West Pakistan planned a package deal of agricultural inputs in the Ghulam Mohammad Barrage and Guddu Barrage Project areas through farmers' extension services centres.

It was proposed to establish one such centre in each union council ultimately. This centre is equipped with a demonstration farm of 100 acres for practical training of the farmers for a period of one year on the principle of "learning by doing." The centre acts as a depot for distribution of seeds, fertilizers and pesticides, makes agricultural machinery available on hire, is provided with bull service for the use of farmers, has the facilities for cooperative marketing of produce and is being equipped with facilities for advancement of loans for agricultural purposes. The staff at the centre also prepares an inventory of the present status of agriculture in the union council and selects 10 farmers every year for the preparation of crop plans and practice of modern technology in their holdings. These centres work on a self-financing basis. Thirty such centres have been established in Guddu Barrage and seven in Ghulam Mohammad Barrage. These centres are annually spending Rs. 3.75 lakhs and obtaining a gross income of Rs. 4.76 lakhs. Besides making agricultural inputs available, these centres serve as a large-scale demonstration of commercial agriculture. The East Pakistan Agricultural Development Corporation is also operating on similar lines. The impact of this approach in agricultural extension has helped to increase agricultural production in the country.

ECONOMIC FACTORS

CREDIT

The farmers are being advanced an increasing amount of agricultural credit for purchase of production requirements. This has been all the more essential in view of the meagre savings available to our farmers for reinvestment. It was only during the Second Five-Year Plan that a real breakthrough was attained in the field of agricultural credit. The Agricultural Development Bank of Pakistan was established during 1960-61 by merging the former Agricultural Development Finance Corporation (established in 1952) and the Agricultural Bank of Pakistan (formed in 1957). The loan operations of the Bank were steamlined and simplified to facilitate speedy loans to the farmers. Credit has been linked with marketing. The Bank also ensures that loans advanced by it are productively used. The loans advanced by the Agricultural Development Bank of Pakistan in the year 1954-55 were only Rs. 1.5 million. These increased to Rs. 43.9 million by the year 1959-60 and to Rs. 77.0 million in

the year 1964-65. During the last year of the Third Five-Year Plan this amount rose to Rs. 192.1 million. Likewise, the quantum of state credit (taccavi loans) also increased. During the year 1954-55 such loans amounted to only Rs. 7.6 million. They touched the peak of Rs. 59.5 million during the year 1964-65.

The development of cooperatives has also contributed much towards raising crop production. The cooperative movement has been strengthened and revitalized to enable the cooperative societies to meet the growing requirements of the farmers for production credit. The State Bank of Pakistan has been supplying credit on a gigantic scale to the Agricultural Development Bank and the cooperatives for subsequent loaning to the farmers. The loans advanced by these societies during the year 1968-69 amounted to Rs. 195 million as against Rs. 41.9 million in the year 1954-55. The total credit operations approximate Rs. 450 million against the requirement of Rs. 3,450 million annually.

ECONOMIC RETURNS FROM CROP PRODUCE

The Government is particularly conscious that the farmers must be assured fair returns for their produce to induce them to bring about a desirable increase in crop productivity. Accordingly, statutory minimum prices/bonus vouchers for the export of jute and cotton respectively have been fixed. The purchase price of sugarcane, another important cash crop, is fixed by the Government at such a level that the farmers get economic returns for this commodity. Procurement prices of the major food items like rice and wheat are also fixed by the Government to ensure better returns to the farmers.

BETTER MARKETING AND STORAGE FACILITIES

The Directorate of Marketing and Grading in the centre and the agricultural marketing directorates in the provinces are running schemes to disseminate training in handling products of different commodities and introducing grading of wool, hair, hides, skins, etc. which are mainly exported. Storage facilities for agricultural products, especially food crops, have been greatly expanded, particularly in the public sector. A large number of cold storage plants has been established in the private sector. This has ensured an even supply of the commodities stored and has resulted in higher returns to the growers. Liberal credit facilities are being arranged for establishing more cold storage plants. Similarly marketing structures are also being reorganized to offer better marketing facilities to the growers. A number of regulated markets has been established to facilitate organized marketing of the farm produce. A pilot project of supervised production and marketing is planned, and will be implemented by the West Pakistan Agricultural Development Corporation.

STATE SUBSIDY

In has been duly recognized by the Government that in order to encourage improved methods of farming various production requirements of the farmers should be made available to them at subsidized prices in the initial stages. Accordingly the main production inputs like fertilizers and seeds are made available to the farmers at subsidized costs. Plant protection services are rendered free of cost or at a very nominal rate.

AGRICULTURAL PLANNING IN THE UNITED STATES

by Dr. John L. Fischer,
University of Arizona

Introduction

United States citizens generally do not think of their economy as being "planned," and in fact the term "planning" is rarely used. However, I hope you will keep in mind that words have various meaning in the English language. We do much planning in the U.S., possibly more than any other country in the world. We plan on a continuous basis, and the result or end product is policy. The difference is the form that the planning activity takes, and the terminology used. Individual farmers and ranchers, private agri-businesses, and all levels of government plan extensively.

The "New" U.S. Agriculture

Rapid change has become a way of life for U.S. farmers. Change has come so fast in the past 30 years that we sometimes say we have been going through an agricultural revolution. In the 1960 decade the rate of change accelerated, and U.S. agriculture today is so different from what it was 30 years ago it is appropriate to speak of the "new" agriculture.

Output per person in agriculture: The process of economic development calls for increasing the productivity of the human resources. In 1900 the average farm worker in the U.S. produced enough food and fiber to meet the needs of seven people. By 1940 the number of people for whom the average farm worker produced food and fiber needs had increased to almost 11, by 1961 it had risen to 27, and in 1970 it was about 48.

Cost of food: One definition of economic development is that the necessities of life are relatively inexpensive, which means that a small share of the average person's total effort is devoted to survival. In the U.S. in the late 1930's the average U.S. citizen was spending about 26 percent of his disposable (after direct taxes) income in food, in 1958 it had fallen to about 21 percent, and in 1970 it was about 16 percent. The real cost of eating is very low in the U.S.

Capital Utilized: How has the above been achieved? The process of economic development calls for supplementing human effort with capital goods so that productivity is enhanced. In 1969 farm lands and buildings were valued at $182,000 million, and farm machinery, motor vehicles, livestock, etc., at $56,000 million. These figures are so large they defy understanding. It is more meaningful to think in per

farm terms. The average value of production assets per farm was $85,000, and per worker $50,000 in 1969

Market Orientation : A subsistence economy cannot provide many of the amenities of life; therefore, economic development calls for specialization of effort with high productivity and extensive utilization of marketing. Today, in the U.S. few farmers milk a cow, unless they are commercial dairymen, and even the farm garden is not a significant contributor to the typical farm family's food supply. The farmer is much like any other businessman, he buys inputs, produces bountifully, and sells in the market.

Purchased inputs : In 1969 U.S. farmers spent about $39,000 million for purchased inputs. This is about seven-tenths of the value of farm products. The big increases in purchased inputs have occurred in fertilizer (319 percent more used than in 1960), power and machinery, and general supplies.

Proportion of population in agriculture : In an overall economy which depends primarily on internal resources for its food and fiber, the proportion of population in agriculture is generally inversely related to material well-being. In 1970 in the U.S. only 3.5 million of the total gainful employment of 79 million was in agriculture. Farm population in the U.S. has declined from 31 million in 1940 (23 percent of the total population) to less than 10 million in 1970 (less than 5 percent of the total).

Farm income : Incomes per farm and per farm worker have been rising, and by worldwide standards are high, but they are still considerably below the U.S. average. The per capita income of the farm population was about $2,900 in 1970, but it is interesting to note that 48 percent came from nonfarm sources. The net income of farm operators averaged $10,693 in 1969.

The New Problems

The above data might be interpreted erroneously to mean all is well with U.S. agriculture. Unfortunately, rapid changes and solutions to old problems have created many new ones. Some of the new problems are very serious, and are similar in many ways to the so-called "second generation" problems of the Green Revolution.

First, our inner-city crisis in the U.S. is closely related to our agricultural situation. During the 1960's an average of about one and one-half million people per year left agriculture and migrated to our cities. Many of those who migrated lacked education and skills and have not found satisfactory urban employment. Our ghettos contain many people who are of rural origin, or are their childiren; they remain a cancerous economic sore the nation must try harder to cure.

Because of the intense competition among farmers for resources, farm land prices have risen very high in relation to economic return. Because of our bountiful production, prices for farm products are relatively low. Therefore, farm incomes, although high by worldwide standards, are very low in comparison to returns from the use of equal capital, managerial skill, and/or labor in nonagriculture. In a sense, we have had relatively hard times in agriculture for many years.

Quite a few of our efficient, commercial, family farmers face serious financial crises today, and both workers and small farmers continue to migrate. Our rural communities are in a state of decay, and new policy is needed.

Looking Ahead

We are struggling to find new ways to cope with our farm and rural problems. Perhaps the most important development is the viewing of rural problems in the context of the overall national socio-economic situation.

In November 1970 President Nixon's office indicated that a new, balanced national growth policy would be formulated within a year, and that one of the major building blocks in the new policy would be rural development. Concern for the rural areas is bipartisan. In the 1968 election both major parties promised to slow or halt rural to urban migration. Senator Humphrey recently introduced a bill which would create a new Rural Development Credit Bank.

The goals of the new balanced growth policy have not been articulated, but one point is clear--the major thrust will be on rural area development, mainly concerned with stimulating the creation of jobs in rural areas, and not on increasing the number of farmers or providing higher commodity prices. U.S. agriculture thus will remain commercially oriented, and farming will continue to become more and more business oriented. The day when farming was a way of life is gone, with very little chance of ever returning.

President Nixon's proposal for reorganizing the U.S. Government in which the U.S. Department of Agriculture is eliminated was received with shock and consternation in many international and U.S. agricultural quarters. This proposal must not be interpreted to mean the U.S. Government is taking less interest in the welfare of rural or farm interests, but is in fact, the opposite. What the proposal does is arrange for the Government to view problems and policies functionally. For example, contamination of food is not a problem unique to agriculture. Under the new setup, contamination regulations and enforcement in agriculture would be handled by the same agency handling similar problems in all industries.

I believe that in the next few years we will see the U.S. adopt some form of national growth policy in which one of the goals will be to get a more uniform population density by regions. We will become increasingly concerned about the population pouring out of the middle of our country--the rural areas--and concentrating on the coasts and in the great strip cities. Our farmers will continue to stress efficiency in production, and they will be tough competitors in food markets at home and abroad. Our emphasis on rural development will increase, but the major thrust will be on creating jobs in rural areas rather than in supporting farm prices or incomes. Farmers will have less political power, and will increasingly have to turn to economic organizations to protect their interests. The transition will be difficult, but I believe they are prepared to make it.

I am happy to report that agricultural disciplines (professions) in the U.S. are rapidly dropping their national orientations and becoming more international in interests and scope. For example, a very high percentage of the 1971 annual meeting of the American Agricultural Economics Association was devoted to international topics. The need for worldwide agricultural adjustment, problems in aid agencies, and world trade in food and fiber were among the international topics discussed. All U.S. agricultural colleges now have internationally oriented programs. Farm organizations and commodity groups are anxious to learn more about people and agriculture in other countries.

It is a good sign when the professions view the world, rather than their nation, as the meaningful entity on which to focus attention. Hunger and poverty recognize

no national boundaries, and solutions to the problems of hunger and poverty are not likely to be related to the national origins of the searchers for solutions. I share with most U.S. agricultural scientists the belief that the world's food and fiber problems can be solved if we will but expend the world's professional energies wisely, and apply our technical know-how properly. The first step is cooperation--working together--just as is being done in this seminar. The members of the U.S. delegation are pleased to be participating.

U.K.

COUNTRY

REPORT

by Dr. E. S. Clayton,
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Since the Second World War agricultural policy in the United Kingdom has been based on price support principles. It has involved a system of fixing the prices to farmers at a level above the consumer food prices and the payment of subsidy to farmers to make up the difference between these two prices. The objectives of this policy have been to maintain farm prosperity, low food prices and guarding the balance of payments by reducing the country's dependence on the import of foodstuffs. Though not everyone would agree, it is my opinion that a real degree of success has attended this policy which has shown great flexibility in coping with inflation and technical advance. In general, the objectives of this policy have been achieved while at the same time the supply of and demand for farm products have been kept in balance.

In recent years, however, the weight of technical advance in agriculture has increased, which has emphasised the economic advantages of large-scale production. This advance has worked against the small farmer who has proved himself inflexible in face of the need for structural adjustment. This inflexibility has tended to keep agricultural prices higher than they should have been, which in turn has tended to increase the level of subsidisation which has proved unacceptable to Government. It has given rise to "the small farm problem" and in recent years Government have devised "small farm policy" to encourage the amalgamation to small holdings into larger units by means of compensating those farmers who sell their farms to enable amalgamation to take place. It is too early yet to judge the degree of success of this policy.

But a new problem of major dimensions has arisen out of the probability of the U.K. entering into the Common Market. The agricultural policy of the Common Market in many ways has opposing objectives to those of U.K. policy. It has a policy which gives support to a high cost and high price agriculture which has a built-in tendency to produce surpluses of agricultural products within the community. This is clearly an embarrassment to the U.K. and some of us hope that Great Britain's entry into the Market will induce a modification of this original policy leading to the adoption of some of the more useful aspects of the U.K. system which endeavours to combine farm support and farmer incentives. Although in countries where the majority of population is engaged in agriculture, it is not feasible to operate the farm price support system, nevertheless, a selective application of this system can in many cases usefully be applied to encourage the agricultural development of the developing countries.

AGRICULTURAL PLANNING

by Dr. A. T. Mosher,
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The Period of Creating A Modern Agriculture

In analyzing the problem of planning for agricultural development, it is useful to think of each country as moving along a continuum that can somewhat arbitrarily be divided into three stages. First, each country goes through a long period during which technology changes very slowly, most farm products are consumed by rural familes, and purchased inputs play little role in agricultural production. Later, a country may enter a period when substantially more productive technology has become available, when the fraction of farm production that moves into national and/or international trade increases, and when purchased inputs play an increasing role in farm production. During this stage, different parts of the country start their more rapid agricultural development at different points in time, depending primarily on when improved technology related to the crops that can be grown in each region becomes available.[1] Finally, a stage has been reached when most of the land in a country on which modern commercial farming can be developed has such farms on it.

Corresponding with each of these stages there is a different set of public policies that are most appropriate. In this paper we will be concerned primarily with countries in stage 2 because the three countries represented in this conference have entered it but still have a considerable distance to go before they enter stage 3. We shall not discuss planning in stage 1 and we shall be concerned with stage 3 only, because, in many instances, planning procedures that are pertinent mainly in stage 3 are being prematurely adopted by countries in stage 2 when those procedures are not appropriate.

In general, we can say that agricultural production planning is appropriate primarily in stage 3. In stage 2 what is most needed is planning that will provide more and more of the agricultural parts of a country with the physical and institutional facilities that will allow all farmers in regions where higher production is possible to produce for the market, using increasing amounts of purchased inputs. In other words, the primary concern during stage 2 should be to increase the country's capacity for agricultural production, rather than trying to get the maximum production out of the capacity it already has, although that too, is important.

1. And sometimes depending on price relationships becoming such that increasing production of certain crops becomes profitable.

Another way to state the focus of our attention in this conference is to say that it is on the task of creating a modern agriculture.

What is modern agriculture ? It is one in which :

1) The technology and efficiency of farming are continuously being improved.
2) The kinds of commodities produced on farms are constantly changing (at least in their proportions to each other) in response to changing market demands and costs of production.
3) The quality of land, the competence of labor, and the forms and quality of capital instruments used in farming are steadily being improved.
4) The proportions in which land, labor and capital are combined in farming keep changing in response to changes in population growth rates, changes in alternative employment opportunities, and changes in farm technology as expressed in shifting relative prices of factors of production.
5) The private and public agencies serving agriculture are continuously being adapted to perform their functions in new ways.

Based on this definition, a modern agriculture does not consist of any specific crop variety or set of varieties; it does not require any particular form of farm organization; it does not involve a fixed relationship in the proportions in which land, labor, and capital are combined; it does not require any particular land or price policies or any immutable form of government organization. Instead, a modern agriculture is one that is highly dynamic and highly flexible, as well as increasingly productive.[2]

Stage 2, then, is the period in the agricultural history of a country after it has become feasible for a modern agriculture to be created but before the task has been completed.

What kind of agricultural planning is most appropriate during that period?

The Nature of Agriculture

A BIOLOGICAL PRODUCTION PROCESS

Agriculture is an industry characterized by a particular production process -- one which directly utilizes solar energy through the biological growth processes of plants and animals. Unlike the steel industry, the shoe industry, the textile industry, each of which produces a particular commodity, agriculture produces a wide variety of commodities. In addition to food products agriculture produces fibres, industrial oils, leather, rubber and other products as well. It is its biological production process that sets agriculture apart as a separate industry, rather than the nature of its products.

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2. A modern agriculture may or may not be highly mechanized, although there is a tendency for it to move in that direction. Japan had a modern agriculture by this definition long before tractors began to be used to any appreciable extent.

One of the cardinal principles of good agricultural planning flows directly from this characteristic. It is that the primary goal of public activities related to agriculture is to increase the profitable opportunities to utilize the unique production process of agriculture in each set of local circumstances throughout a country, almost regardless of what specific products each region produces so long as there is an economic demand for them, at home or abroad. Much too frequently we think of the agriculture of a country as being made up of so many million acres of rice, wheat, cotton, groundnuts, oil seed crops, etc., and so many head of various classes of livestock. Instead, in agricultural planning it is more useful to think of the agriculture of a country as being made up of thousands or millions of farm businesses of various sizes and types, each attempting to utilize the biological production process of agriculture profitably. The combination of products that those farm businesses produce changes over time in response to changes in technology, in market demand, and in access to markets at home and abroad. Consequently, we should not assume that each region will produce its present set of farm products indefinitely. We should concentrate instead on creating and maintaining a flexibility of each agricultural region to shift from crop to crop as technological and economic conditions change.

FOUR FUNCTIONAL COMPONENTS OF MODERN AGRICULTURE

The second characteristic of agriculture that has marked implications for planning is that, in its modern form, it has four essential functional components, only one of which is farming itself.

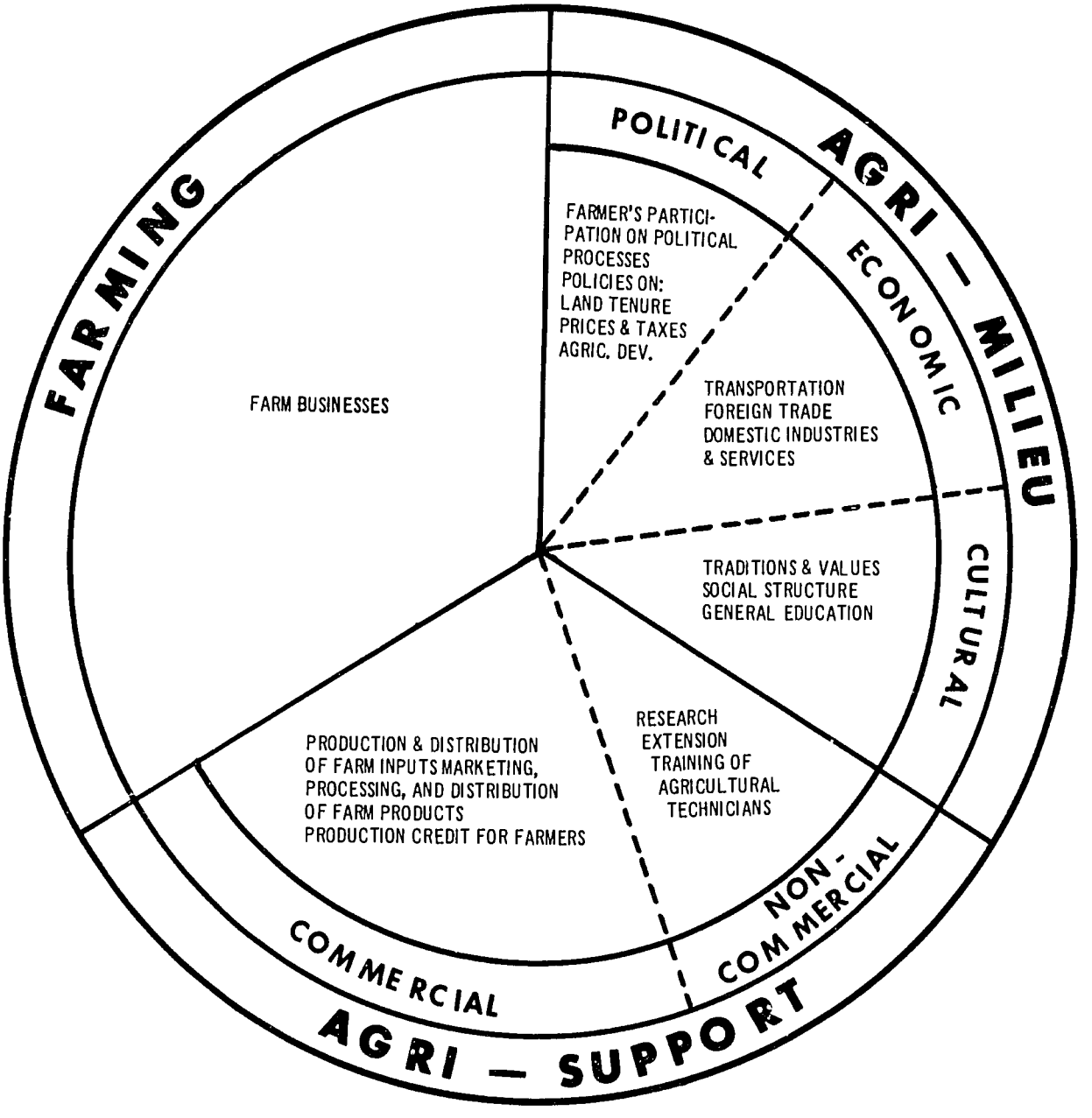
In a subsistence agriculture "farming" and "agriculture" are synonymous; each farmer uses only his own land and family labor. In a modern agriculture farming is still central, but each farm becomes only the assembly line, utilizing and combining. many different types of inputs drawn from throughout the economy.

Some of these inputs are provided by commercial agri-support activities that comprise the second functional component of agriculture. These include the manufacture and distribution of farm inputs, marketing and processing services to handle farm products, and credit to finance farming operations. They are called "commercial" agri-support activities because farmers normally pay for them as they are used, whether they are provided by the private sector or by governmental agencies.

The third functional component of a modern agriculture is made up of noncommercial agri-support activities --services that farmers need but that they typically do not pay for directly. Agricultural research is one of these; education and training of farmers and of the technicians who operate agri-support services is the other.

Agri-support activities, both commercial and noncommercial, are not farming but they are essential off-farm components of a modern agricultural industry. If a country had no farms it would not need agri-support activities.

The fourth functional component of the agricultural industry is what might be called the agri-milieu. It is a combination of all of the influences that affect what can be done within farming and within agri-support activities but that are general to the whole country.



FUNCTIONAL COMPONENTS OF A MODERN AGRICULTURE

Some of these influences are economic: 1) the state of domestic industry and the consequent domestic demand for farm products, 2) the extent of nonagricultural employment opportunities, 3) price and tax policies, 4) foreign trade opportunities, 5) domestic income distribution, 6) general transportation facilities, and 7) the rate of population growth.

Another part of the agri-milieu is made up of political factors: 1) land tenure policies, 2) general development policies, 3) agricultural development policies, and 4) the extent of farmers' participation in the political process.

Still other aspects of the agri-milieu are cultural: 1) the traditions and values of the people, 2) the structure of the society, and 3) the extent of general education.

All of these taken together form a general environment of opportunities, constraints, inducements and attitudes that set the rules-of-the-game within which farming and agri-support activities must be conducted. They are not formulated primarily for their impact on agriculture, yet they need constantly to be scrutinized because it is important to see just what effects they are having on agriculture, in order to determine what changes might be advisable. Even though its many aspects are not overtly agricultural, therefore, it is important to count the agri-milieu as one of the four functional components of an agricultural industry, along with farm businesses, and with commercial and noncommercial agri-support activities.[3]

What is the relevance of this discussion of the four functional components of a modern agriculture for organizing and planning? It is that each of them requires specific but differing types of public attention. Sometimes it is a changed public policy that is needed. Sometimes it is a public program. Sometimes it is public stimulation and/or regulation of activities in the private sector. Basically, the task of public organization and planning is to assure an adequate and appropriate development of agri-support activities, both commercial and noncommercial, and to achieve appropriate changes in the agri-milieu.

THE GEOGRAPHIC STRUCTURE OF AGRICULTURE

To support a modern agriculture, agri-support activities must be easily acessible to each farmer in regions having agricultural potential. To accomplish that, two units of geographic organization are crucial. One is the farming locality. The other is the farming district.

A farming locality is the area within which farmers can easily travel to a locality center, avail themselves of all of the agri-support services they need and get home again within a reasonable period of time on the same day. The locality market center should provide:

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3. For a more extended discussion of the functional components of agriculture, see "What is Agriculture?," The World Food Problem, Report of the U.S. President's Science Advisory Committee, Vol. I, pp. 60-73, May 1967.

1) A local market for farm products
2) Retail outlets for all needed farm supplies and equipment
3) Services of an extension agent[4]
4) Production credit
5) Access roads between farms and the locality's market town where all these services are available

6) Somewhere nearby there needs to be, in addition, a set of local verification trials to determine the most profitable farm practices for the locality.

(Effective farming localities can be of different sizes depending on prevailing methods of travel and transportation. Where many farmers must travel on foot or by cart, a locality market center cannot effectively serve farmers more than four to five miles away.)

A farming district is the area within which the farming localities it embraces can be adequately serviced from a district headquarters. Such a district headquarters should contain facilities for servicing each of the agri-support activities carried on in its locality market centers. In addition, it should have adequate roads to connect all locality centers with the district headquarters and to connect the district headquarters with the outside world.

Again, there is no universal criterion as to the most efficient size for an effective farming district. In general, a district headquarters can adequately service localities whose market centers are within about 25 miles of it, assuming that roads on which trucks can travel connect all of the locality market centers.

This geographic structure of a modern agriculture is of great importance and is frequently neglected. In arranging for rural agri-support services, the places at which these are made available are usually too far apart. As a result, many farmers are much too far away from the supplies and services they need. Many village market towns provide one or two components of an effective farming locality, but not the others. Yet the complementarity among all six components is so great that one or two are of little value without the others. Markets for farm products and locally available supplies and equipment are the absolute minimum. An extension service, locally available production credit, and verification trials can increase the rapidity with which farmers adopt new technology. Adequate roads to tie farms and agri-support services together become increasingly important as market sales increase, as more purchased inputs are used, and as fields are occupied by crops more months of each year.

Because of the high complementarity among agri-support activities and the dependence of farming localities on district support, farming districts are the most efficient unit for expansion of agri-support activites.[5]

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4. Whether or not there is an extension agent for each locality depends on the density of population and size of farms. Normally, one extension agent would serve more than one locality.

5. For a more extended treatment of the geographic structure of agriculture, see A.T. Mosher, Creating a Progressive Rural Structure (New York: Agricultural Development Council, 1969), Chapters 1, 2, and 3.

REGIONAL VARIATIONS

The fourth characteristic of agriculture that should have a profound impact on organization and planning is that it is subject to great variation from region to region within each country.

Differences in production possibilities: The initial source of this geographic variation is differences in soils, climate and topography that make different regions best suited to rice, wheat, maize or sugarcane; to rubber, tea, coffee or coconuts; or to livestock. Terracing and irrigation modify the natural factors that lead to regional differences, thus leading to further regional variations.

Apart from natural differences in soils and climate, geographic variations in agricultural production are induced by differences in the location of each region with respect to major urban industrial centers and access to foreign markets. The growth of each city increases the demand for certain perishable farm products and thus encourages production of them nearby. Regions with easy access to seaports have a cost advantage in producing for export. Obviously, the availability and efficiency of transport facilities have a major influence. Regions distant from a city can provide it with perishable products if economical transportation is dependably available. Similarly, regions far inland can produce for export if transportation is available and cheap. Thus market and cost factors, as well as natural factors, influence the almost infinite variations that characterize agricultural production in different regions of each country.

Differences in potential for growth: Still other factors come into play with respect to the potential of different regions within a country for agricultural growth. One is the availability of new technology tested and ready for use. In the past few years, regions growing wheat, rice and maize have forged ahead while regions growing most other crops have not. Similarly, the presence or absence of irrigation facilities that allow precise water management practices makes some regions more ready for rapid agricultural growth than others.

These regional variations in readiness for rapid agricultural growth are of the utmost importance in planning to create a modern agriculture. They dictate which parts of each country can achieve a modern agriculture quickly, and in which places particular preliminary activities must be completed first.

AGRICULTURE: PRIVATE AND PUBLIC

One final characteristic of agriculture that has enormous consequences for planning is that many of the decisions and actions that affect agricultural growth and rural welfare are private--taken by individuals and private business firms within a country -- while many others must be public -- taken in legislative halls and executive agencies of the government.

The exact division between what is done privately and what through public action varies from country to country. The general situation can be expressed in four statements, each referring to one of the four functional components of a modern agriculture.

1) The management of farm businesses is generally private.

2) The agri-milieu can be modified only by public action.

3) Noncommercial agri-support activities must be publicly administered.

4) Commercial agri-support activities can be either private or public, with great care taken in either case to avoid monopoly or to regulate monopoly where it is unavoidable.

The important point is that planning should be appropriate to the most effective combination of public and private agricultural activities. It should give particular attention to modifying the agri-milieu in ways that allow farm businesses and all agri-support services to operate efficiently. It should assure ample and effective agricultural research services, see to the education and training of agricultural technicians, and operate an effective extension service. With respect to commercial agri-support services, it should at least establish business standards, market grades, and laws governing contracts and loans with regulatory agencies and courts to enforce them. It may, in addition, find it advantageous to operate one or more commercial agri-support services directly in certain circumstances, although in general these are more efficient when privately operated. It should leave the planning of actual farm production to farm operators.

Sometimes what public policy allows is more important than what it regulates. We have all heard the comment, "What government can do to speed development is to get out of the way." Although that is only half true, it is half true. We need types of organization and planning both to set men free and to discipline their joint efforts. When we recognize that a modern agriculture is always partially private and partially public we are saying also that agricultural growth depends partly on what men do individually (for which they need freedom and a wealth of alternative opportunities among which they are free to choose with a minimum of regulation) and partly on what they do jointly through the agencies of their government and through voluntary forms of cooperation.

We can summarize the requirements that the nature of agriculture as an industry sets for agricultural planning as follows :

- First, farmers in regions of immediate agricultural growth potential must be surrounded by opportunities to utilize the biological production process to produce whatever combinations of farm products are most profitable, given changing product prices, farm technology and costs.

- Second, planning should embrace consideration for all four functional components of agriculture with special attention to agri-support activities and the agri-milieu.

- Third, planning should be geared to regional variations in production possibilities and particularly with respect to agricultural growth potential.

- Fourth, special attention should be given to developing the geographic structure of a modern agriculture: the development of fully functioning farming localities and districts.

Roles and Concerns of Public Policy

AGRICULTURAL PRODUCTION, GROWTH AND ADJUSTMENT

Public activities and policies play three roles with respect to agriculture :

1) They are part of the production process of agriculture, even at a constant level of production.

2) They should contribute to agricultural growth.

3) They should contribute to adjustment within agriculture and between agriculture and other sectors of the economy.

Public Role in Production : Although farming itself is generally private, certain essential public activities are really part of the agricultural production process : market information services, establishing and policing grades and standards, then enforcement of contracts, and the maintenance of public roads and highways are some examples. They are needed even if agricultural production is not increasing and they involve public costs.

Similarly, much of the cost of agricultural extension services is a production cost. Agriculture is a widely dispersed industry. It requires an equally widespread information network with respect to profitable production opportunities and means of coping with pests and diseases. An extension service helps to provide these. Similarly, the training of agricultural technicians is really a cost of production insofar as it provides trained replacements for those who retire or who move into nonagricultural employment.

If, in addition, a government chooses to subsidize fertilizers or pesticides, or tractors, or farm credit, or farm product prices, the cost of such subsidies, including the cost of administering the programs, are part of the cost of agricultural production. They cannot properly be classified as investments because they do not increase production capacity in future years. Even part of agricultural research-- particularly that to keep pests and diseases under control-- is really part of the production process. Such research is a public activity contributing to achieving and maintaining agricultural production at the current level. Only research that develops new, more profitable technology can be classified as an investment for future growth.

These public aspects of agricultural production are important at all times. Provision must be made for them even when it is important to give major attention to agricultural growth.

Promoting Agricultural Growth : The second objective of public activities related to agriculture is to promote agricultural growth. There are two different types of activities that can contribute to that objective.

One type of activity that leads to agricultural growth is to take steps to exploit all of the opportunities currently available for increasing agricultural production within the present structure of the agricultural industry. An important form of such activities is crop campaigns in which a concerted effort is made to promote a combination of farm practices with respect to a particular crop for which

a higher yielding variety and package of associated cultural practices are available. Another example is a program to encourage multiple cropping. A third is a price policy designed in such a way as to shift production from one crop to another to encourage the use of more and more productive inputs in the production of a particular crop or livestock product. A fourth is a general extension program that is not tied to any particular crop campaign but is designed instead to help each farmer find the best combination of crop and livestock enterprises and production practices for his own farm.

The other set of activities that can lead to agricultural growth consists of creating and/or improving the facilities that a modern agriculture requires. Among these are: 1) a national system of agricultural research, 2) arrangements for importing farm inputs or increasing industrial capacity to produce them, 3) an adequate and integrated rural agri-support infrastructure for each farming locality and district, 4) land development, including irrigation and drainage facilities, 5) universities and other training facilities, and 6) an organizational capacity of the ministry of agriculture itself to administer its activities effectively. All of these require investment, all of them provide the structural components for the steadily expanding agricultural productivity. They are analogous to building new factories or modernizing old ones to expand plant capacity for industrial production. In themselves they do not produce crops and livestock, but they increase the capacity for greater production in the future.

Both of these types of activities aimed at agricultural growth are important. Planning should embrace arrangements for both. Activities to increase the utilization of present capacity make the most of present opportunities; those to build the structure of modern agriculture expand opportunutie for the future. Many countries have, in the past, given too much emphasis to the first and not enough to the second, partly because of the urgency of increasing production and partly because methods of planning developed in the past are more relevant to production planning than they are to planning to create a modern agriculture-- to increase the capacity of the agricultural industry.

Promoting Agricultural Adjustment : The third role of public activity and policies related to agriculture, in addition to participating in production and promoting growth, is to promote agricultural adjustment. One form that the need for adjustment takes, even quite early in agricultural development, is the need for attention to income distribution as between farmers. Typically, increases in agricultural production occur commodity by commodity. Those farmers growing the commodity for which a more profitable technology becomes available forge ahead while the others lag behind.

Another type of adjustment that is frequently needed is to weigh the advantage of higher prices to farmers against the advantage of lower farm prices to urban consumers and make whatever adjustments seem indicated.

Still another type of adjustment that should continuously be considered is between agriculture and other parts of the economy. At one stage it may be advantageous to encourage a net flow of capital into agriculture to expand its capacity while at other times it may be advisable to encourage a net flow in the other direction.

The need for agricultural adjustment takes many forms, but whatever form it takes it calls for one or more types of public action.

The point of this discussion of production, growth and adjustment is not that different activities of a government are related solely to one or another of these three objectives. Frequently they are not. The same activity may serve two or all three, depending partly on how much of it is undertaken, how it is conducted and

where within the country it is concentrated. It is important that the three objectives be kept in mind, however, lest the people of a country fool themselves about what is being done for agriculture. A ministry of agriculture could have a very substantial budget with all of its expenditures devoted to current production and no investment being made in growth. Conversely, substantial investments may be made to spur growth, but be limited in their returns because inadequate attention is being devoted to those activities that are really the public part of agricultural production. Or problems of adjustment may be ignored only to build up social or economic crises for the future.

Agricultural planning should take all three of these functions into account. Too frequently development plans are drawn up that provide only for investments or "development expenditures." They provide only for public expenditures in addition to the established on-going activities of each ministry but do not critically review the need for the nondevelopment expenditures that support those already established. Many plans are not consistent about this, however. They sometimes budget development funds for subsidies that help pay for increased current production without laying any base for continuing this production.

The principle to be drawn from this discussion is that agricultural planning should embrace all public programs related to agriculture whether their purpose be current agricultural production. agricultural growth, or adjustment.

OBJECTIVES OF AGRICULTURAL PLANNING

A government almost always has more than one objective in whatever planning it may do with respect to agriculture.

1. To create a modern agriculture : Once a country has entered stage 2, discussed earlier, it should set about at once to create a modern agriculture over as much of its agricultural land area as possible. This can be done economically in some regions of each country much more rapidly than in otners. In some regions of each country it cannot be done at all within the foreseeable future. But whenever it is feasible, creating a modern agriculture is the objective that should receive priority attention.

Giving priority attention to creating a modern agriculture where that is feasible does not mean that due attention should not also be given to other objectives.

2. To increase the value-added in agriculture : Even with respect to food production--and agriculture can and does produce much more than that--a productive agriculture is desirable not so much because it produces food as because it can produce income for individual farmers and for the nation. Families and nations can have enough to eat if they have sufficient income no matter how that income is earned. Food can be purchased, and it can be imported if it is not produced in sufficient quantities and varieties domestically. Consequently, the basic reason why agricultural growth is so important in many countries is not because people need more food. Instead, it is because so many and such a high percentage of the people are dependent on farming for their income and because alternative employment opportunities are so limited.[6]

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6. It is because of the predominant importance of this income aspect of agriculture that it is better to plan and conduct public agricultural activities so as to surround farmers by more profitable opportunities to engage in the biological processes of farming, regardless of what they produce, than it is to plan primarily to increase the production of specific farm commodities. Each farmer is more likely to squeeze more income--more value-added--out of the resources of his own farm and location if he is free to select his own pattern of production than if he is forced to grow certain crops in order to help meet commodity targets.

In considering the seemingly competing demands on resources for creating a modern agriculture and for increasing the value-added in agriculture the critical requirement is an appropriate time horizon. Higher farm incomes are needed now; creating a modern agriculture will make higher agricultural production possible in the future. Neither should be entirely sacrificed for the other. The tendency in the past has been to press for immediate increases, except for investments in irrigation. The time has come now to give greater attention to the other elements of an enlarging capacity for agricultural production.

3. To provide remunerative employment: The current high rates of population increase in nearly every country involve, inevitably, a rapid rise in the size of the labor force and in the number of dependent families. So long as family income is dependent on productive employment, it is only those families that have at least one working member who can share in what the country produces or imports. Moreover, the capital cost of increasing non-farm employment is sufficiently high that there is no hope within at least the next generation of creating new non-farm jobs any faster--and probably not as fast--as the size of the labor force will increase. Consequently, agriculture will have to continue to provide employment for at least as many people in each country as it does now, and probably for many more, if increasing numbers of workers are not to remain unemployed.[7]

Different aspects of increasing the value-added in agriculture have employment effects that may work in opposite directions. Sorting out their net effect different sets of local circumstances becomes very difficult.[8] Yet impact on employment opportunities must be a major factor in agricultural planning.

4. To reduce rural poverty: There was a time when the statement would go unchallenged that the task of a ministry of agriculture is to foster agricultural growth and that rural welfare will then improve automatically. Not so today! Countries whose agriculture is relatively advanced have learned that it is possible for much of their agriculture to become commercial and highly productive and still have large numbers of rural people who are very poor.

Rising rural incomes and an improved income distribution depend on more than just increasing the value-added in agriculture to aggregate terms. They depend on the degree to which there is an active market for land. They depend on the presence

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7. In view of the need for more employment opportunities, the practice of many governments of subsidizing the increased use of tractors by preferential import duties is probably a mistake. Subsidies increase the profitability to individual farmers of shifting to tractors. They do this by substituting a public cost (equal to the subsidy) for a private cost. While doing that they impose the additional public cost of dealing with the increased employment problem that introduction of the tractors may create.

8. It is important to keep the focus on total agricultural employment opportunities, not just on farm labor requirements. Operating agri-support activities requires more and more workers as farming becomes more commercial. Shifting from animal to tractor power reduces farm employment partly by speeding up field operations and partly by ending the need for labor in caring for work animals. It simultaneously creates employment in servicing tractors and in distributing fuel. Tractorization affects the foreign exchange position also, if tractors and/or fuels have to be imported. Domestic production of tractors can provide some employment, but the capital cost per worker employed is rather high.

or absence of alternative off-farm employment. They are affected by the form of various agri-support activities, both commercial and noncommercial: are these services equally available to all or only to the more affluent and powerful? They are influenced by the degree to which farmers themselves have an effective voice in their economic and political affairs.

In every country there are pressures to reduce wide disparities of income, both between regions and between families in the same regions. Consequently, the reduction of rural poverty in both senses should be one of the objectives of agricultural planning.

5. To overcome adverse foreign exchange situations: Agricultural planning can affect a country's foreign exchange situation by increasing specific agricultural commodities either for export or to replace present imports, or by decisions with respect to whether farm inputs are to be imported or produced domestically.

All five of these objectives of agricultural planning are important. The importance of each relative to each of the others will be different from place to place and from one time to another in the same place. In some cases there will be no conflict between them; the same measures can support two or more objectives. In other cases there will be a conflict, and giving more attention to one of them will necessitate being satisfied with less achievement toward one or another of the others.

Major Requirements for Sound Agricultural Planning

Our concern is about that particular period when creating a modern agriculture has become a feasible immediate objective in at least some parts of each country, but when the task has not yet been completed. Later on, other forms of planning may become preferable, but to shift to those now would result in practices that would not serve the immediate task of creating a modern agriculture satisfactorily.

PLANNING TO CREATE A MODERN AGRICULTURE MUST INCLUDE ATTENTION TO BOTH TECHNOLOGICAL AND INSTITUTIONAL CHANGES

The goal is a radically different kind of agriculture from that which each country has had in the past. This new type of agriculture involves new methods of farming, a changed organization of the countryside, and new forms of local and national organizations and policies.

These major transformations involve both technological and institutional changes. Some of the needed technological changes affect methods of farm production. Some provide new methods of marketing, storing, transportation and processing farm products. Still others affect the technical methods of producing and distributing farm inputs.

The institutional changes that are involved include new organizational arrangements for agricultural research and for training agricultural technicians, new ways of extending credit to farmers, new patterns of operation for organizations that market farm products and that distribute farm inputs, arrangements for influencing farmers' production incentives, sometimes for changing patterns of land tenure and tenancy and frequently new methods of arranging for the management of

irrigation systems. They need to include changes in how ministries of agriculture are organized and operated and a distinctive method for agricultural planning itself.

Another way of stating these requirements is that creating a modern agriculture involves improving the quality of most inputs, not just increasing the quantity of them devoted to agriculture. That is true not just of agricultural research to improve the quality of individual inputs ranging from seeds through implements and cultural practices to power units. It is true also of credit institutions, marketing facilities, tax collection procedures, and administrative procedures.

PLANNING SHOULD EMBRACE ALL PUBLIC ACTIVITIES RELATED TO AGRICULTURE: PRODUCTION, GROWTH, AND ADJUSTMENT

During the period when a modern agriculture is being created, agricultural growth should be the primary goal. But attention must also be given, even within that period, to those parts of the agricultural production process that need to be conducted as public activities, and to needed adjustments within agriculture and between agriculture and other parts of the economy. To fail to make proper provision for activities like seed certification, policing of market grades and standards, and public attention to crop and livestock pest and disease control would be to fail to take advantage of the already existing capacity for agricultural production. Likewise, attention to the special problems of small farmers, to growing disparities between the incomes of farmers in different parts of the country and between farm operators and laborers in the same regions cannot safely be delayed. A reasonable degree of political stability is important to current production and an acceptable pattern of income distribution should be a major goal of public policy in any case, quite apart from its relevance to agricultural growth.

All three roles of public agricultural programs--production, growth, and adjustment--have to be financed out of public revenues. The programs of the same public agencies frequently serve two or even all three functions. Consequently, agricultural planning needs to cover all activities that serve any of the three purposes.

EFFECTIVE AGRICULTURAL PLANNING [9] REQUIRES AN APPROPRIATE SPECIFICATION OF THE "ACTIVITIES" AMONG WHICH RESOURCES ARE TO BE ALLOCATED

It is of the utmost importance that the main components or "activities" of agricultural planning be appropriately specified and the classification chosen needs to satisfy several criteria.

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9. The term "planning" has a narrower connotation in this paper than many planners prefer to give it. Many planners argue that planning includes implementation. They insist that planning means systematic activity in pursuit of explicit defined objectives, and thus set up a sequential determination of, first "objectives," then "intermediate goals," then program or policy "instruments," then "projects" and the implementation of those projects.

Others prefer a simpler sequence that they define as "plan formulation" (in terms of broad macro-economics categories); programing (for individual sectors of an economy); and implementation. In terms of this classification, what I choose to call (agricultural) planning is quite similar to what is meant, by others, by "programing."

I prefer not to include implementation as part of planning. To me, planning is what is done in preparation for action. The action that follows then constitutes "implementation."

First, it should be a classification that is consistent with the nature of agriculture as an industry.

Second, it needs to be appropriate for action. This means that it needs to separate from each other those activities that are inherently different, that require different kinds of professional competence, that require different kinds of administration. By the same token, it needs to group together in the same category those activities that are similar in the above respects. It also needs to group together those activities that are so highly complementary in their dependence on each other that to separate them leads to difficulties of coordination.

Third, the classification needs to be such that it can be used for both organization and planning. If it does not meet this criterion, it becomes very difficult to translate a plan into action. If planning proceeds without specifying which agency is to do what or, worse still, if a single item in a plan can simultaneously be claimed for implementation by several agencies, the result is either agency bickering, or failure to achieve implementation, or both. Many experts in planning have urged that "planning, budgeting and implementation must be integrated." But it is no use asking for that if the classifications are not identical.

Taking these criteria into account, and making adjustments among them where necessary, I conclude that we should adopt six major categories for agricultural planning :

1) Agricultural research
2) Assuring adequate wholesale supplies of farm inputs
3) Developing a rural infrastructure of agri-support services
4) Giving appropriate attention to farmers' incentives
5) Improving agricultural land through irrigation and other appropriate means
6) Undertaking or strengthening arrangements for educating and training agricultural manpower.

1. Agricultural research : We begin with the fact that a modern agriculture, whatever else it may demand, requires a continuously improving technology for farm production agricultural research system, with many different kinds of component parts.

The publicly supported research that is needed runs the gamut of crop and livestock breeding and management, farm business management, pest and disease control, problems of marketing, storing and transporting farm products, developing effective farm inputs, problems of pricing both inputs and products, projecting the demand for and supply of individual farm commodities, assessing the economic impact of land tenancy systems, and many others.

It is important that some research be conducted by each college or university that is training agricultural technicians, partly to assure that those who are teaching be learners as well, and partly in order that students may become acquainted with the methods of doing research.

All of these kinds of research and types of research organizations need to be articulated into a national system of agricultural research--not necessarily a single monolithic research organization but certainly through one or another type of coordinated approach.

2. Assuring adequate wholesale supplies of farm inputs : But the results of research provide only a potential. Before they can be utilized many of them must be embodied in physical supplies and equipment: new seeds fertilizers, pesticides, implements, etc. Producing these involves very different processes from those of research. It involves the multiplication of seeds and the industrial manufacture of the other farm inputs. Alternatively, it requires the importation of farm supplies and equipment from other countries. In either case it requires making estimates of probable aggregate needs, and warehousing and financing activities.

3. Developing a rural infrastructure of agri-support services : The fact that agricultural production must take place on farms that are widely dispersed means that it is peculiarly dependent on an equally widespread network of agri-support services. It is these services that make available to farmers in each farming locality the materials, information, training and credit that they need in order to produce up to the limit set by available technology and by prevailing local prices. It is this combination of agri-support services that I have called a Progressive Rural Structure : 10

1) Retail outlets for farm supplies and equipment
2) Markets for farm products
3) An agricultural extension service
4) Production credit for farmers
5) Local verification trials
6) Farm-to-market roads, and roads connecting each farming locality center to district headquarters.

Each of these agri-support activities involves different processes, and requires a different type of organization and administration, but what they have in common is that jointly they meet the need for a rural "circulatory system" to provide farms with the materials, ideas and financing they must have if they are to participate in a modern agriculture, and to take their products to market. Jointly they provide the geographic structure of a modern agriculture. The complementarity among them is so strong that extending them to additional districts, and to localities in areas of immediate growth potential, needs to be closely integrated. It is this high complementarity that leads to grouping them together as a single element or planning activity.

4. Production incentives for farmers: Even having adequate agri-support services available in a locality will not result in farmers using them unless they have adequate incentives to do so.

Farmers' incentives are affected by the availability of production inputs; they are affected by the adequacy of the Progressive Rural Structure; they are affected by what is done about land development; they are affected by general tax, fiscal and monetary policies. In addition, there are three distinct kinds of activity with respect to incentives that require attention.

The first is the investigational task of keeping informed about the current situation with respect to farmers' incentives in major agricultural regions. This in-

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10. A Progressive Rural Structure, and suggested procedures for establishing it are discussed in Creating a Progressive Rural Structure, op. cit.

volves studies of costs of production and local prices in different parts of the country, estimates of demand and of supply response, and studies of the impact of different tenure systems.

The second requirement is also investigational. It consists of devising changes in policies with respect to prices, subsidies, or land tenancy that could improve the situation.

Third, if direct subsidies of farm input prices, guaranteed market prices for selected farm commodities, or crop insurance schemes are undertaken provision must be made for them in agricultural planning.

5. Land development : So far, the activities provided for are those that make it possible to apply better technology on the land, but the quality of the land itself for agricultural production is also subject to improvement through irrigation, drainage, land clearing and land shaping. This again is quite a different type of activity, involving primarily engineering operations, but requiring extensive agronomic studies as well if the projects undertaken are to lead to maximum production opportunities.

6. Education and training of agricultural technicians : Certainly one of the major impediments to rapid agricultural growth in many countries is the lack of adequately trained personnel to operate the wide variety of agri-support activities, both public and private, that a modern agriculture requires.

To speak of the need for technical manpower training is not identical with considering the programs of schools and colleges alone. Schools and colleges can do important parts of what is needed, but they are not the best environment for developing many of the skills and types of understanding required in particular agri-support activities. Many of those can be developed much more rapidly and efficiently on the job or in intermittent brief periods of inservice training. Moreover, in a developing economy the types of skills that are most needed keep changing, so no matter how pertinent school and college curricula may be much of what they teach is outmoded within 5 to 10 years, but individual careers last 25 to 40 years.

All efforts to educate and train agricultural technicians need to be treated as one unit: schools, colleges, preinduction and inservice training. That is partly because what one type of training does not accomplish others must, and partly because agricultural colleges and universities are frequently the best agencies to conduct certain types of inservice training.

With these six being the major activities for agricultural planning, one can be sure that all of the components for creating a modern agriculture are taken into account in a way that allows direct implementing linkages. If each of the same six is made the responsibility of a major division of the ministry of agriculture, one would have a form of organization for that ministry that is focused primarily on creating a modern agriculture, and that allows a close integration of planning, budgeting, and implementation.

SOUND ALLOCATIVE PLANNING FOR AGRICULTURE
REQUIRES DISAGGREGATION OF CERTAIN ACTIVITIES
IN ACCORD WITH THE VARYING CURRENT AGRICULTURAL GROWTH
POTENTIAL OF DIFFERENT PARTS OF THE COUNTRY

Earlier in this paper it was noted that one of the important characteristics of agriculture is its marked regional variations in agricultural growth potential.

Each of the countries represented in this conference has substantial areas of immediate growth potential (IGP areas): areas of agricultural land on which rapid agricultural growth is possible within the next three years. These are areas: 1) where growing conditions of soil, climate, and water availability are favorable, 2) where new technologies are already available that promise substantially higher production of at least one major crop now being grown, and 3) now having efficient transport links with the national economy. It is in such areas--and only there--that a truly modern agriculture can be created (if it does not already exist) within a period of a few years.

Each country has other substantial areas of agricultural land that have a future growth potential (FGP areas). These are areas having favorable conditions of soil and climate but where one or more of the other essential elements of an area of immediate growth potential is presently lacking. Such an area may lack adequate water supplies and control for higher production, or it may lack new technology to allow higher production of major crops now being grown (or that could be grown) in the area, or it may lack transportation access to tie it into the national economy. To provide the missing element or elements will require time. Whether the need be the construction of irrigation and drainage facilities, or crop research, or providing major highway access, the process will require several years before higher production becomes possible. Consequently, while such areas may have a high potential for future agricultural growth, that potential cannot begin to be realized for several years to come.

In addition, each country has other areas that have a low potential for agricultural growth as far into the future as we can now see (LGP areas). For them to have a potential for agricultural growth will require one or more major technological breakthroughs that we cannot confidently predict at the present time. These are most likely to be areas of low moisture availability for substantial parts of each year, and where no economic source of irrigation water is available, either surface or subsurface, or where the topography is quite rough.[11]

Once the lands of a country have been classified in this manner, the groundwork has been laid for a sound disaggregation of agricultural planning. On the basis of such a classification, appropriate attention can then be given to each type of region.

IGP areas : It is the areas of immediate growth potential, and those only, that are ready for public efforts to increase the production of specific farm commodities, to provide a complete Progressive Rural Structure, and to complete the creation of a modern agriculture. Meanwhile, research to find additional new technologies relevant to these areas should be continued, as should projects of land development that can further increase the potential for additional agricultural growth.

FGP areas : In areas of future growth potential, priority should be given for the time being to activities that will lift them to the categories of areas of immediate growth potential: research to find new technologies for crop or livestock production for which such areas are suited; or the construction of feasible irrigation or drainage facilities; or the construction of a main highway to tie each such area into the national economy. Providing a skeleton Progressive Rural Structure that ties market centers of farming "localities" to district headquarters is worthwhile in FGP areas, but not

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11. For a more extended treatment of this method of defining regions having different growth potentials, see Creating a Progressive Rural Structure, op. cit., pp. 54-74, and 96-106.

farm-to-market roads. Until whichever of these activities that may be needed are completed it would be uneconomic to proceed with the other activities to accelerate agricultural growth.

LGP areas : In areas of low (agricultural) growth potential it is useless to make public expenditures to encourage agricultural growth since we see no grounds for optimism that such growth can occur. However, any feasible ways to develop non-farm employment should be encouraged. In addition, the people now farming in such areas deserve public services that will at least give them or their children mobility to move elsewhere and that will, meanwhile, help them achieve as good a life as possible where they now are. Schools, health facilities, major highways between large towns and cities, and selected community development activities are the most important instruments for this.

It may be inferred from this listing of the activities appropriate to areas having differing potential for agricultural growth that I am suggesting that more public resources be spent in IGP areas that in areas with lower potential. Such an inference would be a mistake. This classification of agricultural land and the tailoring of public activities to it is equally valid regardless of what policy may be adopted with respect to giving greater attention to more productive areas or to the most needy areas. What the classification does is to make it easier to adjust programs to regional differences, and in doing that assure that the activities emphasized in each area will be those for which each type of area is ready and from which it can benefit.

To put the matter another way, a modern agriculture is an objective that is reached geographical area by geographical area. It is achieved (farming) locality by locality, and for each locality what it is important to do each year through public programs and policies depends on whether that locality has an immediate, a future, or a low potential for agricultural growth, as well as on what agri-support activities have already been established there.

In stage 3, after a modern agriculture has been created wherever it can be, commodity planning becomes legitimate. To disaggregate planning by commodities in stage 2, however, makes it almost automatic that important aspects of creating a modern agriculture will be ignored or slighted. Morever, commodity planning of the conventional input-output type cannot really be effective until stage 3 is reached.[12]

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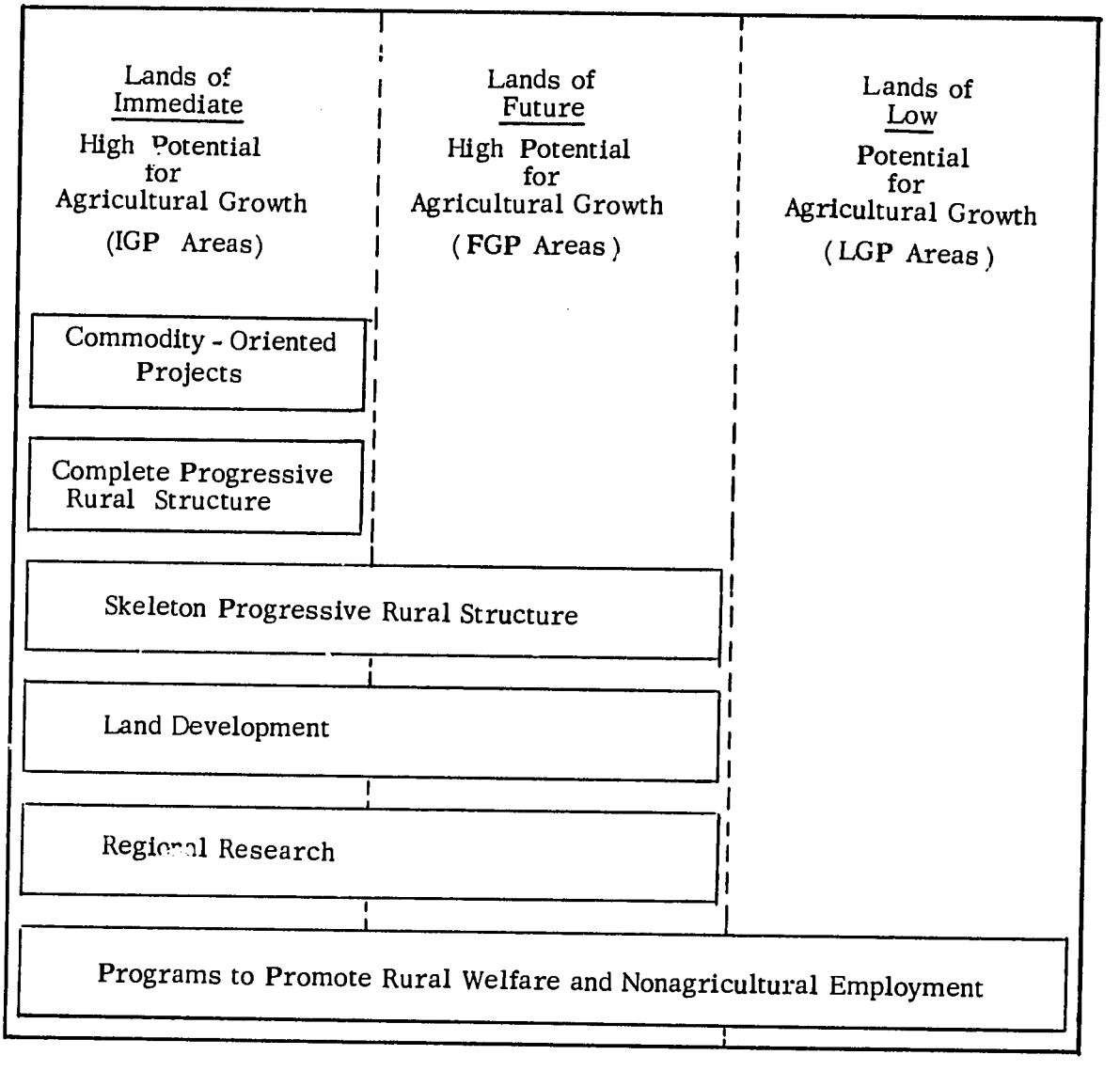
12. Perhaps it bears repeating that this method of planning does not prevent a subsidiary type of commodity planning that can be very useful. If agricultural growth is the overriding objective, commodity planning is only pertinent in areas of immediate growth potential in any case; in the other areas it can only substitute the production of one crop for that of another and in an uneconomic manner, because it can be assumed that farmers are already growing different crops in the proportions that technologies available to them make most profitable. By definition, it is only in areas of immediate growth potential that more profitable technologies are currently available. While using the land classification according to growth potential as the basis for disaggregative planning, priority can still be given to those areas of immediate growth potential that produce a particular crop that the government wants to push, either to improve a balance of trade or foreign exchange situation or to increase the quantity of a particular farm product for domestic consumption.

Tailoring Programs
to
Differing Potential for Agricultural Growth



AGRICULTURAL PLANNING SHOULD UTILIZE SEQUENCES, GESTATION PERIODS AND COMPLEMENTARITIES AS CRITERIA IN MAKING ALLOCATIONS, RATHER THAN SEPARATELY ESTIMATE RATES-OF-RETURN

It is obvious from the nature of the six major activities of agricultural planning that a modern agriculture results from the interaction of a large number of quite different kinds of resources and activities. They cannot all be developed quickly--some, such as a major irrigation works, road networks and universities require

years of preparation. Some can only be effective after others have been developed up to a certain point: extension is more efficient after research results have been achieved and many agri-support services are expensive or inefficient before roads are available. Sequences and gestation periods--the time it takes after a project is launched before it begins to pay off--are, therefore, extremely important. Similarly, certain types of activity are so highly complementary with others that they should be launched simultaneously or where other parts of the complementary package are already in place.

Honoring both sequences and gestation periods is inherent in disaggregation on the basis of growth potentials; honoring complementarities is a major factor in treating all aspects of a rural agri-support infrastructure as a single planning "activity."

On the negative side, separately estimated rates-of-return are inadequate allocative criteria partly because of the impossibility of calculating such rates for separate activities or projects with precision. The complementarities among them are too high to permit separate calculation of benefits. And benefits vary enormously depending on the effectiveness with which a given amount of expenditure is utilized in each activity or project.

There is an additional complication in trying to make allocative decisions on the basis of separate rates-of-return for each activity. Agricultural growth depends on a number of different activities, some private and some public, that are needed in certain physical quantities in relation to each other regardless of the individual costs of each. In some ways it is like constructing a motor car that requires three or four wheels, one engine block, one engine cooling system, one generator, and the choice between one or two carburetors is based on operating efficiency of the total engine rather than how much carburetors cost to manufacture. No matter how costly generators may be, one must be a part of each car; a fifth wheel or a second cooling system cannot substitute for it. And how much it pays to spend on the generator depends on the quality of the generator both intrinsically and in relation to the quality of all other components. It is the quality of each component and the complementarities among them that determine how much it is rational to spend on each.

The situation is similar with respect to creating a modern agriculture. An analysis of the relative costs (if not cost/benefit ratios) of different alternative ways of going about a particular activity can frequently be very helpful in choosing among possible methods. But when it comes to making allocations among activities of different types, the factors to consider are appropriate sequences, gestation periods, and complementarities, with attention to the quality of each activity always being important.

Planning should focus on systematically building the structure of a modern agriculture, taking advantage of emerging opportunities to increase production quickly but not allowing planning to be dominated by them.

In an earlier period, after disillusionment brought on by the failure of single-emphasis "panacea" programs to produce adequate results but before the high yielding cereals were introduced in Asia, it became generally accepted that a productive agriculture is a complicated system, each part of which is important. Then when the new varieties became available the pendulum swung toward the view that new higher yielding technology is the crucial requirement. This near return to a much earlier view was tempered only by recognition that farmers must have adequate economic incentives and that, therefore, price and/or subsidy policies are also important. What was glossed over in this recent trend was the fact that the new cereal technol-

ogies have led to substantial production increases only in areas where a good start had already been made in providing various agri-support services.

We must not forget that similarly spectacular increases in production have occurred before, and that not all of those spurts were triggered by a new crop variety. A few years ago there was a sudden rise in production in northeast Thailand, triggered by the opening of a major highway that increased the convenience and lowered the cost of transportation, coinciding with an expanded demand in Japan for imported feed grains. Still earlier, similar spurts in production occurred in West Africa in response to a market in Europe for cocoa, and in the Punjab in response to newly installed irrigation systems. It is the last essential element to be added that usually gets the credit.

The significance of this history is that spurts in production are to be expected, from time to time, and the triggering element will not always be the same. What the "triggering" element is will depend on what other essential facilities have already been developed during periods when they did not result in substantial immediate increases in production. Consequently, knowing that several different elements are essential if a modern agriculture is to be achieved, it is wise to keep working on them, not haphazardly or equally at all times but selectively, guided by annually updated analyses of the growth potential of each part of the country and taking into account which elements are already reasonably adequate and which ones are lagging behind, locality by locality.

Emerging opportunities for spurts in production can then be exploited as they arise by integrated commodity campaigns in IGP areas, but their success should not be misinterpreted as signs that achievement of a modern agriculture has been completed. They are not.

Making Allocative Decisions

THE NATURE OF AGRICULTURAL TARGETS

During stage 2, the "targets" set by agricultural planning should be in terms of the major components of a modern agriculture (rather than in terms of specific commodities) and different kinds of targets are appropriate for different ones of those components.

For example, agricultural research is a basic element in the structure of a modern agriculture. In order to estimate the total investment that should be made in research, over time, requires an estimate of the nature and size of the agricultural research system that the country will need in view of its size heterogeneity, and resource endowment. Against the estimate of total need, targets can be set for phased accomplishments toward that goal, given the constraints of trained manpower, necessary gestation periods, and the demands of other activities on the same resources.

Creating a Progressive Rural Structure is amenable to similar analysis. The starting point here is the absolute area now classified as having an immediate agricultural growth potential because it is only in such regions that investment in a Progressive Rural Structure is economic for the time being. Given the total area of present IGP lands, and making a judgment about the time period over which the

country is willing to phase its achievement of a Progressive Rural Structure in its IGP areas, targets can then be set in terms of land area to be covered each year by a Progressive Rural Structure.

Land development targets are subject to other but similar restraints. The classification of the agricultural lands of a country as to growth potential is a necessary preliminary step here also. Land development is particularly important for FGP areas because land development and/or appropriate research are the most important activities that can lift FGP areas into the IGP category. The major constraints will be technical feasibility, cost per acre improved and the availability of funds for expenditure.

The utility of targets with respect to allocations for affecting farmers' production incentives seems very dubious. Expenditures on subsidies need to be guided more by how large it is estimated such subsidies must be in order to be effective and by how much it would cost, in the aggregate, to finance them. Moreover, targets in this field are complicated by the fact that the manipulation of production incentives is undertaken as frequently to affect rural incomes or income distribution as it is to influence physical production. Only rough estimates based on assumed supply elasticities can be made of the impact of subsidies or of product price supports on the production of specific commodities. Consequently, the only safe procedure is to make tentative adjustments in incentives, then note the results annually and make further adjustments as may be indicated.

Targets should take still another form in the case of activities to manufacture or import farm inputs. They should be related primarily to projections of near future demands for them as indicated partly by recent past trends and partly by the rate at which a Progressive Rural Structure is being made available to additional land areas.

Targets with respect to training agricultural technicians should be a <u>resultant</u> of plans for all other types of activities, taking into account the likelihood that there will be more and more opportunities for lucrative private employment for persons with certain types of agricultural training in various commercial agri-support activities as well as in farm management as farming becomes more profitable.

Thus, in the form of agricultural planning being proposed here, <u>production</u> planning--setting production targets for specific commodities--becomes quite secondary. Such planning is more pertinent to the period <u>after</u> the structure of a modern agriculture has been largely achieved. Nevertheless, even within the period we are discussing it will usually be considered desirable to try to achieve increases in the production of certain commodities. The best way to meet such needs is by planning: 1) adjustments in farmers' production incentives, 2) types of research to be given priority, and 3) regions to receive first attention with respect both to land development and expansion of a Progressive Rural Structure. Appropriate action at those points can achieve the greatest increase in the production of selected farm commodities that is possible in any case and will avoid the distorting effects of letting production targets dominate the agricultural planning process.

Obviously, with the nature of legitimate targets varying so widely, the planning of activities to achieve those targets must differ also. However, there are certain basic steps in preparing most kinds of project proposals for consideration and some of these are reviewed in the following sections.

PREPARATION OF PROJECT PROPOSALS

Several basic questions need to be answered in each project proposal:

1) What is intended to be accomplished ?
2) By what plan of work are those objectives to be reached ?
3) What are the estimated costs of the program by budget categories ?
4) What are the priorities to be followed in case the project cannot be fully funded ?

The following types of analysis and computation can help develop answers to these questions.[13]

1. Specifying Activity Characteristics

The first step is to analyze each activity in terms of each of three of its characteristics:

1) Its simultaneous components
2) Its sequential components
3) The minimum effective unit for its expansion.

Simultaneous components: Each activity has a number of simultaneous components for which budget provision must be made. For example, many tasks require simultaneous provision for salaries, physical facilities, and operating expenses. This is true of research programs, teaching programs, extension services, and regulatory activities. Some activities, in addition, require working capital to provide loan funds for credit programs or to finance inventories of either farm products or farm inputs within the marketing process.

Some activities, however efficiently they may be conducted, are not very productive unless other activities are carried out in the same farming localities. It is this fact that leads to the advisability of treating facilities for marketing, extension, credit, rural roads and local verification trials as a single activity or project, with the expansion of those activities carried out simultaneously in the same additional farming localities and districts each year.

These simultaneous component characteristics of various tasks comprise some of the complementarities that must be a major criterion in allocative decision making.

Sequential components: Another characteristic of each activity that should be analyzed in project proposals is the sequential components that make it up. For example, expanding a network of farm-to-market roads involves, first, deciding on the location of the new roads and making necessary surveys; second, obtaining the rights-of-way; third, constructing the roads; and fourth, making adequate arrangements for maintenance. In the case of an extension service it is necessary,

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13. These procedures are discussed at greater length, but in different terms in Creating a Progressive Rural Structure, op. cit., Appendix B. pp. 107-165.

first, to arrange facilities for training extension workers; second, to train the first group of workers; third, to launch the program to be carried on by those workers; and, fourth, to make adequate provision for continuing supervision and repeated inservice training. These steps cannot be taken simultaneously; they must be carried out sequentially with the adequate time allotments for each step to be completed.[14]

Launching a research program or expanding an agricultural college and most other essential tasks have similar sequential requirements.

Analyzing the sequential components of each activity is the basis for calculating some of the sequences and gestation periods that are major criteria in allocative decision making. It is essential also to phasing expenditures on individual activities over a period of years to fit within available resources.

Minimum effective units for expansion: The third characteristic of each activity that should be defined is the minimum size of an effective unit for its expansion.

In the process of making allocative decisions it is necessary constantly to choose between an increment of this and an increment of that. But how much is an increment in each case? Clearly one cannot add one-half of a truck or one-third of a pump. It may be possible to add three extension workers at the expense of one kilometer of rural road not built, but do three extension workers constitute an efficient increment? We need to determine the minimum effective unit for expansion of each activity, and then do our allocative planning in terms of incremental units of that size.

For example, an optimum unit for expanding an extension service is probably one that requires between 25 and 30 field extension workers working within a reasonable distance from each other, because that is the optimum size for repeated inservice training and supervision. In the case of arranging adequate local retail outlets for farm inputs, the farming district is the minimum efficient unit of expansion because locality outlets must have direct ties to adequate wholesaling facilities and it is too expensive to provide these for less than one district. The minimum effective unit for research should probably be defined as that which provides all of the related scientific disciplines that are closely related to the particular commodity-oriented project or projects on which that unit of research is to work in the beginning. The minimum efficient size for a fertilizer factory is determined by the technology and economics of production.

Thus each activity has its own appropriate criteria for establishing the minimum effective size for units of expansion. Establishing that effective size is important in order not to waste resources by spreading them over individual units that are too small in any one place to be effective, and because it indicates the units in terms of which a large task should be phased over time.

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14. Various publications that discuss so-called PERT analysis (Program Evaluation and Review Technique) can be helpful in accomplishing this phasing over time. The method is explained in simple terms in U.S. Office of Economic Opportunity, PERT for CAA Planning: A Programmed Course of Instruction in PERT, OEO Training Manual 6321-1 (2 Vols.; Washington D. C.: Executive Office of the President, 1969).

2. Quantitative Requirements and Cost per Unit of Expansion

After the minimum unit of expansion for each activity is established, we can move to determining the quantitative requirements and estimating the cost per unit of expansion of each program activity. That can be done by taking into account both the simultaneous and the sequential components of each program at each stage of its development, estimating the number of personnel of different types and the physical equipment that will be needed, and translating these into a cost budget for salaries, for physical facilities, for operating expenses, and in some cases for operating capital also.

For later convenience in the planning process these costs per unit of expansion should list separately:

1) The requirements for personnel, in terms of numbers of persons with different types of training
2) Foreign exchange requirements
3) Public expenditure requirements.

3. Land Area Served by One Unit of Expansion

For some program activities, it is important to estimate the land area to be served by each unit of expansion. This is particularly true for rural agri-support infrastructure activities. They should be treated as comprising a single activity later in the planning process. The minimum unit of expansion of each element of the program can serve different land areas, yet all must be coordinated to expand the infrastructure locality by locality and district by district.

Moreover, if the goal is set of creating a modern agriculture throughout current areas of immediate growth potential within a given number of years, the land area covered by each unit of expansion in needed in order to calculate how much has to be done each year if the goal is to be reached on time.

The unit of expansion for an extension service was defined as that to be served by 25 to 30 field workers. But this must be related to the land area to be served by each such unit, since an extension service should be expanded only in conjunction with other features of a rural agri-support infrastructure. To accomplish that, the number of farmers to be served by each field extension agent must be decided first, and then related to the average number of farms per square mile. Here, again, an arbitrary decision must be made. It appears that it is unrealistic to expect an extension worker to deal directly with more than about 400 farmers. If it is presumed that new technology will spread among neighbors, a reasonable ratio may be one extension worker to 1,200 farmers. With that decision made, the land area to be served by one unit of expansion can be calculated by taking into account the average number of farmers per square mile in the region under consideration.

How many miles of road will provide a reasonable network of farm-to-market roads for an IGP area? We do not know with precision. But evidence from several countries suggests that, when completed, the minimum should be a road about every mile in one direction, connected by a crossroad about every three miles in the other, or a total of 1.34 miles of road per square mile of land.

Similar analyses can be made for each other task within the creation of the agri-support infrastructure, determining (by the application of criteria appro-

priate to each) the land area that can be served by each unit of expansion of each program activity.

JUDGING PROPORTIONALITY AMONG MAJOR ACTIVITIES

Carefully analyzing each proposed activity along the foregoing lines can result in a reasonably precise estimate of physical requirements, unit costs, and time requirements of tasks essential to creating a modern agriculture. They are important to orderly planning and implementation and to adjusting activities to available resources. What they do not do is to relieve us of the necessity of making qualitative decisions when it comes to deciding how much of available resources to spend on research, how much on procuring production inputs, how much on the agri-support infrastructure, how much on increasing production incentives, how much on land development, and how much on training agricultural technicians.

These must be qualitative decisions because, although we can estimate costs and the land area over which specified activities will make certain facilities available, we cannot similarly estimate benefits in the form either of agricultural production or rural welfare with any comparable precision. Activities vary enormously in quality depending on how they are conducted. The actual use that will be made of facilities that are provided cannot be predicted. There are large uncertainties about the outcome of activities such as research and public expenditures to improve production incentives.

If we give proper attention to sequences, gestation periods and complementarities we can be reasonably certain that expenditures on the various major activities will move us in the direction of creating a modern agriculture, but we cannot do better than to make qualitative judgments about the most effective proportionality among these activities, year by year.

There are, to be sure, mathematical techniques that are often used in connection with planning. They are much more widely applicable in economies that are wholly commercial and modernized (economies that are in stage 3) and they may be more useful in industrial than in agricultural planning. But in a country that is in the process of modernizing its agriculture, their applicability is more limited. They can be used at certain preliminary stages of planning but not at the crucial final point of allocations among major components of an agricultural plan that takes the nature of agriculture and the nature of the process of agricultural growth into account.

Cost/benefit analysis, for example, can be useful in analyzing the probable rate of return on some types of projects (such as major irrigation works). More specifically, an honest cost/benefit analysis can tell us when not to engage in a project because of high cost relative to probable returns, but it cannot tell us to undertake a project at a particular time if the same resources might be put to other uses. That is because there are other activities important to agricultural growth for which comparable cost/benefit analyses cannot be calculated. Those who are competent in cost/benefit analysis know this and they know that final allocative decisions are always made by one or another form of consultative deliberation or administrative decision, informed (perhaps) by cost/benefit studies but not limited by them, even within planning commissions.

Input/output analysis that related output of a given commodity to given amounts of specific inputs of homogeneous quality is a very useful tool for analyzing

relationships within a given firm, industry or economy at a given point in time. But it assumes a given state of the arts and a particular form of organization whereas the core problem in creating a modern agriculture is to change the state of the arts and to change the form of organization of the agricultural industry, developing new agri-support services and constantly improving their quality.

Mathematical models that simulate an economy or the agricultural sector of it can be useful in giving an overview of how an economy works and of what changes in performance might be expected if certain features of it were modified in certain ways. In this sense it is more useful for agricultural planning purposes than input/output analysis because it can estimate the effects of selected changes within a certain order of magnitude. But it cannot, with confidence, derive precise coefficients that can be fed into an allocative equation embodying all of the major activities on which creating a modern agriculture depends [15]. Again, its most competent practitioners know this.

Consequently, when we conclude that allocative decisions in agricultural planning must be made by consultative deliberations, using the best that we can devise in the way of guidelines, we are not proposing that procedure as a substitute for a feasible mathematical alternative; instead, we are relying on the only ultimate method available to us, other than uninformed authoritarian fiat.

In planning, the proportions in which allocations are made among the six main components should be a resultant of summing up the present priority needs of different parts of the country having different current potentials for agricultural growth. Those resulting proportions will be influenced by:

1) The relative proportions of the country's agricultural land that now lies in IGP, FGP and LGP areas

2) What has been accomplished and what remains to be done district by district

3) The relative cost-lines of the different tasks that need to be undertaken now.

The proportions in which resources should be allocated to the six major components of creating a modern agriculture should therefore differ from country to country try and from year to year in the same country.

Merging Geographic, Agency and National Considerations

Should planning be "from the top down" or "from the bottom up?" Effective agricultural planning involves both, plus an initial input from still a third source: the various agricultural implementing agencies of the government.

Creating a modern agriculture is achieved district by district, and only in areas of immediate growth potential. In such areas simultaneous provision for several complementary services is needed, but districts will vary in the degree to which different requirements have already been met. Meanwhile, other preparatory activities need to be undertaken in areas of future growth potential in the

15. Myrdal examines this topic analytically in Asian Drama, Vol. 3, Appendix 3, pp. 1941-68. See also his critique of the use of capital/output ratios, beginning on page 1968.

same districts and in other districts having one or more FGP areas. Having a definite plan for each district, therefore, is essential to planning on any broader front, whether those district plans are initiated within the district or in some central office.

A second initiating input into agricultural planning is needed from the various divisions and bureaus of the ministry of agriculture. District plans will not embrace all needs. They will not, for example, include specific proposals affecting farmers' incentives, although they may mention the need for something to be done. Each public agency should have the opportunity to propose what it feels it should do, based both on the proposals imbedded in district plans and on its own projections of needs and capability.

The third initiating input should be the injection of national needs and priorities into the planning process. The Planning Commision is the obvious source of this input, with its implications for the agricultural plan transmitted to and through the Office of Planning of the Ministry of Agriculture.

A procedure that makes provision for all three of these planning inputs would:

1) Provide for district-by-district planning that can serve both to enrich (without dominating) national planning and as a guide to local district initiative beyond the national plan [16]

2) Give an active role in planning to major divisions of the ministry of agriculture, with each division helping plan the activities it subsequently will be responsible for implementing.

3) Provide a method injecting national priorities and restraints in to the planning process during preliminary stages of agricultural planning within the ministry

4) Provide a means for reconciling the conflicts and discrepancies among the above three initial inputs into the planning process.

Just to state these characteristics implies that many persons and agencies have important roles to play in agricultural planning. The relationships among agencies in planning are shown in broad outline in the following chart. District plans need to be developed for each district. These district plans become an input into the planning activities of each major division of the ministry along with initial proposals generated by those agencies themselves. Meanwhile, the staff of the (Agricultural) Office of Planning should prepare a statement of national considerations that indicates what priorities and constraints agricultural planning should take into account. The district and agency inputs should then be brought together in consultative deliberations with the Office of Planning for revision, coordination and reconciliation.

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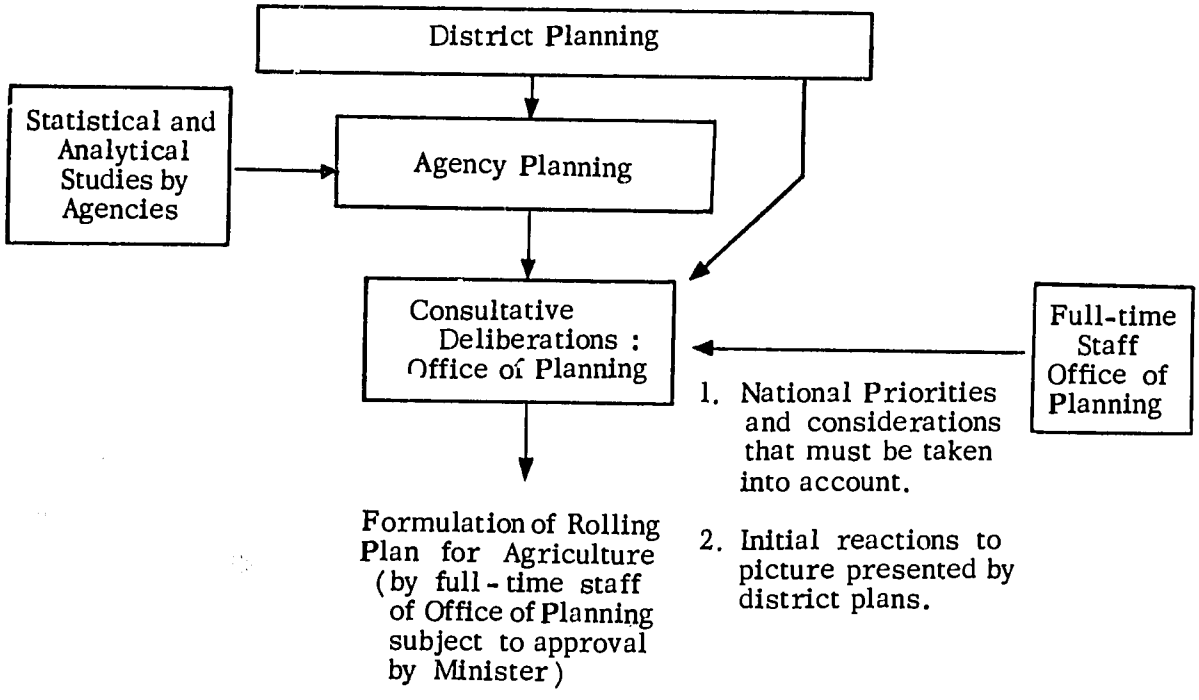
16. The districts referred to here are farming districts as defined earlier in this paper and discussed more fully in Chapter 2 of Creating a Progressive Rural Structure, op cit. pp. 13-30. As a practical matter, local or district planning will probably be done by present administrative districts, kabupatens, or "provinces." In most of south and southeast Asia "farming districts" of optimum size would range from 1,500 to 2,500 square miles in area, having an average radius of 20 to 30 miles from the district headquarters market center. Whatever administrative unit comes closest to that size is probably the best unit to drawn up "district" agricultural plans.

A PLANNING PROCESS FOR AGRICULTURE



DISTRICT PLANNING

The first task of district planning is to classify the lands of each district on the basis of growth potential: to locate each area of each type within the district. The second task is to propose appropriate programs for the district, separately for each of its different classes of land from the standpoint of growth potential, and taking into account the twin goals of agricultural growth and rural welfare. District plans, as well as national plans, need to follow the "rolling plan" format, because much of what needs to be done in each district must be phased over a number of years if creating a modern agriculture is the goal. Each district plan needs to show not only the magnitude of each aspect of the total task but a manageable staging of the implementation, year by year, until the goal is attained. Then, each year, this rolling plan can be revised to take account of what has been accomplished and of new opportunities that have emerged.[17]

AGENCY PLANNING

The second major input into good agricultural planning is by the various public agencies related to agriculture, whether all of these are within the ministry of agriculture or not.

17. A method of preparing district plans is outlined in Creating a Progressive Rural Structure, op. cit., Appendix B.

Agencies differ markedly in the degree to which they need to take district plans into account in drafting their proposals. Those that need to take district plans seriously into account include the various bureaus of the Division of Research and Rural Agri-Support Infrastructure, the Division of Manpower Training and the various bureaus of the Division of Land Development.[18] For example, the Extension Bureau should review all of the district requests to discern what volume and variety of extension activities they would require in the aggregate. The Bureau of Irrigation of the Division of Land Development should total the requests for irrigation construction, outline the magnitude of the task of undertaking technical feasibility studies for them and estimate the cost of those projects on which preliminary studies are far enough along that early construction can seriously be considered. Similarly, each other bureau and division should estimate its own responsibility if all district requests were to be honored, and outline the program and the budget that would be required.

Following that, each agency should make an independent projection of what its own program should be in the coming year, taking into account but not being limited by the district requests. In making that projection, the agency's primary criteria would be twofold. First, what is its own realistic expansion capacity, given the requirements of each activity for trained manpower and administrative oversight ? Second, what are the agency's judgments as to where within the country the limited amount that can be done within the coming year should be located ? The Division of Research may feel that it can only take on one to two additional crops for intensive development even though district plans suggest that research on five new crops is needed. That alone may determine which areas of future growth potential within the country can effectively be served. Or the division may currently have personnel trained to work on one particular crop that is important in limited areas, but not competent to deal with a crop that is now grown over a much larger area of future growth potential. In that case, the decision undoubtedly should be to work on the crop the division is now competent to deal with and to begin to develop or recruit competence to tackle the other crop of intrinsically higher priority a year or two hence.

In other words, while it is the function of district planning to identify needs and propose programs it is the function of agency planning to judge feasibility and to propose orders of priority based on both need and feasibility.

RESPONSIBILITIES OF THE OFFICE OF PLANNING

The staff of a ministry of agriculture's Office of Planning has the primary and demanding task of being the translating and mediating agent among agricultural agencies, on the one hand, and between agricultural planning and overall national planning on the other.

In carrying out these responsibilities the full-time staff of the Office of Planning has important activities before, during and after its enlarged consultative deliberations with representatives of districts and agencies.

Before those deliberations the staff should:

1) Initiate district planning by preparing and sending out standard forms

2) Collate completed district plans for reference by agricultural agencies

18. This discussion assumes that the structure of the Ministry of Agriculture is parallel to the six major "activities" of agricultural planning proposed herein. That topic is covered in the forthcoming book by the writer, To Create a Modern Agriculture, from which excerpts were used in compiling this paper.

3) Prepare and submit to all agencies its own comments after scanning the district plans

4) Prepare and submit to all agencies a statement of national priorities and constraints that need to be taken into account.

During the consultative deliberations, it should participate with all other members in discussing adjustments and alternative courses of action.

After the consultative deliberations the full-time staff has two tasks :

1) To work out final formulation of the proposed plan for agriculture, subject to the approval of the Minister

2) To translate the agricultural plan into a form in which it can be plugged into the process of overall national planning.

Review of District and Agency Proposals : The full-time staff needs to bring to the review of district and agency proposals an overall perspective that transcends the more limited viewpoints and interests of representatives of regions and of agencies. To do that, it must have a deep understanding of the nature of agriculture and of the capabilities and limitations of public activities devoted to its development. It must understand the complementarities among different public programs and private activities. It must have an understanding of the importance of the sequences in which activities are launched and expanded, both nationally and within particular districts. Added to these, it must keep abreast of what is happening within the agricultural economy so that it can detect emerging problems as well as evalluate, in a general manner, the effectiveness of what has been done in the recent past and of what is being proposed for the future. In other words, to perform this first function of providing a broad perspective plus a competence in critical review, members of the full-time staff of the Office of Planning need to be specialists in agricultural development as a process rather than being primarily specialists in techniques of macro-economic analysis and manipulation. At the same time, in order to work effectively with the Planning Commission, at least some members of agriculture's Office of Planning need to be fully versed in conventional macro-planning.

An important critical task for the Office of Planning with respect to district and agency proposals is to review proposed programs as to the proportionality of their attention to areas of immediate, future and low agricultural growth potential, and with respect to their relative attention to agricultural growth and to rural welfare. It is important to move promptly toward creating or expanding a thoroughly modern agriculture in areas of immediate growth potential. It is important not to squander public expenditures trying to do that in areas not yet able to achieve it. It is important meanwhile to mount or strengthen those activities that are currently needed to raise at least some of the areas of future growth potential into the immediate high growth potential category.

With respect to each new program that is proposed the Office of Planning should ask: "Must this be a public activity, or could it be satisfactorily handled by the private sector, perhaps with suitable public stimulation and appropriate public policies ?"

That question should be raised because of the need to get the most out of limited public resources. Every activity that can reasonably be left to private

initiative, thereby stimulating private savings and investment, should be. Moreover, the administrative burden on each government is already great and should only be increased where absolutely necessary.

The question will not always be answered in the same way, but it should always be asked.

Interpreting National Priorities and Restraints : The second role of the full-time members of the staff of the Office of Planning is to interpret national priorities and restraints to the representatives of regions and agencies who participate in the consultative deliberations of the office. These have to do primarily with five factors: 1) available trained manpower, 2) the foreign exchange situation, 3) funds available for public expenditure, 4) repercussions or employment opportunities, and 5) current administrative capacity.[19]

Planning by "Consultative Deliberations": After district and agency proposals have been prepared and national priorities and restraints have been placed on the table, the time has come for the plan to be put together. This can only be done by a process of trial and retrial until a feasible plan emerges. The participants in this process should include staff members of the Office of Planning, representatives of each division of the ministry of agriculture, representatives of major agricultural regions, and consultative members from related ministries.

It is in these deliberations that the proposals of each of the participating groups should be critically examined, both in themselves and in relation to each other. That examination should not be just in terms of proposed expenditures; instead, it should be in terms of what each agency proposes to do, in what manner it proposes to do it, where in the country each activity is to be carried on, and whether the timing of each activity is appropriate in the light of the current growth potential of different parts of the country, complementarities among activities, and the various gestation periods that are involved.

The second task of consultative deliberations is to adjust and reconcile agency proposals into a plan for agriculture. Having the initial proposals made by agencies (after reviewing district plans and injecting their own technical judgment) should assure the availability of soundly conceived projects and programs. At the same time, it means that those projects and programs emanate from specialists who may not have taken important factors into account. Even if they have, resources may not be adequate to allow all of the proposed programs to be provided for at the full strength at which they are recommended.

Judging proportionality is the most difficult part of agricultural planning because we must rely, as stated earlier, on human judgment. But thorough preparation of project proposals along the lines suggested above can make the task easier.

It should not be inferred that the consultative deliberations during which the major decisions with respect to an agricultural plan are discussed should occur only once, after which the full-time staff of the Office of Planning would formulate the plan for approval by the Minister. Instead, those consultations should take place at least three times, and perhaps more.

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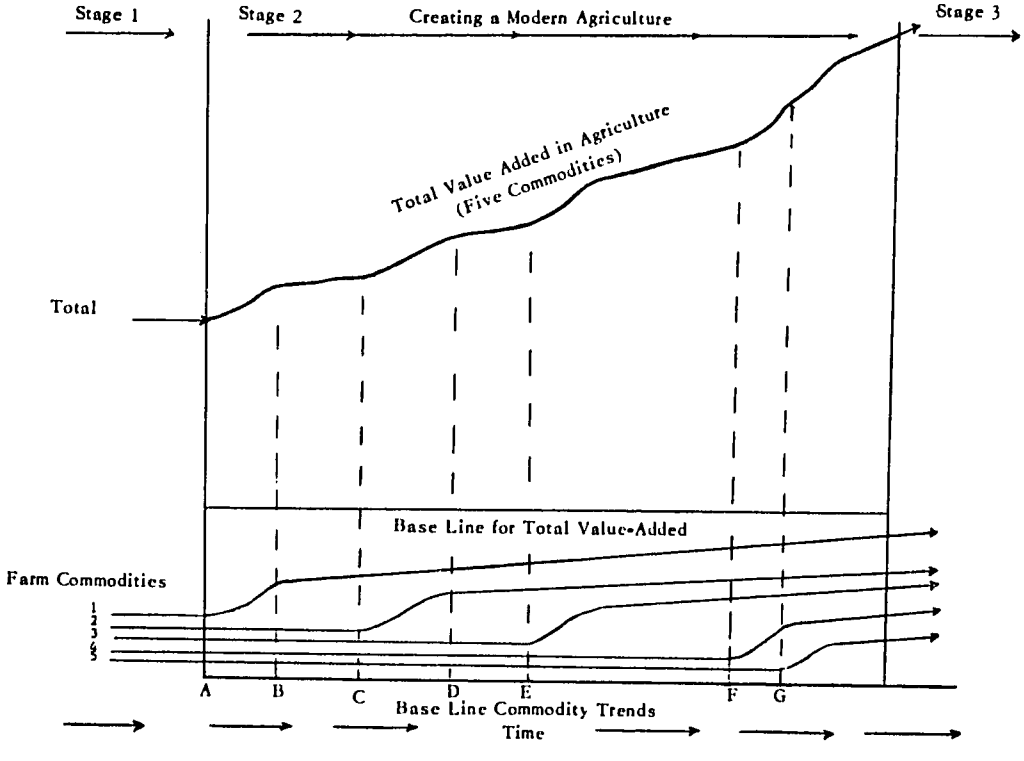
19. Each of these restraints is discussed more fully in To Create a Modern Agriculture, op. cit.

The first occasion would be when the representatives of regional agricultural development officers and of the various divisions and offices of the ministry (including the full-time members of the Office of Planning) present their initial proposals. At that time the discrepancies, conflicts, and overall balance would be fully discussed and proposals for modification suggested.

The second occasion would be after suggested modifications have been formulated when, again, all members would have an opportunity to comment and recommend further modifications.

The third occasion should be after the final plan for agriculture has been drafted by the full-time members of the Office of Planning but before it has been approved.

SCHEMATIC DIAGRAM OF THE NATURE OF AGRICULTURAL GROWTH



APPENDIX

The Nature of Agricultural Growth

Growth in aggregate value-added in agriculture is a summation of what happens to individual commodities.

Sudden spurts in the production of particular commodities are commonly attributed to the availability of new technology growing out of research. Such highly yielding technology certainly is a necessary condition, but other factors are also. The complete list includes :

1) A market demand and marketing facilities for the product

2) New technology making higher production possible

3) Local availability of the farm inputs that the new technology requires

4) Production incentives that make adoption of the new technology profitable to farmers

5) Adequate rural transportation facilities.[1]

In fact, the triggering mechanism for a sudden rise in the production of a farm commodity can be any of these five. Since all of them are essential to a rise in production it is the last essential element to be added that triggers the advance. The places where the recent Green Revolution has taken hold have been the places where all other elements except the new technology were already in place. The places where wheat or rice are grown but have not yet experienced a spurt in production are where one or more of the other essentials are still lacking.

The attached schematic diagram illustrates the way in which total agricultural growth results from what happens with respect to individual commodities. The five trend lines at the bottom of the diagram represent the trend in value-added for each of five commodities beginning in the latter part of stage 1 (at the left edge of the diagram) and continuing through stage 2 to the beginning of stage 3 (at the right side of the page).

Commodity #1 (which might be wheat) experiences a spurt in production (at point A) due to a new technology that sets the process of more rapid growth

1. These five factors are discussed as "The Essentials of Agricultural Development" in Part I of Getting Agriculture Moving by the writer (New York, Frederick A. Praeger, 1966).

in motion and ushers in stage 2. For a few years, production of commodity # 1 increases rapidly as it spreads throughout the area where it can be grown and where the other four essential factors are present but then it begins to level off (at point B). From that time on the rate of increase in production of commodity #1 may continue to rise more rapidly than it did before point A either due to land improvement or to making up deficiencies in one or more of the other four essentials, or to the adoption of a series of new and gradually improving varieties.

At point C a spurt in production of another commodity-- commodity # 2 (perhaps maize)--is brought on by the addition of the last essential element for agricultural development that can, again, be any of the five listed on page 89. The rapid increase in commodity # 2 continues until point D when both the trend line for commodity # 2 and that for total value-added in agriculture again subside to a less dramatic rate of increase.

Additional spurts in total value-added are brought on by developments with respect to commodities # 3, #4, and # 5 at points E, F, and G.

It should be understood that this diagram is schematic only, its purpose being to illustrate two things. One is that even though the rate of increase with respect to each commodity during the period of each "spurt" cannot be maintained, the rate of growth in total value-added (considering all commodities together) can continue to increase over a considerable period of time. The other is that since most of the essential elements require preplanning and investment some years before they will pay off in a spurt of increased production, it is important to launch efforts to meet the required conditions for increases in additional commodities without waiting for the potential for any one commodity to be fully exploited.

AGRICULTURAL SECTOR PLANNING: THE TURKISH EXPERIENCE

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Introduction

This paper is directed to outline the methods followed in the development plans for the agricultural sector. The Turkish plans are comrehensive; the agricultural sector is only a part. Keeping this in mind, an attempt is made here to have a brief look at some features of the general planning and organization before going into the details of steps in formulation within the agricultural sector in Turkey. In this connection, legal provisions related to the establishment and functioning of the State Planning Organization will be summarized in an effort to present the general picture of establishment and functions.

Legal Provisions

PROVISIONS OF THE TURKISH CONSTITUTION

The Turkish Constitution reads in Article 41, regarding the regulation of economic and social life :

Economic and social life shall be regulated in a manner consistent with justice and the principle of full employment, with the objective of assuring for everyone a standard of living befitting human dignity.

It shall be the duty of the State to encourage economic, social and cultural development through democratic processes, and to enhance national savings, to give priority to investments promoting public welfare, and to draw up development projects in order to attain this end.

Article 129 states :

Economic, social and cultural development will be based on a Plan. Development shall be carried out in accordance with the provisions set in the Plan.

The Organization and functions of the State Planning Organization, the principles to be observed in the preparations, execution, implementation, and revision of the the Plan, well as the measures necessary to prevent changes tending to impair the unity of the Plan, shall be regulated by special legislation.

LAW REGARDING THE ESTABLISHMENT OF THE STATE PLANNING ORGANIZATION

Observing the provisions made in the Constitution, Law No. 91, relating to the establishment of the State Planning Organization under the Prime Ministry was adopted in September 1960.

FUNCTIONS

In Article 2 of the law, the functions of the State Planning Organization are indicated as follows :

- To assist the Government in determining economic and social objectives and policies, through the compilation and evaluation of exhaustive data on all types of natural, human, and economic resources and potentials in the country
- To make recommendations to and act in a consultative capacity for the ministries, with a view to securing the coordination of ministerial activities relating to economic policy
- To prepare long and short-term plans for the realization of the objectives to be adopted by the Government
- To advise on the improvement of the organization and functioning of government offices and agencies as well as of local administrations concerned to assure successful execution of plans
- To follow up implementation of the plan, evaluate it, and make revision where necessary
- To propose measures which will encourage and regulate the activities of the private sector in harmony with the goals and objectives of the plan.

It will be noticed that the Turkish plan was born of a realistic and pragmatic approach to economic and social development problems. In a democratic system the plans are imperative for the public sector, indicative for the private. Turkey entered an area of planned development at the beginning of 1963 after the organization was set up and tedious preparation works of the First Plan were completed.

ORGANIZATION

The State Planning Organization (here and after SPO) was organized so as to be capable of functioning in a democratic system and of drawing up national plans by taking advantage of modern planning concepts and techniques.

SPO is under the Prime Minister and acts as an advisory body to the Government, assists in determining economic and social policies and objectives and in formulating plans.

HIGH PLANNING COUNCIL

The High Planning Council is the highest body of the Planning Organization. The Prime Minister acts as chairman of this body. Ministries of Finance, Commerce and Industry, Foreign Economic Relations, the Under Secretary and the three department heads of the SPO are the members of the High Planning Council.

The main function of the High Planning Council is to establish economic and social objectives and to determine the plan strategy. The High Planning Council examines the plans and annual programs prepared by SPO. The plans and programs are presented to the Cabinet and Parliament after the Council is satisfied that they are in conformity with the strategy and the principles.

CENTRAL PLANNING ORGANIZATION

The Central Planning Organization is the second body in planning whose function is to prepare plans and programs. This body is attached to the Prime Minister through an Under Secretary. The Organization consists of the following three departments:

1) Economic Planning Department
2) Social Planning Department
3) Coordination Department.

The Economic Planning Department consists of three sections: 1) Long-term Plans, 2) Annual Programs and Financing, 3) Sector Programs. At this point I would like to point out that the agricultural sector is placed under the Sector Programs Section.

The Social Planning Department consists of Research and Planning Sections.

The Coordination Department has three sections: 1) Financial and Legal Measures, 2) Research and Analysis, 3) Publication and Public Relations.

All these departments are entitled to organize permanent and ad hoc committees which might be composed of the experts coming from both public and private sectors, when the need arises.

Another main body in the State Planning Organization, whose function is administrative, is the Secretary General's Office.

The agricultural sector is placed in the Sector Programs Section of the Economic Planning Department mentioned earlier. The issues of agricultural employment and of education are placed under the Social Planning Department.

DURATION OF PLANS

The development plans are almost invariably prepared for a fixed period. Turkish plans are medium-term, a five-year plan period found to be convenient in Turkey. A medium-term plan indicates the aggregate magnitudes like investment, the targets to be achieved at the end of the period, sector by sector.

In order for plans to become an effective guide to action, the formulation of an annual programs system is adopted. Thus, annual programs include current development activities without losing sight of medium-term goals and objectives. The functions of annual programs, however, are to convert existing medium-term plans into action programs. Annual programs provide a basis for reevalution of investments, growth rate, export, etc. In this respect annual operational programs start with an account of the progress of the Five-Year Plan in the previous year. As stated by Waterston [1] a comparison is made between planned and actual

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1. Waterston, Albert, Development Planning, Oxford University Press, London 1966. p. 143.

development to date and reasons for deviations from targets are analyzed. Consideration is also given to the action to be taken in the current year to correct deficiencies and to make up for shortfalls in the previous year in order to reach targets by the end of the Five-Year Plan.

Annual programs are also subject to the approval of the High Planning Council before being submitted to the Cabinet and to Parliament as in the case for Five-Year Plans.

Stages in Planning

Turkish planning is done in stages. As is well known, these stages consist of : 1) macro-level studies, 2) sector studies and 3) project studies.

In the macro-level studies stage, general magnitudes of economy such as national income, employment, total investments, export and import, propensity to save, and government revenues are determined and are projected. A number of alternatives are obtained with a computer system.

In the stage of sector studies the development possibilities of the individual sector are examined within the framework of a macro-model. Sector studies mainly begin with the establishment of ad hoc committees. This will be discussed later.

In the project studies stage, the findings obtained in both macro and sector studies are examined. The types of projects that should be included in the investment portfolio to be able to realize the production targets are investigated.

These three stages of course do not wait for each other. All studies are carried out simultaneously and balancing is exercised at the end.

An Outline of the Methods Followed in Turkish Agricultural Sector Planning

DEFINITION OF AGRICULTURE

From the Turkish planning point of view, agriculture consists of four basic sectors : 1) crop production, 2) livestock products, 3) forestry and 4) fishing. Crop production is the largest subsector, livestock comes second.

COLLECTION OF INFORMATION, PERMANENT AND AD HOC COMMITTEES

In accordance with Law 91, governing SPO, the Organization shall cooperate closely with the State Institute of Statistics in fulfillment of its duties. Furthermore, the SPO may call on all governmental agencies, other persons and institutions for data and information which are deemed necessary for planning.

It shall be incumbent on all departments and organizations and other persons and institutions from which information is demanded, to make such information available in the shortest time possible.

Any data containing business secrets shall be safeguarded in strict confidence. (Article No. 10).

As indicated earlier, the Economic Planning Department consists of three sections, and also includes permanent and special ad hoc committees of experts.

Along this line in each period of plan preparation ad hoc committees have been established. The members of these committees coming from both the public and private sector are composed of subject matter specialists. The duties of the committees established are to analyze the past performance of subsectors, make some forecast of the development possibilities in the next 10 or 15 years, and set some policy measures for the particular sector to function more efficiently. In fact, the most important contribution of the committees has been in the collection of data. The views expressed by the committees and their findings are not binding for the SPO.

It might be worthwhile to mention some other benefits which have no direct relation to the sector programs:

- The introduction of basic planning terminology and some simple techniques into the administration
- The contribution to a conviction in public organizations of having participated in the preparation of the plans
- The possibility of a larger choice of the experts whose services could be used during the final stage of formulation.

By participating in the preparation of the plans the agencies outside the Planning Organization might be brought to feel that the plans are in some sense "ours" instead of "theirs." This will of course help create a favorable environment in the plan execution.

The ad hoc committees established for the Third Five-Year Plan in the agricultural sector have been working for some six months. Five basic committees were set up:

- General agricultural policies and problems
- Crop production
- Livestock products
- Forestry
- Fishery

Each committee consists of sub-working groups, such as a cereal group, industrial crops, and a fruits group.

DEMAND PROJECTIONS

Future demand estimation for food items is mainly based upon income elasticities for food. The main handicap encountered in estimating income elasticities is the lack of household survey data on family consumption expenditures. The family budget surveys have only recently been initiated by the State Statistical

Institute. So far, 12 provinces have been completed and findings are published. Since these surveys are urban our knowledge on the consumption pattern of rural population is very limited. These cross-sectional studies include commodity groupings, i.e. bread and all cereals, meat (fish, poultry and all other meat), dairy products, eggs and oil, fresh and dry vegetables and fruits, processed foods, tobacco and beverages. The data in these survey studies have been useful materials to process in the Third Five-Year Plan preparations.[2] It might have been more useful if the surveys had been originally designed with the need in mind to which they were later applied.

Another approximation to demand projections is to obtain a consumption series in the following manner:

Amount consumed = Production + Import-export, seed, waste, feedstuff ± changes in stock

In cases where it is possible to figure out the amount used by the processing industry, it has been subtracted from the amount consumed.

All commodities are treated in the same way described above, and per capita consumption is established. Constant prices are used in transferring the per capita consumption into value terms. Since the list of agricultural products includes some 40 items, groupings are made where appropriate--for instance, edible pulses and citrus.

The second step is to find out the percentage changes in the expenditures per capita on food items in each product between two successive years.

At this stage another crucial element that has to be employed is the per capita disposable income growth per annum. This was found to be 3.2 percent in the Second Plan.

After having these two components it simply is a matter of division to estimate income elasticity in the following manner:

$$\text{Income elasticity} - \frac{\text{Percentage change in food expenditures}}{\text{Percentage change in disposable income}}$$

The coefficients of income elasticities estimated in different ways through different sources are not taken as they are. Other sets of data which are taken advantage of are the comparable information on elasticities in other countries where the situations are somewhat similar to Turkey's.

After having had the sets of income elasticities for various commodity groups, percentage increase in per capita disposable income per annum and the population estimates, they are processed in the manner shown on the following page.

Since constant prices are used in all the manipulations above, the percentage increases determined at the end of the period in monetary terms are applied to the physical figures for the base period to estimate physical consumption to set production targets for the end of the period.

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2. The formulas used :

1) Logarithmic - Loge = loga + b logy $\qquad e = b$

2) Semi - logarithmic . e = a + b logy $\qquad e = 0.4343 \frac{b}{e}$

3) Logarithmic - inverse - Loge + a – b $\frac{1}{y}$ $\qquad e = 2.3026 \frac{b}{y}$

The demand projection discussions above are concerned with foodstuffs originating from agricultural production. The demand for industrial raw materials--cotton and other fibers--is estimated by working back from industrial growth.

Commodity	Annual Food Consumption Expenditures Per Capita TL	Population Base Period 1967 National Food Consumption Expenditures TL	Income Elasticity 1972-77 TL	Annual Increase in Disposable Income Per Capita in Percent	Annual Increase in Expenditures Per Capita in Percent	Population 1972 Annual Consumption Expenditures Per Capita in Percent	National Consumption TL
	1	2	3	4	5	6	7
Cereal					3 x 4	5 x 1	6 x total population
Wheat							
Rice							
Sugar							
Vegetable Oil							
Livestock Products							
Meat							
Milk							
Eggs							
TOTAL							

EXPORT PROJECTIONS

Export projections for agricultural commodities are made through an independent study. Basic commodities for export in agriculture are cotton, tobacco, hazelnuts, figs and raisins. Export projections for these commodities based on existing trends with some adjustments constitute pretty reliable estimates. Tobacco, hazelnuts, figs and raisins obviously have very low income elasticities in improving countries so that any large foreign market expansion can hardly be expected.

Admittedly it is relatively difficult to project cotton export, since production level in the competing countries has been the determinant of export level. Secondly, it is relatively difficult to anticipate the relative share and the direction of synthetic fibers substituted by the industry.

Comprehensive commodity and country studies have been made for the fresh fruits and vegetable groups which are increasing in importance in the total agricultural export. In fact, an export-oriented fresh fruits and vegetables project to be implemented through the Third and Fourth Plan periods has already been prepared.

PRODUCTION PROJECTIONS

Once the total demand projections have been made, the next step would be to make projections of supply in order to set targets so as to form a supply-demand balance. In Turkey, the scope for extending cultivation to new areas is very limited. The main scope will of course be for improving the yield per unit.

The production projections are based on existing trends and various interrelations. In the first stage, future production possibilities for individual crops based on existing trends are estimated. This assumes that existing limitations and bottlenecks would continue in the same way. The second stage is to examine the possible deviations from existing trends. This constitutes the most crucial part of the productions estimate work.

In trying to estimate possible deviations from the existing trends the projections of acreage, yield and production are estimated in the following manner.

	Area		Yield		Production	
	Base Period	End of Period	Base Period	End of Period	Base Period	End of Period
1. Irrigated						
Fertilizer + Improved seed						
Improved seed						
Ordinary seed						
2. Non-irrigated						
Fertilizer + Improved seed						
Improved seed						
Ordinary seed						
TOTAL	a (1+2)	c (1+2)			b (1+2)	d (1+2)
Average Yield			b/a	d/c		

In these exercises the extent of the effects of such factors as fertilizer, irrigation, improved seed, and pest control on yield are estimated through the results of experiments and research carried out by the agricultural experiment institutes. Some modifications, of course, are made to adapt the findings to farmers' conditions.

These exercises are repeated for each product and such balances as land use, output, fertilizer and pest control are determined.

Perennial crops and livestock production receive separate treatment. In estimating livestock, for instance, changes in herd composition constitute a basis in arriving at livestock production estimates.

The output projections established through various interrelations and exercises should be compared with demand projections. In cases where there are serious imbalances insofar as particular crops are concerned, alternative ways of meeting these imbalances will have to be considered.

ESTIMATING RESOURCES TO ATTAIN PRODUCTION TARGETS

Once the production targets are set, it would be necessary to determine the total of investments and other strategic inputs and measures that would be needed to attain these levels of output.

The magnitude and the distribution of investments among the different sectors are first determined in the macro-model which is based on an input-output study.

In distributing the investment outlay allocated to agriculture, preproject studies of expected investment by various state agencies are collected and evaluated on the basis of certain criteria--cost-benefit ratio, internal rates of return, etc. The main features considered in the benefit stream of a project are:

- Added-value that will be created
- Employment effect
- Foreign exchange savings and/or earnings.

Added-value consideration is highly significant due to the fact that the main objectives of the plans are to increase income per capita.

The largest part of the investment outlay in agriculture is devoted to water resource development, irrigation and land improvement in the plans.

In machinery and equipment investment preference has been given to the machinery which would not reduce the use of manpower to a great extent.

In input programming, coefficients derived from the findings of research and experiment stations, and from the experiences of state farms are utilized to a large extent. These data are fundamental in estimating the input required for a given increase in output.

There are other measures that influence the volume of production not confined to outlay of both capital and current. These are incentive schemes and measures such as extension, research, institutional changes, credit and price policy which directly or indirectly affect output.

Explicit in this paper, there is not an individual sector planning, rather there are sector studies which will be integrated with macro-models. In integrating the agricultural sector with the overall plan, several balances have to be attained. In attaining these balances the targets and goals initially established are subject to modification in one direction or other. Because the several magnitudes are interrelated, any modifications would also involve corresponding changes in other magnitudes.

In summing up, this process goes on until a satisfactory and balanced series of magnitudes is finally obtained.

AGRICULTURAL PLANNING IN PAKISTAN

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Pakistan began its efforts at planned economic development in 1955 when the First Five-Year Plan (1955-60) was put into operation. The country has by now gone through three successive five-year plans spanning a period of 15 years. The Fourth Five-Year Plan (1970-75) was launched in July 1970. In the process of planned development Pakistan's economy has undergone a remarkable change reflecting significant increases in gross national product, savings, investment, employment and export earnings. However, the rate of population growth stepped far above historical rates and much of the gain in output did not lead to improvement in the standard of living.

Pakistan's agriculture has achieved a breakthrough after a long and difficult journey. It grew very slowly during the first decade after independence. The annual compound rate of growth of agriculture during 1948-58 was 1.2 percent which was offset by the population growth rate of more than 2 percent per annum. Beginning in approximately 1958-59, however, the agricultural situation changed rather dramatically. During the period 1958-68, the rate of agricultural growth was 3.4 percent per annum.

The introduction of high yielding Mexican varieties of wheat and IRRI rice in 1966-67 resulted in a spectacular increase in the production of foodgrains. Wheat production increased by nearly 60 percent between 1967 and 1969. This phenomenon is popularly known as the "Green Revolution." Undoubtedly, the new seeds have been the major engines of growth especially in West Pakistan's agriculture, yet the foundation of the Green Revolution had been gradually laid in the years prior to the commercial introduction of Mexican wheat and IRRI rice in 1966-67.

Agricultural planning in Pakistan has been fairly successful as reflected in the growth performance of agriculture. The planning institutions have gained ability and repute for formulating sound development plans. The central and provincial governments have given unqualified support for implementation of the plans. The Government has also sought the support of the people of Pakistan to make their fullest contribution to the realization of the objectives and goals of development plans.

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1. New high yielding varieties of rice developed at the International Rice Research Institute.

The objective of this paper is to review Pakistan's planning experience and the performance of agriculture under successive five-year plans.

Development of the Planning Agencies

The planning machinery in Pakistan has undergone a radical transformation during the last two decades. Starting from a position of impotence, with undefined functions and uncertain status, the planning agencies have gradually come to acquire a central position in the economic decision-making process of the country. The change, of course, was neither easy nor dramatic; it was the result of a slow, evolutionary process.

Early attempts at economic coordination and planning began in 1948, when the Government established a Development Board which was assigned the functions of coordinating development plans prepared by the provincial governments, recommending priorities, watching the progress of development projects, and making periodic reports to the Cabinet on the progress of development projects. The Board could not perform its functions effectively and it proceeded on an individual project basis without reference to any overall design of development for the economy. A Planning Advisory Board, composed of officials and representatives of the private sector, was set up simultaneously with the Development Board to advise the Government on matters relating to planning and development, reviewing progress in implementing plans, and eliciting public support for the development effort. The Advisory Board made no attempt to guide the Government in preparation of a comprehensive integrated plan.

In 1950, under the umbrella of the Colombo Plan, the Development Board within a short period compiled a Six-Year Development Plan (1951-57) which envisaged a modest public expenditure of Rs. 2,600 million or an annual outlay of 2.5 percent of GNP. This lacked the balance and consistency of a systematic plan, and represented merely a loose aggregation of a number of individual projects in various fields. No aggregate targets were mentioned for the economy as a whole. There was no attempt to relate projects to each other, and the private sector was largely ignored. It was an example of pragmatic planning at its crudest. Given the short time and the lack of basic statistical data for planning, it was perhaps inevitable. The Six-Year Development Plan, however, laid a significant basis for further progress. It exposed the deficiencies in the plan organization, and served as essential ground work for a comprehensive and consistent plan on a national level.

In 1953, a Planning Board (later renamed the Planning Commission) was formed. It was created as a temporary organization, being given fresh leases of life after short intervals. The Planning Board had the usual teething troubles of shortage of staff, absence of statistical data, uncertain status in the Government, and resentment from other ministries, particularly the Ministry of Finance and the State Bank, which regarded it as a rival institution. The provincial governments, for a long time, also did not appreciate the true significance of the Board's work and consequently no effective planning machinery was built up in the provinces. Under these conditions it was not surprising that the First Five-Year Plan could not be published until April 1957, nearly two years after the First Five-Year Plan period began. Its implementation suffered due to rapid changes in government and lack of political support.

Following the 1958 coup, economic development became the prime objective of the Government. The new regime was quick to realize that this would involve the streamlining of the entire administrative machinery, including the planning agencies. The status of the Planning Commission was raised to a division in the Pres-

ident's Secretariat. The President himself assumed the chairmanship of the Planning Commission and a deputy chairman, with the ex-officio status of a minister, was made the operational head of the Commission. This unique position has allowed the Planning Commission to be represented and heard in all Cabinet discussions.

One of the most important developments since 1958 was the success achieved in institutionalizing the planning process. Provincial planning departments were organized, reflecting the greater role of the provincial governments in determining national priorities. Planning cells were created in various ministries and departments and the Planning Commission was represented on practically all decision-making committees in the Government. The Deputy Chairman of the Planning Commission was made a member of the National Economic Council, the nation's highest economic decision-making body. The Central Development Working Party, which scrutinizes all development projects in the public sector above a certain minimum financial limit and accords its approval at a technical level, is chaired by the Secretary to the Planning Division. The Industrial Investment Schedule, which provides broad guidelines for the investment activities of the private sector within the framework of each five-year plan, is drawn up in consultation with the Planning Commission. The Planning Commission is also represented on the Permissions Committee which sanctions private investment. The Planning Commission also provides the Secretariat for the Executive Committee of the National Economic Council which looks after the day-to-day work of the National Economic Council and is responsible for the final approval of development projects. The Government's annual development programs are now formulated entirely within the Planning Commission, in consultation with the provincial planning departments and other agencies, and the development programs are substantially reflected in the Government's budgets. In addition, the Planning Commission and the planning departments prepare annual plans in which short-term policy measures are related to the annual economic targets. Finally, the Planning Commission is represented on the Foreign Exchange Control Committee which makes decisions regarding the allocation of foreign exchange and therefore exercises a decisive influence on the pattern of allocation, particularly in the private sector.

Thus relatively sophisticated machinery for framing economic development policies has evolved. As the status and financial reward of working in the Planning Commission and the provincial planning departments increased, they became able to attract competent staff members. There is little doubt that the economic competence of the various planning agencies outweighs that of any other government agency and that it compares very favourably with similar economic staffs in other developing countries.

Growth Performance of Agriculture

During the preplan period (1947-55), Pakistan's agriculture was largely subsistence-oriented, producing a few cash crops for export as raw materials. Age-old agricultural technology, heavy pressure of the population on the land, small and fragmented farms, lack of agricultural credit and marketing facilities, and the outmoded land tenure system acted as important impediments to the development of agriculture. Despite the importance of agriculture in Pakistan's economy, due attention was not given to the development of agriculture. Consequently agricultural production declined and the disparity between the food output and the growing population became extremely serious. The Government then realized the importance of modernizing agriculture.

We may now review briefly the growth performance of agriculture and the policies and programs pursued during successive five-year plans.

FIRST FIVE-YEAR PLAN

The First Five-Year Plan (1955-60) accorded high priority to agriculture, but final approval of the Plan itself was delayed nearly two years after the First Plan period began. In the matter of implementation the attitude toward agriculture was lukewarm. In fact, Government continued to favour the industrial sector. Fiscal policies encouraged industrial growth, and new industries were given tariff and other protection support and tax holidays. No economic incentive was accorded to encourage agriculture. On the contrary, agriculture faced a number of disincentives such as heavy export duty on agricultural commodities, and forced procurement of foodgrains at below market prices. Of the resources devoted to agricultural development, the major portion went to programs with long gestation periods that produced no tangible results on public investment. The agricultural growth continued to languish. The annual compound rate of agricultural growth was 1.3 percent during the First Plan period.

SECOND FIVE-YEAR PLAN

High priority was given to the development of agriculture in the Second Five-Year Plan (1960-65). The performance of the agricultural sector was near phenomenal as it achieved an average growth rate of 3.4 percent as against 1.3 percent during the First Plan period. This impressive agricultural growth was the result of a series of economic policy measures and the changes brought about in the institutional arrangements. Most important policy decisions which provided a great incentive to the farmers for increasing food production were the abandoning of compulsory procurement of foodgrains and introducing a system of price support. The price supports were announced well before the sowing period of crops so as to help the farmers in planning their cropping pattern. Subsidies were announced on key agricultural inputs such as fertilizer and improved seeds, and plant protection offered as a free service. Consequently the consumption of fertilizer, in terms of plant nutrients, increased from 30.6 thousand tons in 1959-60 to 132.2 thousand tons in 1964-65. The area covered by plant protection operations increased from 1.7 million acres in 1959-60 to 6.5 million acres in 1964-65. For augmenting irrigation water supplies in East Pakistan the small irrigation pumps were hired out at the rate of about 50 percent expenditure. To give further economic incentive to the farmers, export duties on jute and cotton were substantially reduced.

In the field of institutional arrangements, a land reform program was implemented. In West Pakistan cultivation of about 2 millon acres of land was resumed under this program benefitting about 200,000 tenants who were provided ownership rights. Other institutional reforms included the following:

1) Creation of two provincial agricultural development corporations for the procurement, storage and distribution of farm supplies so that these become available to the farmers at the right time. These corporations are also responsible for taking up specific project areas for integrated and balanced development, i.e. a "package" deal.

2) Establishment of the Agricultural Development Bank and reorganization of the cooperatives to enable them to deal more effectively with both agricultural credit and marketing.

THIRD FIVE-YEAR PLAN

The Third Five-Year Plan (1965-70) was formulated within the framework of the 20-year perspective plan (1965-85) and in the light of achievements of the two

previous plans. Encouraged by substantial achievements in the agricultural sector during the Second Plan and the potentialities of future agricultural growth, the Third Five-Year Plan accorded high priority to agriculture with the prime objective of achieving self-sufficiency in foodgrains. The growth rate in agriculture during the plan period was 4.5 percent against the target of 5 percent and compared to 3.4 percent achieved during the Second Plan period. The growth rate of 4.5 percent was achieved despite poor foodgrains production during the first two years of the Plan, because of drought in West Pakistan and floods in East Pakistan. With the commercial introduction of Mexican varieties of wheat and IRRI rice, agricultural production showed a remarkable improvement during 1967-68. Wheat production went up from 4.3 million tons in 1966-67 to 6.4 million tons in 1967-68. It further rose to 7.3 million tons in 1969-70. Rice production increased from 10.8 million tons in 1966-67 to 14.2 million tons in 1969-70.

Two high powered agricultural policy committees, headed by the respective governors in each province, were appointed for the formulation and effective implementation of foodgrains self-sufficiency programs. A food self-sufficiency program prepared by the committees sets out the production targets for various important crops, outlines programs for increased use of inputs and indicates the required provision of auxiliary services for the achievement of these targets every year. Necessary institutional and organizational changes form an integral part of the program. For the successful implementation of these programs detailed action programs are formulated, breaking down the targets of production and the use of inputs by districts in each of the provinces.

The large increases in agricultural production during the Third Five-Year Plan were the result of various programs which are given below:

1) The introduction of high yielding varieties of wheat and rice provided the basis for the spurt in production.

2) Irrigation water supply in West Pakistan increased by 20 percent during the Third Plan period, as a result of an increase in canal water supply and the installation of tubewells. In East Pakistan the number of low lift pumps increased fourfold.

3) Economic incentives were given to the farmers for increasing agricultural production. The economic incentives included subsidies on key agricultural inputs and guaranteed minimum support prices of major foodgrains.

4) Credit arrangements were expanded through the Agricultural Development Bank and other credit institutions to facilitate the purchase of inputs.

Future Issues and Policy

The impact of past developments and the Green Revolution is weak in East Pakistan. Hence the agricultural policy issues are markedly different for East and West Pakistan. The emphasis in East Pakistan must continue to be on increasing production of foodgrains. This calls for continued reliance on input subsidies and other economic incentives. In West Pakistan, with prospects of surplus capacity in foodgrains, the main concern of the policy maker would be to find export outlets. Efforts will also be made to increase output of oil seeds, pulses, eggs, poultry and other livestock products. The level and structure of support prices will need to be reviewed in this context.

WHY DO PROJECTS FAIL TO COME UP TO EXPECTATIONS?

by Dr. John L. Fischer,
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The remarks which follow are intended to set the stage for more meaningful discussions on this and other topics. The topic is not a pleasant one because it is always distasteful to recognize errors; however, we learn by doing, and if we do much, we all will have some failures. The only man who makes no mistake is the man who does nothing.

I reviewed the literature available again (I had reviewed it earlier for another paper) in preparation for this discussion, and was again disappointed at how indefinite we must be when discussing what accounts for either success or failure. Much of the research that has been done is of questionable transferability to another culture, area or level of development.

Also in preparing for the topic I talked to about a dozen people with vast agricultural development experience, and added their opinions to an earlier review I had conducted of project performance. My discussions revealed that there is no shortage of opinions about why projects fall short! However, it was interesting to note that many experienced people have come to very similar conclusions on many points. It is unfortunate that we have no really satisfactory method of establishing an "experience bank," or a "memory bank" for agricultural development.

The first problem I faced was determining what "expectations" for any given project really were, or are. One might think he could get good data if he would limit his review to projects that have involved AID, FAO or another aid donor; however, the earlier projects of these agencies were not especially well documented, and objectives are at the present time often stated in very broad, often qualitative terms.

The approach to which I have resorted is to list a group of factors which in my own experience and through my evaluations of projects seem to generally be associated with the project being a disappointment. In all cases several other workers with considerable development experience and with whom I discussed this topic share my opinion; however, they might express the problem, or factor, differently.

The list of factors is biased by my having reviewed only projects that involved some form of external aid. Internally financed projects could be different; however, at this time I see few new reasons which would cause them to be different.

Two criteria imposed by external conditions have influenced my definition of "falling short," thus factors listed. First, on August 17, 1971, Dr. Sen, Executive

Director of IBRD and President of the International Association of Agricultural Economists, in a paper entitled "Whither Aid?" deplored the tightening of terms of aid, the tendency to shift from grants to loans, and the general decline in aid from the United States. His and other reports all indicate that the supply of aid funds and technical assistance available from the developed countries are decreasing relative to the need, and no relief is in sight. Therefore, it behooves the aid recipient country to use every ounce of aid it gets as wisely as possible, and I took into account how much increase in productivity was obtained per dollar of aid input in my evaluation.

The second criterion is more elusive, yet very important. The U.S., Sweden, the U.K., FAO and West Germany among others, to my knowledge have given their aid programs an extensive review since 1968, and all have concluded that aid without a very dedicated self-help effort on the part of the recipient country means that the effort is likely to yield disappointing results. Therefore, I qualitatively tried to determine the level of self-help and included it in my evaluation.

Based on my evaluation and study, I believe the probability is high that any given project will fall seriously short of expectations under the following conditions:

1) The project is developed by externally supplied technicians, has not been tested in the local area, and is, in effect, superimposed from the outside.

Comment : We have known for some time that projects developed by aid donors, based on the aid donor's home country conditions, superimposed on an LDC are failure prone. The key problem is the relatively well understood lack of adaptation to local conditions. However, I note another group of projects with an equally bad record! They are the ones prepared in the LDC capital by professional planners who have little practical experience, specifically little field experience. Replacing an aid technician or planner with an inexperienced, untested host country national is certainly no guarantee that projects will be adapted to local conditions. Is not the lesson to be learned that there should be no "USAID" or "FAO" or "X" aid donor program, but rather an effective host country program in which aid donors may participate, but with the national program involving the local people in a meaningful way so that project goals are consistent with the local peoples' hopes and aspirations?

2) The resources planned for the project are not committed.

Comment : I was surprised to learn how few projects ever really get the resources that were planned for them. In most cases I am sure there are good reasons for the resources not being provided, but we cannot expect full results when the inputs needed are not committed.

One reason that resources do not materialize is that we who plan dream more than we should. We expect more foreign aid, or outside capital, or trained manpower, etc. than is available. Also it is easy to get a high priority for a new activity but in time priorities have a way of getting shifted around.

One hears many complaints about the shortage of foreign exchange in LDC's. I found it interesting that in projects where there were both foreign exchange and local fund requirements, projects were hampered more by lack of local funds than from foreign exchange. I have known of very few projects that, once initiated were blocked by lack of foreign exchange.

Is the problem that we tend to overextend ourselves? Do we get too many projects going and then have to cut some back?

3) The project is not an integral part of a sound overall strategy for development.

Comment : Projects that are not an integral part of an overall strategy tend to be susceptible to revision of goals and resources allocated; therefore, have a high fall-short rate.

One of my pet peeves is that too few LDC's have an adequate strategy for the development of their agricultural sectors. Orderly, step-by-step plans for beginning "where they are," relying only on resources that are very likely to be available, assuming only genuine market potentials, and targeting in on "where they want to go," while considering the costs, are too few. Unfortunately, the agricultural professions have provided little assistance in terms of helping establish proper priorities for alternative activities. We have tended to outline the things that need doing, but have failed to take into adequate account the limitations and restrictions, economic and social, that developing countries face. Must we not be more realistic about restraints and limitations, and make sure our activities fit properly into a sound strategy?

4) The project is not economically sound.

Comment : In agriculture we have often been enamored with increasing food production, conserving the soil, or some other physical or biological problem. Development involves solving physical and biological problems, but in an economically sound and socially acceptable and politically palatable way.

A few years ago I reviewed a group of agricultural projects, and became interested in whether their benefits were as great as their costs. After endeavoring to estimate both costs and benefits, I concluded that fully three-fourths of the projects were not economically feasible. (I had discounted benefits over time equal to or greater than discounted costs.) Since the time of my analysis, almost all of the uneconomic projects have run into serious difficulty of one kind or another. LDC's cannot afford to expend resources on projects that do not pay off.

The major cause of economic unsoundness in projects is that the project design does not remove limiting factors, or it fails to obtain maximum output from the use of the limiting factors. The limitations which must be considered in program or project development in the CENTO region, as in any other area, are many. Of greatest importance is the fact that the CENTO countries have available a very limited supply of technically trained manpower, followed closely by shortages of capital, and next by local institutional inadequacies. Therefore, the first question that must be asked about any proposed project is, "Does the project obtain great or small increases in productivity in relation to the technical manpower required?" If increased productivity in relation to technical manpower is not great, the project perhaps should be scuttled. Second, from even my two brief stays in Turkey, and visits to Pakistan and Iran, I note management skills are scarce. Therefore, any proposed project must be questioned in terms of whether it maximizes production from the use of the limited managerial skills available. Third, capital is definitely a limiting factor everywhere in the region; therefore the third question to be asked is, "Does the use of capital proposed to be used in the project obtain increases in production greater than other uses?"Those programs which will get the greatest return from capital in the shortest period of time should be given priority. Have the above questions always been asked?

Since the CENTO institutions have not fostered especially rapid growth and progress, at least until the past 6 or 8 years, there are big differences among areas

in each country. Many of your farm people have had limited experience with the institutions which foster a modern, progressive economy. Therefore, will projects likely be successful if they are not as simple as possible? The relevant question then is, "Is the proposed organizational structure for any new project workable in your country?"

Although there are certain limitations which must be considered, there are also certain resources which are rather bountiful and can thus be used extensively. Many areas have good soil, and certainly a favorable climate. Unskilled labor is readily available and its use in lieu of capital investment will often be found wise. Your location with reference to certain export markets is excellent. Your people learn fast and are hard workers. Your farmers respond to price incentives. These are advantages to build upon. What other advantages and bountiful resources do you have ?

5) The project is not attuned to the farmers' incentives.

Comment : Incentives generally are recognized as being important in projects, but the question of whose incentives is sometimes not adequately answered in plans. One problem is that national interests and the individual's best interest are not always consistent without major changes in policy, which, unfortunately, often are not forthcoming. For example, national planners often recognize the need for an increase in agricultural production in order to export more and obtain badly needed international exchange requirements, but this means nothing to the individual farmer. The individual does not export. Also, the evidence would seem to indicate that while increases in productivity may be induced by appeals to nationalism or patriotism, the effect is very short lived.

6) The projects makes erroneous assumptions about the effectiveness or capabilities of institutions.

Comment : Institutions give an economy its structure; therefore, the lack of adequate rural progress may be attributed to the fact that the rural people lack institutions which foster and support a more modern agricultural economy. Common institutional shortcomings are :

a) Capital investment is not adequately encouraged, or rewarded.

b) Market systems are not reliable, efficient, or prices paid are not based on the consumer needs and preferences.

c) Training and educational institutions are too few, and fail to teach the skills required in a modern economy, or provide a satisfactory work ethic in trainees

d) The transportation system is inadequate and inefficient.

e) The system of distribution for farm supplies and services does not meet the needs of a progressive agriculture.

f) Although enough research has been done to produce some proven technology upon which to start programs for development, what is known will not go far. Research is often attuned to international and professional viewpoints rather than local development efforts.

g) Outreach (extension) capability is inadequate--often because it is not designed to meet the local conditions.

h) Institutions needed to improve the quality of life and rural living do not provide the amenities a newly enlightened people expect. Life in the rural areas often means people are condemned to drudgery, poor health, poor education for their children, and little opportunity to break the poverty chain. (People are more interested in getting out than in increasing productivity.)

i) Governmental agencies responsible for agriculture have traditionally been hampered by small budgets and inadequate manpower. And this is but a symptom. The cause is that agencies responsible for agriculture have lacked the political influence needed to produce the desired change. Agriculture, the basic industry in almost all LDC's, is given low priority.

7) A pragmatic approach is not used in designing the project.

Comment : A pragmatic approach involves considering alternative means-ends schemes rather than trying to determine goals first, and then figuring out how to achieve them. The approach is simple and logical, yet I feel it is often not used. Both goals and capability to carry out the goals need to be considered.

8) The project is not designed for a specific audience or clientele.

Comment : This factor could have been covered under No. 4 because it contributes to economic unsoundness. In a recent lecture to the Turkish Executive Development Seminar I said, "In the last 20 years I have clearly learned that programs tend to be successful when they are designed for a specific audience or clientele. All farm people do not face the same limitations, nor will they respond to the same incentives." Nothing I have read or seen since then has altered my opinion.

The following farm groups of rural people can be identified in almost every country, thus the grouping may serve as a logical base for discussing project development.

Group 1 - The subsistence farmer and his family who lack adequate land and capital resources to rise above a subsistence level.

People in this group are uneducated, know little about proper diets or sanitation, and farm by age-old methods. From a practical standpoint: a) It is very difficult to train them, or b) They are not within reach of a facility for training in the technical or managerial skills needed by a commercial or quasi-commercial farmer. Unfortunately, fairly large numbers of Turkey's , Pakistan's and Iran's rural people probably fall into this group.

It is extremely difficult to develop this group to the point where they will produce for the market. This group is the most difficult of all to reach with a development project that is bankable or even economically feasible. In my analysis of agricultural projects mentioned earlier, the three-fourths that had benefits worth less than costs were almost all working with people in this group.

Yet there are things people in this group can do for themselves if the incentive and opportunity are provided. For example, an improved variety of wheat or other crop increases the family food supply. High quality eggs might improve their poultry flocks. A community well with a sanitary cap might improve their health. A school might make it possible for their children to break the poverty chain. A cooperative might lower the costs of the few items they buy.

Under no circumstances would I ever say that a LDC should ignore people in this group because they are the people who need help the most. However, a LDC that concentrates all of its effort on this group could end up making very little progress because of the size and scope of problems faced. As a challenge, I suggest that in working with this group you must watch your costs very carefully. What could be done that would not cost too much?

Group 2 - The predominantly subsistence farmer who will remain primarily a subsistence farmer, but who can be readily reached by a relatively low cost facility to develop limited technical and managerial skills.

If this farmer has available land resources that would enable him to develop a small cash crop or livestock enterprise, he could become a quasi-commercial farmer. I suspect that in the CENTO region there are enough of these farmers to initiate large programs, and with well designed programs, they could lead very dignified, satisfying lives. A viable commercial economy could be built upon them. Am I right?

Group 3 - The intelligent, industrious young man who, if offered the opportunity via supervised credit, marketing programs and maybe land reform and training opportunities, could become the operator of a family type commercial farm.

Farms of this type can furnish the foundation for a high level, market-oriented agro-industrial economy of the future. They can be efficent, produce for the world market, and feed your great cities. When I was in Turkey, I visited with numerous young men who fit this category. I observed many of them on my trip to Pakistan, and I believe there are many in Iran. Am I right?

Group 4 - The large-scale commercial farm. These may be classified in three subgroups: private, public and cooperative.

I believe there is a place for each of them in the agricultural economy of the CENTO region. They may provide the incentive needed to attract badly needed capital and managerial skills from external sources; they can supply both world (export) and your own urban markets through efficient production; they can train local people; they can accumulate capital. Just because these farmers are well off does not mean planners should ignore them. They may play an important role in the economy.

The relevant question that must be asked is, "What are proper targets for each development project?" I repeat that development projects must be aimed at specific targets if they are to accomplish very much. A project that will induce a man to develop a large farm in Group 4 above will likely have no effect on peasant farmers who make up Group 1. A project aimed at benefitting Group 1 would likely be irrelevant to Group 3, etc. Some groups can be used to contribute to certain national goals while others cannot.

The national goal of increased agricultural production for export can probably be met most effectively by concentration on Groups 3 and 4 listed above. In light of Turkey's and Pakistan's needs for more foreign exchange and Iran's need for more food, commercial farming might well be emphasized. High priority could be given to this type of agriculture in the next five-year plans. However, I also recognize that projects which will achieve the necessary goal of increasing exports may

not meet the needs of spreading the base of economic opportunity among the large numbers of Turkey's, Pakistan's and Iran's rural people who fall into Groups 1 and 2. Therefore, simultaneous with the development of commercial agriculture, projects consistent with the national goals, but with benefits and implications for the large numbers of traditional farmers, must be developed. Balance in the overall plan is mandatory.

9) The project spreads its resources too thinly.

Comment : The obstacles must be overcome. If they are not, the effort is wasted.

10) The project fails to take the human element into full account.

Comment : The type of program we generally now believe best suited to the traditional or small, subsistence peasant farmer conditions are the "package" programs. Greater welfare for the program participant (farmer) is the goal in a package program; however, the program puts the achievement of greater welfare into proper perspective by leading people through a logically consistent, step-by-step process of human resource development.

The very heart of the successful package programs is that they begin by concentrating in a single-purposed manner on increasing productivity per man. As productivity rises, improved welfare (level of living) is a natural consequence.

The package program strikes first at the root of the low income problem--low per capita productivity. Increases in productivity must occur before there can be significant general increases in welfare.

People play a twofold role in any successful economic development. First, the purpose of development is its effect on people. Second, people are also a resource and as such are an important input into the development scheme. If mathematics is used as an analogy, people appear on one side of the economic development equation as inputs (or resources), and simultaneously on the other side of the equation as the recipients (or beneficiaries) of the development.

I have observed that rural people anywhere in the world are very intelligent. Their actions are both rational and efficient, within the limitations they face. If they are convinced of the value of change, they will not be adverse to it. They are inevitably hard workers, and in the existing circumstances they know their jobs well. Still, they are not able, under present limitations, to increase their productivity to meet the increasing demand for agricultural products, or to provide very much for their own welfare.

Successful programs utilize human resource development as the central theme, beginning by focusing attention on the crucial problem--lack of productivity--and moving forward on the self-help principle. Such programs are possibly the CENTO area's only hope because the resources available other than those internally generated by the people themselves are very limited. Large quantities of help (often called aid) in the form of either technically trained manpower or capital are not likely to be available to the rural people from either the government or foreign aid donors. Rural people must learn how to muster their own resources and help themselves through local effort. Self-help is the only answer.

11) The various ministries involved do not coordinate their efforts.

Comment : I realize that I may be opening up the seminar to controversy; nevertheless, I feel you must face up to this question. The CENTO countries are generally large countries and their total social and economic development needs are obviously beyond the scope of any one ministry or agency. There is plenty of room for all. However, when more than one agency or ministry is involved, problems of coordination multiply and become serious blocks to progress. Inevitably, these problems are more serious in the LDC's than in the developed countries. There should be no undesirable overlap or competition among ministries and agencies. Many projects have fallen far short of goals because the various ministries and agencies did not work together as they should.

12) Effective demand for the products fall short.

Comment : There is an increasing volume of writings in economic development literature concerning the role of effective demand in generating a modern agriculture. At least one authority has said that lack of effective demand is the major block to agricultural progress.

In my reviews of projects dating back to 1966 I have run into project shortfalls because of ineffective demand time after time. The causes are many. Marketing often does not make the projected progress, therefore, market costs are high and returns to producers lower than anticipated. Competing areas sometimes move ahead faster and undercut the area in which the project is located. Domestic demand sometimes does not grow as was anticipated. In my opinion, the biggest problem has been the project planners' tendency to make unrealistic assumptions about markets and prices. Too often quantity/price relationships are ignored in planning.

13) Yield or output projections are not based on the level of management available.

Comment : It is difficult to project yields, or output, when the experience in any given area is limited, yet we cannot wait until we have total knowledge before initiating projects. Indeed, in some cases the initial effort should possibly have been a pilot operation. However, all projects need not be preceded by pilot operations. I believe that the biggest problem has been lack of good judgment in transferring research results to farm operations. I believe experienced technicians can make the transition reasonably accurately if they are properly used. I have found that the original technicians' projections tend to be rather accurate, and the changes that were made after the original estimates and before final project plans were completed tend to lessen accuracy.

CONSTRAINTS ON AGRICULTURAL PLANNING

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Introduction

Agricultural planning is not easy work. Yet this is not an undertaking of recent times. In the time of the Holy Prophet Hazrat Yusuf (Alaheassalam) the Pharaoh of Egypt had dreamt that seven fat healthy cows emerged from the River Nile and soon after seven lean and thin cows emerged from the same river and devoured the seven healthy ones. The emperor was naturally worried as to the interpretation of the dream. On being informed of the ability of Hazrat Yusuf Alaheassalam in interpreting dreams, the emperor sent for him, then committed him to prison for some manufactured false allegations. Hazrat Yusuf Alaheassalam explained to him that Egypt would have from then onwards 7 years of good harvest followed by 7 years of famine. Immediately the Pharaoh released Hazrat Yusuf Alaheassalam and put him in charge of planning the production of crops and the end use of food in Egypt.

This anecdote from the Holy Book (Al-Quoran) reveals and teaches that man must plan for agricultural production so that future needs can be met without much difficulty. In carrying out the planning work Hazrat Yusuf Alaheassalam had to take into consideration the present agricultural condition and present levels of production of the food crops in Egypt. He had also to make use of all the facilities available through the farmers to increase production while the time was good. He had further to take into consideration the future requirements of food for the following 7 years after the 7 years of good harvests. In doing so, he had to take into consideration the possible population growth to ensure that no one died due to famine. The mention of the River Nile is significant, because irrigation as an input is a sine qua non in agricultural production.

Need for Agricultural Planning

The need for agricultural planning has been felt in the subcontinent of India and Pakistan even in the pre-independence days by the then British Government who ruled the country for maintaining law and order and collection of revenues. They had realized that agricultural development was essential for ensuring an adequate supply of food and raw materials for industries in order to maintain peace and

prosperity in the country. Famines, natural calamities and slowing down of agricultural production as an aftermath of two world wars induced the Government to set up commissions for recommending measures for increasing agricultural production. Sir John Russell's report came out in 1903. The report of the Royal Commission on Agriculture came out in 1928. This was followed by the postwar reconstruction plans of the Department of Planning and Development after the Second World War. Since independence, the Pakistan Government has set up two commissions--one named the Agriculture Inquiry Commission under the chairmanship of Lord Boyd-Orr in 1952, and the other named the Food and Agricultural Commission under the chairmanship of Khan Amir Muhammad Khan, Nawab of Kalabagh, in 1959, for assessing resources and requirements in the field of agricultural development and making recommendations for meeting these requirements.

Apart from the setting up of the commissions, the Government of Pakistan felt the need of planned development and initially had drawn up a six-year development programme in 1950 under the aegis of the Colombo Plan for the period from 1951 to 1957. In this six-year programme the Government had also drawn up a two-year priority programme for the years 1951-52 and 1952-53. The pace of progress was found to be slow and the Planning Board decided to draw up an overall plan of economic development on a five-year period basis. The First Five-Year Plan of Economic Development in Pakistan, covering the period from April 1,1955 to March 31,1960, was completed in draft form in the autumn of 1955 and it saw the light of day in print in May 1956. This was studied and discussed by the various agencies and other units of the central and provincial governments, the Chamber of Commerce, industrial organizations, universities, trade unions, cooperative societies and the press. During the First Plan in the agricultural sector the total output was to increase by 13 percent and the foodgrain production by 9.3 percent making the country self-sufficient in food by 1960.

The Achievements of the Five-Year Plans of Pakistan

The implementation of the Plan as a whole was greatly delayed and although two-thirds of the Plan consisted of projects which were in various stages of execution at the beginning of the plan period, the pace of plan implementation was slow in the first three years. The constraints faced were as noted below:

1) Inadequate fund allocation in the annual development programme against fund provision made for the projects in the Plan

2) Untimely release of funds for the implementation of the programmes as per Plan

3) Lack of an adequate number of qualified technicians in the field of agriculture

4) Backwardness of agricultural techniques

5) Foul weather conditions

6) Unproductive land tenure pattern

7) The system of official control of prices of agricultural products which had the effect of curbing the farmers' initiative to increase output and investment

8) Laying of greater emphasis on big projects at the cost of small ones crucial for agricultural production

9) Lack of public participation and active popular support, as a majority of farmers, workers and villagers never grasped the purpose of the Plan and were not even aware of its existence.

During that period the GNP increased by 11 percent instead of the targeted 15 percent. The increase in per capita income was negligible due to the increase in population which had been greater than expected. Though in the last year of the Plan the foodgrains harvest was good, the overall achievement in agriculture was conspicuously below the target. The Plan targets were technically possible and capable of attainment under favourable conditions, but they had little chance of realization. The provincial agriculture departments were understaffed both technically and administratively. They were inadequately equipped and the staff was too inexperienced to handle a development programme of the size in the Plan. There were insufficient facilities for providing farmers with essential inputs such as improved seeds, fertilizers, pesticides and other supplies. Delays in official procedures in procurement of the inputs and difficulties experienced in the supply to the farmers seriously interfered with the realization of the crop production targets.

Whatever may have been the success or the failure of the First Plan, it must be admitted that it was useful in the preparation of the annual development programme and had stimulated and aided systematic thinking about development and many of the developing plans have influenced the evaluation of public policy. During the Second Plan period agricultural development corporations were set up in both wings of the country for accelerating agricultural development and successfully implementing projects involving provision of improved seeds, fertilizers, pesticides and other supplies on the recommendations of the Food and Agriculture Commission set up by the Government in 1959.

In the Second Plan drawn up by the Government for the years 1960-61 to 1964-65, again the target was set for self-sufficiency in food in the agricultural sector by the end of the Second Plan period. In this Plan serious attempts were made to remove the constraints faced in the First Plan. Many of the available resources earmarked for agriculture and industries were directed to areas where high yields were attainable. The targets for water and power resources development were set matching the requirements of irrigation, drainage, flood control and power facilities needed for achieving the targets in agriculture and industries. Similarly the targets for the development of railways, highways and other means of transport were set to match the requirements of agricultural and other programmes. Training programmes for technicians were worked out by estimating the kind and number of technical personnel required to implement the various programmes. This shows that in the Second Plan, in order to enable the implementation of the agricultural programmes to succeed, an overall matching planning procedure was undertaken.

Due to the Indus Basin Agreement the Second Plan had to be revised in May 1961, and the investment target had to be raised accordingly. The revised Second Five-Year Plan gave an increase in agricultural output the highest priority and

made larger allocations to the agricultural sector during the Second Plan though only 52 percent of the planned investment in the agricultural sector was actually achieved in the First Plan period. The planned targets called for a rise of 21 percent in foodgrain production to achieve self-sufficiency by 1965. In order to mitigate the evil effects of a rapid increase in population growth the Second Plan adopted a programme of family planning so that agricultural development could really help the development of a self-sustaining economy.

The achievements in the agricultural sector during the Second Plan period were heartening. The growth in agriculture which was shared almost equally by both the provinces of Pakistan, was over 3.5 percent per annum against the rate of 1.3 percent per annum for the period of 1949-50 to 1959-60. The optimum growth rate in agriculture has been worked out by the economists to be 5 percent per annum against an average rate of population growth of 3 percent per annum. The production of foodgrains, sugarcane and cotton exceeded the targets by the fourth year of the Second Plan. The manner in which these gains were brought about are noted below:

1) Increased use of improved inputs

2) Improvement in the institutional framework and the institutions serving agriculture

3) Improvement in agricultural policy.

To a large extent the latter two reasons were responsible for the greater use of improved inputs although all three are closely related aspects for bringing about agricultural development for which agricultural planning is done.

The policy of forced procurement of wheat at below market price was replaced in 1960 by a price-support and buffer stock operation. Export duties on key crops of cotton and jute were reduced. Increased attention was paid by the farmers to cropping patterns based on comparative advantages. Fertilizers, plant protection measures, seeds and water supply were subsidized. These steps permitted the Pakistani farmers to purchase improved inputs at specially favourable prices to enable them to get a substantial economic gain through farming. Similarly, improvement in the general extension efforts for the spread of technological knowledge in the field of agriculture had created a climate which called forth individual initiative of a sizeable portion of Pakistan's millions of farmers. In spite of the agriculture of Pakistan, like other underdeveloped countries, being dependent on weather conditions, the substantial gain in production during the Second Plan has demonstrated that planned efforts do contribute very greatly in the achievement of the targets. Given appropriate policies and programmes agriculture is capable of growth.

Nevertheless, problems of a very serious nature, as well as less serious problems, still face agricultural development in Pakistan.

These needs are noted below:

1) Adequate protection against floods in East Pakistan

2) Adequate protection against waterlogging and salinity in West Pakistan

3) The problems of :

a) a sufficient number of agricultural technicians

b) transfer of technical information to the illiterate and conservative farmers

c) supply of animal protein

d) guaranteeing of a timely and adequate supply of credit and improved inputs

e) Providing a marketing and storage system for assuring the farmers reasonable prices for their produce.

The Third Five-Year Plan (1965-66 to 1969-70) in the agricultural sector, therefore, adopted objectives, strategy and targets as narrated below. The goals set were :

1) To increase the real income of the farmers to an extent comparable with the nonagricultural sector

2) To move towards sufficiency in food requirements to the extent compatible with the other needs of the economy

3) To improve nutritional standards in food consumption

4) To promote agricultural development on a sound and proper basis by further improvement in agricultural organization

5) To intensify programmes such as development of marketing, cooperatives, storage, credit, educational and other institutional infrastructural facilities.

The overall strategy was to emphasize the necessity for creating an economic climate in rural areas so that the farmers could take the maximum initiative as individuals and as groups. Subsidies on the inputs were to be continued. Attempts were to be made to involve the private sector for agricultural development. Agricultural development would proceed on the basis of implementing short-run and developing long-run agricultural programmes.

During the Third Plan the economy had to operate within a tremendous squeeze on resources. The combined impact of reduced aid flows and increased defence expenditures introduced a scarcity of development funds notwithstanding a doubling of the proposed plan targets of additional taxation. Investment and savings rates declined significantly and intermediate industrial imports were cut sharply. The revised strategy of concentration on agriculture did recompense somewhat for the fall in industrial growth rate, but here too, recurrent floods in East Pakistan and droughts for two successive years in West Pakistan led to foodgrain shortages in some years. The scarcity of development funds hurt social sector programmes most. These sectors bore the brunt of the squeeze since attempts to safeguard growth impulses were given first priority. The disparity in per capita income of East and West Pakistan also increased during the period because the agricultural breakthrough was limited to West Pakistan. The growing imbalances in personal and regional incomes, the cut in social sector programmes and the rising cost of living underlined the need for greater attention to social objectives.

The Fourth Plan was therefore drawn up with a view to bringing about social and economic justice in the country. Politics guided the framing of this plan, yet it had to be kept in line with the 20-year perspective plan drawn up by the Government. Agriculture continued to receive highest priority.

The Constraints on Agricultural Planning

The five-year plans of the Pakistan Government have been discussed in some detail to give an insight into the constraints which act on planning for development and thus affect agricultural planning. The latter itself has to face a series of constraints because the art and business of agriculture depend on quite a number of factors which may be grouped under five major heads:

1) Physical input factors
2) Economic factors
3) Organizational factors
4) Cultural and motivational factors
5) Knowledge factors.

The planner must take into consideration all these factors before he can present to the country a suitable agricultural plan capable of implementation and producing the desired results.

It will be seen that all the five are very closely interdependent. Failure to pay proper attention to one may act as a constraint on another. In the physical group of factors the land within a country is not the same all over and cannot be treated as such. Naturally within the overall plan, regional planning according to land capabilities will be necessary. But to make this possible reliable data regarding land capabilities are lacking. On the basis of the land capabilities, inputs like seeds, water and fertilizers have to be planned. As regards seeds, accurate data as to the suitability of a particular crop and a particular variety of a given crop in a given locality are also lacking. Information regarding requirement of water and the response of the different crops and varieties of crops to fertilizer doses and types are also not available to the desired degree of accuracy. How far mechanization of agriculture would increase production with commensurate economic gains is yet to be accurately determined.

Quite a lot of research is being carried out in different fields of agricultural development in respect to various inputs. The agricultural planner makes use of the findings of research. Yet since agriculture is organic and as time passes, more research is required to keep up the pace of increase in production.

In the field of economic factors, transportation, storage, processing and marketing facilities for the developmental inputs as well as the products will have to be considered by the planner. There have been instances where production has increased beyond the plan targets, yet due to lack of these facilities the products of these farmers brought a far lower price than that obtained in places where production was short. The lack of such facilities acted as a disincentive to increase production in the locality. Similar facilities for the supply and distribution of the inputs including the supply of credit for enabling the farmers to procure and use these inputs, need to be there so that the agricultural plan may be successful. The price of the inputs, including interest rates on credit, need to be attractive. The prices of the farmer's products need be sufficient to enable him to pay the prices of the consumer goods. This means that there should be price balancing between the farmer's products and the consumer goods he buys in order to make an agricultural plan effective. Agricultural taxes should not become constraints on agricultural development. In a developing country development of agriculture will call for substantial subsidies and considerable fund allocation.

In respect to organizational factors the land tenure system as well as the farm size may act as constraints. The Pakistan Government has introduced land reforms and in the newly colonized areas has fixed a farm size at a minimum of 12 acres but in East Pakistan more than 75 percent of the farmers have land below five acres.

The policies of the government and semi-government institutions often act as constraints on agricultural planning. The characteristic agricultural need for unusually complex and extensive organizational and administrative arrangements poses an acute dilemma for societies, whose scarcest resource is often organizational and administrative talent. There is need for effective two-way communication in the administrative process, with information passing efficiently from the farmer up through the bureaucratic hierarchy as well as down to him from ministries, research stations and the like. Two-way communication is necessary for the effective operation of any administrative system but it is both much more important and much more difficult to achieve in agriculture than in industry because of the decentralization and variability of local circumstances of farming. An attempt has been made in the Comilla Project to provide a solution to this difficulty with some degree of success.

In respect to the cultural and educational factors apart from the constraints which may be posed by public administration--structure, values and mode of operation of the bureacracy, constraints of social structure, cultural values, and dynamics of peasant communities affect agricultural planning to a great degree.

In respect to the knowledge factors constraints of organization of basic and applied research and diffusion of knowledge relating to technical matters, economic policies, political stability and general education, such as extent of illiteracy, the degree of adult education and the efficiency of mass communication will affect the drawing up of the plan for agricultural development.

At the same time modernization of agriculture by the introduction of fertilizer, water, new seed, and pest control followed by multicropping and rotation does enormously increase the complexity of farm management and can act as a constraint in the absence of appropriate and simultaneous qualitative and quantitative improvement of education both general and technical, training of the workers and the farmers, extension services and organizations supporting agricultural development.

Time required for agricultural development often acts as a constraint on agricultural planning. Technical, economic, attitudinal and political transformations of the whole structure of the rural society cannot be brought about quickly. The transformation of traditional agriculture requires a series of interlocking changes in so many different aspects of rural life that a perspective of decades is required. The introduction into the rural economy of innovations that will ensure sustained agricultural growth requires patience and a very steady purpose.

Another constraint is that agriculture as a profession is looked upon as a low-status occupation. Consequently the brightest, most imaginative, most innovative and most ambitious members of the rural community shun farming. This is also true of such farm-related activities as research, extension, cooperatives and marketing. The innovative and energetic types alone can take the lead in the modernization of agriculture. Development programmes must deal with the problem of raising the status of agriculture.

Other constraints which act on agricultural planning are :

1) Lack of sincerity in the national and local leadership for agricultural development

2) Lack of political stability and continuity in a country undertaking agricultural development.(Agricultural plans produce results only in time horizons of decades and not of months and years, and when the very large numbers of people engaged in agriculture fully, jointly and steadily participate in the implementing of the plans.)

3) Paucity of administrative and organizational talent and competence

4) Shortage of nationals trained in agriculture

5) Absence of expanding markets for the products of agriculture

6) Availability of the required quantum of domestic and foreign resources to supply the necessary capital inputs for agricultural modernization

7) Lack of adaptive research and experimentation under local conditions for studying the different responses to different manipulations of the economic environment, organizational and institutional patterns, absorptive capacity of the local people, training and education.

Finally, the last but not the least constraint on agricultural planning is the agricultural planner himself. The planner must know his job. He must have a clear comprehension of the objective, the present situation in the field of agriculture in the developing country and the reasons thereof, and the capability of the farmers to absorb and to translate into practice the innovations which his agricultural plan may propose for achieving the objectives. He must have full knowledge of the resources and requirements and be able to suggest measures for meeting the felt needs within the bounds of full economic, political and socio-cultural justification and equity. He must have an accomodating attitude of fitting in his agricultural plan, within the overall development plan of the country. Lastly, he must be equipped with the knowledge of the latest "tools" used in the planning of agricultural development. In case the planner lacks in meeting any one or some of these requirements his plans may be lopsided and the desired objective may not be achieved.

DEVELOPMENT OF BIG SOIL AND WATER RESOURCES SCHEMES

by

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The purpose and the target of development of a soil and water resource are no different than in the development of any other natural resource. In simplest terms, it is necessary to get optimum benefit from the use of that resource. For this reason the development of a soil and water resource requires the establishment of a series of structures and measures designed to meet the requirements, to solve the deficiencies and to overcome obstacles in the most economical and effective way.

This involves planning, design and construction, operation and maintenance studies and works.

In Turkey these functions for big soil and water resources are carried out by the General Directorate of State Hydraulic Works (DSI).

In order to discuss and defend a soil and water resource development, first of all it is necessary to know the location, extent, quality and the present condition of that resource. This requires collection and investigation of basic data before planning can begin.

Investigation and Planning

In Turkey planning for water resources development is completed in two stages:

1) Reconnaissance studies for planning

2) Planning studies.

Reconnaissance studies are carried out mainly for river basins and the following results are obtained: an inventory of soil and water resources needs and problems, approximate cost-benefit ratios and their comparisons, priorities of the investigations to be made and descriptions and recommendations for further studies for the final and definite planning.

It will be understood from this foregoing statement that the reconnaissance studies are restricted to field observations and investigations of short duration, together with the presently available data. For these reasons the results achieved

are only approximate. However, through these reconnaissance studies, an inventory of the resources in connection with the relationship between the soils and water in the basin is made, and a general plan to use these resources is prepared so that during the planning studies, work on individual projects in that basin can be carried out. Reconnaissance studies provide plans for the final potential development in the basin, or for a specific project as a whole.

BASIC DATA AND INVESTIGATION

At present in Turkey studies on the following investigations and documents are deemed necessary to provide a base for project formulation either in reconnaissance or in planning:

1) Topographical surveys and documents

For reconnaissance studies, topographical maps on a scale of 1:25,000 with 10-meter contour intervals are needed. For planning studies in addition to these maps, it is also necessary to have maps on a scale of 1:500 or 1:1,000 for the location of some structures such as dams, power stations or diversion dams. For reservoirs maps on a scale of 1:5,000 or 1:25,000 may be needed, depending upon their size.

In relation to the mapping activities mapping engineers, surveyors and subtechnicians are used.

2) Hydrological and meteorological documents and investigations

In connection with the water resource and project area, location, volume and quality of water source and climatological characteristics are determined. For this purpose it is necessary to make flow measurements, to establish observation stations on rivers and lakes, to take water samples for sediment and quality determinations, to carry out snow surveys for run-off estimations, to investigate groundwater characteristics and some specific weather conditions. These investigations are carried out by hydrologists, meteorologists and relevant subprofessionals.

3) Soils and drainage documents and investigations

Information needed in relation to the land resources may be summarized as follows: suitability of lands for sustained irrigation, location and size of irrigable lands, their productivity and development needs by classes, conditions and requirements of lands requiring reclamation, necessity for drainage, location of drain areas, type and cost of drainage. To obtain these data, land classification and drainage investigations are carried out and maps and reports are prepared for land classification, land use, drain areas, drainage systems, and water table conditions.

For reconnaissance studies maps on a scale of 1:100,000 are sufficient and the other data obtained may be less accurate. For planning studies generally maps on a scale of 1:25,000 are used, but sometimes maps on a scale of 1:10,000 or 1:5,000 may be needed. Moreover it may be necessary to consider some field experiments and tests.

Soil and drainage studies are conducted by agricultural engineers and subprofessionals.

4) Investigations and data needed for engineering geology

Investigation and research are conducted on the stability and water holding capability of foundations for the structures proposed by project formulation.

At the same time a study is carried out for the supply of materials to be used in the construction of the structures and canals.

In connection with these requirements common geophysical investigations are also made. These works are completed either in the field or in the laboratory, depending upon their nature. After the completion of these investigations an evaluation is made and then a report is introduced, together with the necessary documents such as geological and materials supply maps, geological cross-sections and drilling logs for dam sites.

In this subject civil engineers, geologists, geophysicists, subprofessionals and drilling technicians are used.

5) Investigation for power needs and supply

In this respect, availability and present sufficiency, as well as requirements for the future, need to be determined. Possibilities to meet power needs from the basin itself or from the interconnecting system are investigated.

In addition to the power supply, characteristics of power needs in the basin, and the situation regarding the potential of power to be generated from the project development are fully studied. These studies are made by electrical engineers and specially trained subtechnicians.

6) Investigation for agricultural economic needs

For this purpose studies are made of the income and agricultural situation of the people in the area, both before and after the development of the project. Repayment capacities of the beneficiaries of the project are calculated. These investigations and studies are completed by using statistical information and documents collected from agricultural irrigation experiment stations, from the farmers and extension services within the project area, together with the findings from land classification and drainage investigations.

Works in this field are carried out by agricultural economists and general economists.

As a result of the studies and investigations in each specific field mentioned above, reports are prepared and forwarded to the planning engineer who will make a project formulation to plan development of the soils and water resources.

Operation and Maintenance of the Project

Operation and maintenance of the project is the second most important part of soil and water resources development after planning.

Principles and regulations applied in Turkey concerning operation and maintenance of the irrigation projects may be summarized as described below.

Irrigation systems are divided into two groups: state irrigation systems, and public and private irrigation systems. Methods of operation and maintenance for the state irrigation systems vary depending upon the nature and establishment of the system.

In the big major projects, operation and maintenance are carried out entirely by the state. In these projects water is distributed mainly by two methods, demand and rotation systems. Concerning the demand system, water is kept available in all tertiary canals during the irrigation season so that it can be received any time it is required.

In the rotation system project lands are divided into several sections depending upon certain properties such as texture of soil, topography of lands and crops. Then each section receives water at certain intervals of time (a day) and for a certain period of time (an hour).

In some of the projects, after completion of construction, the system is transferred to the people who are beneficiaries of that project by previous agreement. The operation of this kind of system is conducted independently by the people themselves. Maintenance is carried out mostly by these people, but sometimes it is taken care of by the state.

Water charges in state-built projects may vary. At the present time charges on most of the projects are determined by the size of the area irrigated and the type of crop grown in various regions. The amount is determined by a board consisting of representatives of the Ministries of Energy and Natural Resources, Agriculture, Finance and Rural Affairs, and then it is approved by the Council of Ministers. The charge is issued every year before the fiscal year begins and is valid for one year. Water charges cover only the cost of operation and maintenance on most of the projects.

For some of the projects water charges also include repayment costs. This is a relatively new practice.

Another recent innovation is the offer to give water at a special low price if the beneficiaries will establish soil-water cooperatives and agree to operate the systems by themselves. In this case a 15 percent discount is made from the charge decided upon.

If the beneficiaries take care of the maintenance at the same time, then a 25 percent discount is given.

Development Programs of Big Irrigation Schemes

In connection with the development of the country, five-year planning programs were adopted in 1961. The objectives of these five-year plans are mainly to achieve a rapid and sustained increase in per capita income, and balanced development between various regions and income brackets, to secure employment possibilities for a greater number of people, to share the benefits and burdens of the development with equity and within the principles of social justice, with an efficient and stable improvement in the social economic welfare.

The First Five-Year Plan terminated at the end of 1967. The Second Five-Year Plan is now in its third year.

As in the First Five-Year Plan, the Second Plan also has put special emphasis on irrigated agriculture within the agricultural sector.

In order to meet the demand for food which will be created by the increase in income and population during the period of the Second Five-Year Plan it is deemed necessary and possible to increase the agricultural contribution to the national economy by 23 percent through internal production.

This amount corresponds to an average increase of about 5 percent per year. As is shown in Table 1, during this period a total of 16.9 billion TL will be invested.

TABLE 1

INVESTMENT PROJECTIONS
(Unit: Million TL at 1965 Prices)

	1968-72[1]
1. Water and soil resource development	9,186
2. Tractors and equipment	3,625
3. Research publication and other public services	815
4. Agricultural buildings and marketing facilities	575
5. Seeds, fruit trees, etc.	300
6. Selected breed studs	42
7. Forestry	1,661
8. Fisheries	517
9. Others	179
Total	16,900

1. Increase in livestock population is excluded.

The projected targets for the irrigation and soil conservation measures to be undertaken through the investments mentioned above are indicated in Table 2.

TABLE 2

IRRIGATION AND SOIL CONSERVATION TARGETS OF THE SECOND FIVE-YEAR PLAN
(Unit: Hectares)

Years	Irrigation System to be Constructed	Area to be Irrigated	Soil Conservation
1968	100,273	61,182	52,400
1969	108,623	69,211	56,200
1970	110,605	71,713	60,600
1971	94,507	84,894	64,400
1972	126,759	105,000	60,300
Total	540,767	392,000	293,900

During this period 392,000 hectares of land are to be brought under irrigation to reach the goals of crop production.

Investment in the development of soil and water resources constitutes about 53 percent of the total investment in the agricultural sector. Among these the percentage of major water resource development projects is 50 percent.

As an example of the big irrigation schemes planned to be constructed in the future, irrigation features of the multipurpose Lower Euphrates Project are given briefly below.

The irrigation supplies will be derived from the Karababa Reservoir, which is one of the three main river dams to be constructed under the Lower Euphrates Project. Development will be implemented through the construction of two separate diversion and conveyance systems. Each of the systems will be constructed in two stages, thus full development of irrigation will involve four stages of construction.

Total project irrigable area is 700,000 hectares with an annual cropping intensity of 125 percent and a total 8.6×10 m^3/year irrigation diversion requirement. The project will involve electric power generation requirements totaling 1253 MW installed capacity and 4191 GWH/year for pumping schemes.

Four development areas are embodied in the project. The development areas corresponding to each system and stage are shown in Table 3.

TABLE 3

IRRIGATION AREAS AND SYSTEMS
Lower Fırat Project Feasibility Report
(Unit: Hectares)

Development Area (Plains)	Urfa Tunnel System Stages		Hilvan Canal System Stages		Total Project
	1	2	3	4	
Urfa-Harran	136,000				136,000
Siverek-Hilvan			144,000	3,000	147,000
Mardin-Ceylanpınar		164,000		206,000	370,000
Nusaybin-Cizre				47,000	47,000
Total	136,000	164,000	144,000	256,000	700,000

Construction will begin in 1972. Irrigation development is projected to grow at a rate of 25,000 hectares per year after the first year of operation in which 50,000 hectares will be served. To achieve full supply to the service area of 700,000 hectares will require 32 years from the first year of construction and 26 years from the first year of irrigation.

Estimated capital cost of constructing the project works, including the cost of land, engineering, administration and an allowance for contingencies, and annual cost of operation and maintenance, are as shown below:

TABLE 4

OVERALL CONSTRUCTION COSTS
Lower Fırat Feasibility Report

System and Stage	Capital costs Local	Capital costs Foreign	TL x 10^6 Total	Recurring Costs* (TL/Yr/Irrigable hectare) Operation and Maintenance	Energy for Pumping	Value of Diversion	TL x 10^6 Total
Urfa Tunnel							
Stage 1	1,386	2,385	3,771	140	140	126	406
Stage 2	1,087	1,862	2,949	104	128	128	360
Subtotal	2,473	4,247	6,720	120	133	127	380
Hilvan Canal							
Stage 3	1,378	2,583	3,961	194	542	125	861
Stage 4	2,815	4,968	7,783	133	438	129	700
Subtotal	4,193	7,551	11,744	155	475	127	757
Total Irrigation	6,666	11,798	18,464	98	230	89	417

Notes: * Weighted average.
Foreign currency includes 50 percent surcharge.
Energy for pumping based on 0,055 TL/KWH.

The average net value of agricultural production increases from 320 TL/Ha. under present conditions to 1,100 TL/Ha. in the first year of irrigation, and ultimately to about 13,000 TL/Ha. after full development.

An analysis of the present worth of cost-benefit streams for the sequence 4 development plan over a 75-year period yields the following economic parameters for irrigation development as in Table 5.

TABLE 5
BENEFITS OF PROJECT

	Present Worth * of Net Benefits TL x 10^6	Benefit-Cost Ratio	Internal Rate of Return Percent
Urfa Tunnel System	5,544	2.28	10.95
Hilvan Canal System	2,733	1.97	10.40
Subtotal Irrigation	8,277	2.16	10.80
Multipurpose development	12,661	2.05	11.22

* Present worth of gross benefits less sum of all capital and annual costs discounted at 7 percent.

Difficulties in Planning and Recommendations

ESTIMATING CONSUMPTIVE USE

Conservation of water supplies, as well as soils, is of the utmost importance in the agricultural economy. In basin-wide surveys consumptive use is one of the most important parameters that has to be considered. In areas for which few or no measurements of consumptive use are available, it often becomes necessary to estimate consumptive use of various crops from climatological data by means of empirical formulas. Insufficiency of experimental data is the most common case in our country. Even for the large irrigation schemes we adopted an empirical approach to the problem. Among them the Blaney-Criddle method is the most widely used one in Turkey.

As is known, various factors influence water consumption of plants. Their effects are not necessarily constant, but may show differences with geographical location and fluctuate from time to time. Normal practice is to estimate consumptive use on a monthly basis for the entire period of meteorological observations taken at the representative points in the project area. Then frequency distributions of monthly seasonal and annual water requirements are obtained together with peak period use rates. For a selected return period the amount of water needed by the plant in any year is then computed.

If we assume a 10-year period this means that when we supply that much water to the area every year, this would satisfy the demand 9 years out of 10 on an average. At this point, decision is a matter of economics. A comparison should be made with the incremental cost of impounding water in a reservoir and the

possible reduction in the crop yield in case of deficiencies to meet the demand at times of droughts. As an example a summary of the studies for the Çarşamba Project is given in Tables 6 and 7, and Figures 1 and 2 for a selected cropping pattern in the area.

Table 6 gives the annual diversion requirement and Table 7 gives peak period use rates for the period 1933-69. In Figure 1 frequency distributions of annual demand, and in Figure 2 peak period use rates are given. For a selected return period, required water can be read from these figures. Peak period use rate affects the size of the main canal, while annual demand defines the size of the storage area. These computations can be carried out for each month of the year. Results may be used in the evaluation of the run - off of the river irrigation schemes.

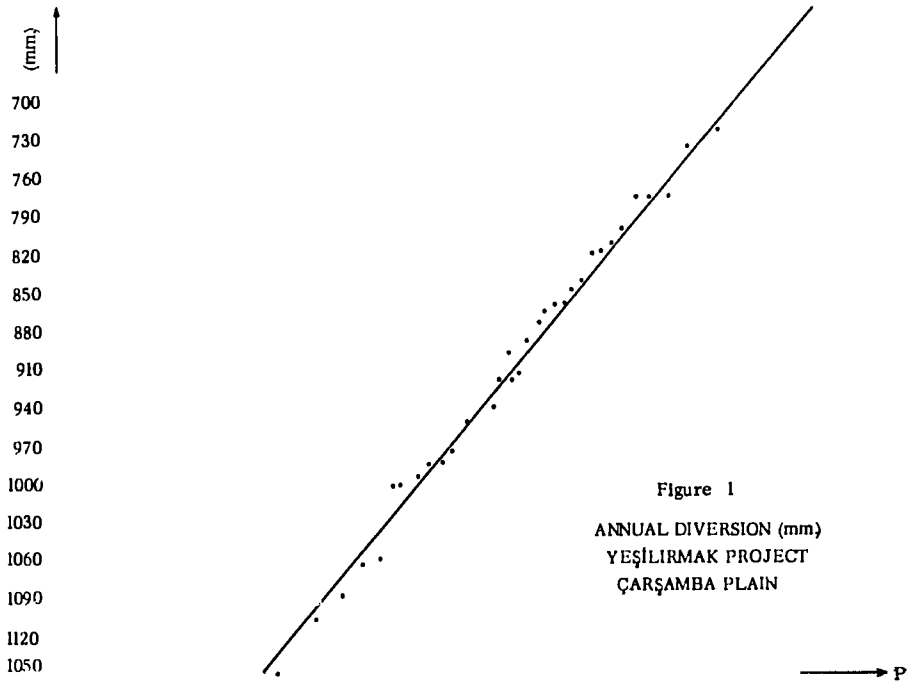

Figure 1

ANNUAL DIVERSION (mm)
YEŞİLIRMAK PROJECT
ÇARŞAMBA PLAIN

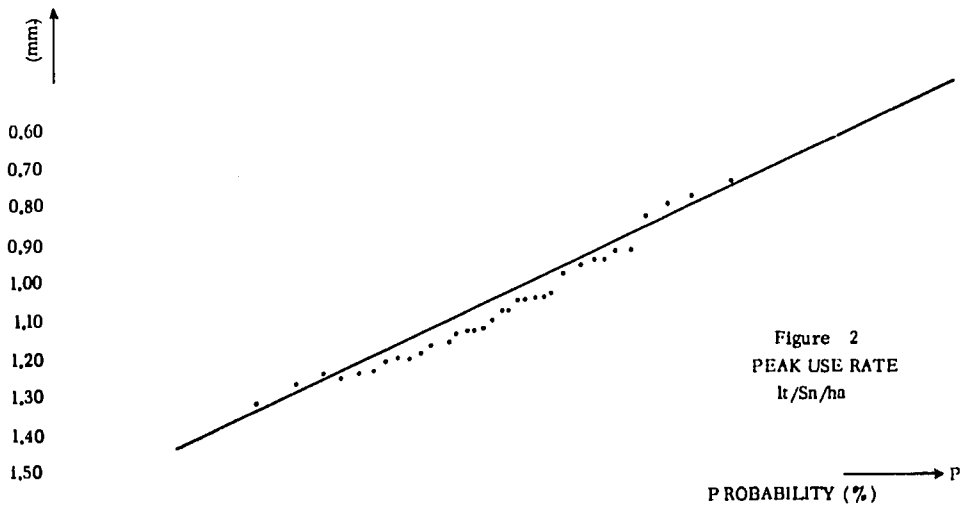

Figure 2
PEAK USE RATE
lt/Sn/ha

TABLE 6
DIVERSION REQUIREMENTS (mm.)

Years	Months									
	IV	V	VI	VII	VIII	IX	X	XI	XII	Annual
1933	-	149.86	131.23	148.32	255.35	167.00	9.88	-	-	861.64
1934	No observation made									
1935	0.92	184.52	196.63	254.22	228.09	75.94	28.49	-	-	968.81
1936	0.81	153.75	48.49	174.46	304.69	24.93	3.19	-	-	710.32
1937	-	195.95	147.31	333.99	203.00	168.18	10.36	4.70	-	1,063.48
1938	-	160.22	180.39	246.56	332.77	36.48	34.54	-	-	990.96
1939	3.69	168.80	197.29	159.20	275.54	38.74	11.06	-	-	854.31
1940	-	91.25	70.45	252.48	240.60	105.88	6.73	2.90	-	770.29
1941	2.26	187.22	191.89	277.35	165.98	27.11	-	-	-	851.82
1942	-	129.81	203.49	139.28	242.61	53.10	-	-	-	768.28
1943	-	122.93	103.83	277.79	250.04	161.26	-	-	-	915.86
1944	0.33	122.12	148.44	282.08	199.41	122.69	7.10	-	-	882.16
1945	-	190.25	103.96	278.21	322.64	104.40	0.06	0.25	-	999.78
1946	3.48	153.44	79.67	206.29	220.84	38.49	-	10.69	-	712.94
1947	11.10	180.93	172.34	302.17	321.00	70.61	-	-	1.60	1,059.75
1948	-	162.43	59.34	171.12	318.78	56.64	-	-	-	768.30
1949	-	178.82	122.86	252.51	288.90	59.88	-	10.13	-	913.11
1950	28.81	166.96	84.74	261.22	246.96	172.51	11.11	-	1.42	913.73
1951	1.63	114.60	159.88	166.70	195.06	166.78	-	-	-	804.66
1952	0.33	127.54	104.30	274.24	299.46	106.67	23.29	0.33	-	936.16
1953	4.85	130.39	76.82	324.45	287.75	50.72	33.06	-	-	908.04
1954	-	159.83	140.68	273.01	333.47	173.81	6.76	-	-	1,087.56
1955	-	150.60	193.08	301.88	210.03	49.65	38.45	-	-	943.69
1956	3.15	137.16	139.26	273.65	330.60	89.12	8.65	-	-	981.58
1957	4.56	142.69	182.82	326.00	352.75	137.84	10.67	-	-	1,157.32
1958	2.35	196.50	145.07	205.38	295.96	23.43	0.91	-	-	869.60
1959	3.12	134.94	161.96	252.58	224.45	16.82	-	-	-	793.87
1960	-	154.55	102.01	285.72	140.68	124.30	34.97	-	1.17	843.40
1961	13.45	159.81	159.97	282.36	311.25	16.08	6.01	-	-	948.92
1962	2.47	194.90	164.27	278.07	309.75	147.26	-	19.66	-	1,116.38
1963	-	149.34	169.25	205.23	340.28	72.90	-	3.59	-	940.59
1964	2.57	144.03	183.60	166.28	210.48	85.78	19.31	-	-	812.06
1965	-	153.11	169.46	265.11	282.25	115.63	-	-	-	985.56
1966	5.44	113.44	176.92	190.27	244.51	52.49	44.32	7.53	-	834.93
1967	-	120.15	69.43	232.34	303.66	88.13	-	-	-	813.71
1968	0.10	191.68	126.45	206.18	157.92	45.97	-	-	-	728.29
1969	-	162.39	154.03	273.94	312.70	95.87	-	-	-	998.93
36-year Average	-	148.86	136.97	236.86	248.52	61.56	0.28	-	-	833.04

TABLE 7

PEAK USE RATE (Lt/Sn/Ha.)

Years	Months									Max. Annual	Ranking Descending Order
	IV	V	VI	VII	VIII	IX	X	XI	XII		
1933	-	0.56	0.51	0.55	0.95	0.64	0.04	-	-	0.95	1.32
1934	No observations made										
1935	-	0.69	0.76	0.95	0.85	0.29	0.11	-	-	0.95	1.27
1936	-	0.57	0.19	0.65	1.14	0.10	0.01	-	-	1.14	1.25
1937	-	0.73	0.57	1.25	0.76	0.65	0.04	0.02	-	1.25	1.25
1938	-	0.60	0.70	0.92	1.24	0.14	0.13	-	-	1.24	1.24
1939	0.01	0.63	0.76	0.59	1.03	0.15	0.04	-	-	1.03	1.23
1940	-	0.34	0.27	0.94	0.90	0.41	0.03	0.01	-	0.94	1.21
1941	0.01	0.70	0.74	1.04	0.62	0.10	-	-	-	1.04	1.20
1942	-	0.48	0.79	0.52	0.91	0.20	-	-	-	0.91	1.20
1943	-	0.46	0.40	1.04	0.93	0.62	-	-	-	1.04	1.19
1944	-	0.46	0.57	1.05	0.74	0.47	0.03	-	-	1.05	1.17
1945	-	0.71	0.40	1.04	1.20	0.40	-	-	-	1.20	1.16
1946	0.01	0.57	0.31	0.77	0.82	0.15	-	0.04	-	0.82	1.16
1947	0.04	0.68	0.66	1.13	1.20	0.27	-	-	0.01	1.20	1.14
1948	-	0.61	0.23	0.64	1.19	0.22	-	-	-	1.19	1.13
1949	-	0.67	0.47	0.94	1.08	0.23	-	0.04	-	1.08	1.13
1950	0.11	0.62	0.33	0.98	0.92	0.67	0.04	-	0.01	0.98	1.12
1951	0.01	0.43	0.62	0.62	0.73	0.64	-	-	-	0.73	1.10
1952	-	0.48	0.40	1.02	1.12	0.41	0.09	-	-	1.12	1.08
1953	0.02	0.49	0.30	1.21	1.07	0.20	0.12	-	-	1.21	1.07
1954	-	0.60	0.54	1.02	1.25	0.67	0.03	-	-	1.25	1.05
1955	-	0.56	0.74	1.13	0.78	0.19	0.14	-	-	1.13	1.05
1956	0.01	0.51	0.54	1.02	1.23	0.34	0.03	-	-	1.23	1.04
1957	0.02	0.53	0.71	1.22	1.32	0.53	0.04	-	-	1.32	1.04
1958	0.01	0.73	0.56	0.77	1.10	0.09	-	-	-	1.10	1.03
1959	0.01	0.50	0.62	0.94	0.84	0.06	-	-	-	0.94	0.98
1960	-	0.58	0.39	1.07	0.53	0.48	0.13	-	-	1.07	0.95
1961	0.05	0.60	0.62	1.05	1.16	0.06	0.02	-	-	1.16	0.95
1962	0.01	0.73	0.63	1.04	1.16	0.57	-	0.08	-	1.16	0.94
1963	-	0.56	0.65	0.77	1.27	0.28	-	0.01	-	1.27	0.94
1964	0.01	0.54	0.71	0.62	0.79	0.33	0.07	-	-	0.79	0.91
1965	-	0.57	0.65	0.99	1.05	0.45	-	-	-	1.05	0.91
1966	0.02	0.42	0.68	0.71	0.91	0.20	0.17	0.03	-	0.91	0.82
1967	-	0.45	0.27	0.87	1.13	0.34	-	-	-	1.13	0.79
1968	-	0.72	0.49	0.77	0.59	0.18	-	-	-	0.77	0.77
1969	-	0.61	0.59	1.02	1.17	0.37	-	-	-	1.17	0.73
36-year Average		0.56	0.53	0.88	0.93	0.24	-	-	-	0.93	

SHORTAGE DURING EXCEPTIONAL DROUGHTS

Size of a storage area is usually determined by the conventional Rippl method which can be used to determine the amount of water required in storage at each date of the cycle and thereby, the necessary capacity of the reservoir. If one allows certain shortages during the critical years, required capacity for the same demand pattern may be considerably smaller than the no shortage allowed. This becomes very important when the topographical situation limits the storage or when the cost of impounding water is expensive. To irrigate the same area a lesser amount of live storage could be sufficient or for the same storage it could become possible to control a higher percentage of river flows, consequently a larger area can be irrigated. The most important factors in setting up such criteria for shortages are the reduction in the yields of the specific crops when deficiencies occur at times of droughts and overall economy of the project. Appropriate allowances may be determined by thorough investigation of cropping pattern and yield-water requirement relations together with meteorological factors affecting crop requirements. This idea is used for several projects in Turkey, such as the Konya-Çumra Water Resource Development Project which represents the high plateaus of the semi-arid Central Anatolia region. Criteria used in this particular project are as follows:

1) During the most critical year, maintain a minimum of 65 percent of full supply.

2) During the most critical five consecutive years, maintain a minimum of 75 percent of full supply on an average.

3) During the entire period of study, maintain a minimum of 95 percent of the full supply on an average.

4) During the entire period of study, maintain full supply at least 50 percent of the time.

It must be kept in mind that these criteria are subject to change depending on the crop characteristics and of the geographical location. But for a given area suitable criteria may be established and allowance made for shortages in critical years, thus promoting fuller use of water and reducing waste during years of high runoff, permitting an economical project development.

SHORTAGE MAXIMIZING NET BENEFITS

Optimum water requirements of different crops may be defined as "the seasonal depths of water that result in maximum yields where the depths include soil moisture supplied by precipitation as well as water delivered by irrigation."[1] Optimum irrigation requirements are the seasonal or monthly depths of irrigation water, exclusive of rainfall, that result in maximum yields. Yields basically change with the amount of irrigation water among other factors such as type of the soil texture or soil fertility. Water is the most important component of yield.

For a given crop with zero irrigation water a certain yield may be produced if the climate is suitable. When we increase the water applied to the crop, yield also increases at a rate depending on the type of crop and the characteristics of the soil.

This curve usually has a peak value after which the increase in water causes reduction in yield. For some crops this summit is fairly well defined. Optimum requirement, by definition, is the peak value of this curve. In order to give an idea of the reduction in the yield as a percentage of maximum yield when irrigation shortages occur, the following table is given for sugarbeets and oats:

SUGARBEETS (Utah)
(Unit: Percent)

Irrigation Shortage	Reduction in Yield
10	1.6
20	4.9
30	8.2
40	15.0
OATS	
10	3.3
20	7.8
30	11.1
40	19.4

Yields of a few crops, such as alfalfa, sometimes continue to increase with increasing depth of water so that no optimum requirements are apparent.

Assuming a parabolic relation between the yield and water at least for the rising limb of this curve, A. Mat[2] derived a formula for optimum irrigation area maximizing the net benefit from the project.

1. Irrigation Engineering, Volume I, Houk.

2. Proceedings of Third Technical Congress of Turkish Society of Civil Engineers.

(1) $$A_o = A_m \sqrt{\frac{V_m - V_k}{C}}$$

Where :

A_o =optimum area (da) (da = $\frac{1}{10}$ hectare)

A_m = area to be irrigated when no shortage is allowed (da)

V_m = maximum yield under full supply (TL/da)

V_k = yield under dry conditions (TL/da)

C = Annual cost of irrigation system per unit area (TL/da)

$V_m - V_k$ = Increase of benefit from unit area after irrigation

$V_m - V_k > C$ Since irrigation is economically feasible thus

$$\sqrt{\frac{V_m - V_k}{C}} > 1 \quad \text{and} \quad A_o > A_m$$

This means by supplying less water to the unit area than is required for maximum yield, greater benefits would result as a whole despite the reduction in the yield from the unit area. Benefits that can be derived from area A_o (optimum irrigation area) become :

(2) $$G_o = 2\,G_m + \mu - 2\,(A_o - A_m)\,C$$

Where :

G_o = Annual net benefits from A_o (da)

G_m = Annual net benefits from A_m (da)

μ = Annual cost of storage (TL)

(3) If $\mu = 2\,(A_o - A_m)\,C$ $\quad G_o = 2\,G_m$

(4) $\mu > 2\,(A_o - A_m)\,C$ $\quad G_o > 2\,G_m$

This means for the case $\mu > 2\,(A_o - A_m)\,C$ we can increase the net benefits more than two times the benefits for the full supply.

If we start decreasing irrigation water from full supply we create a better situation until we reach the amount (S_o) -- which is defined by the maximization

of net benefits of the project under given hydrological conditions. After that point is reached, net benefits start decreasing.

$$(5) \quad S_o = \frac{\lambda Q}{A_o}$$

λ = Total losses (as percent)

Q = Available water at storage structure.

The idea of optimization of the irrigation area for a crop may be extended to several crops. First of all, the cropping pattern is selected among alternative patterns maximizing objective function under limiting conditions for each crop defined by the market studies. Then by using each crop's yield-water relation, the optimum area for each crop is computed. If water requirement for a given crop is S_{oi}, the optimum area that can be irrigated by the same amount of water becomes:

$$(6) \quad A_o = \frac{\lambda Q}{\sum P_i S_{oi}}$$

here P_i is the percentage of the i'th crop.

Thus area for i'th crop becomes $A_{oi} = P_i A_o$

INSUFFICIENCY OF TIME TO MAKE AND ELABORATE ALL THE INVESTIGATION NECESSARY

This may be seen at the beginning of planning studies and only for the type of investigations which require a markedly long time, such as land classification, stream flow measurement and drainage. The best thing for this case is to start these investigations as early as possible.

LACK OF EXPERIMENTAL DATA OBTAINED LOCALLY

This may be very important for development projects which need only supplemental irrigation or have a limited water supply.

For this purpose experimental studies for different regions in the country have to be started and made available. These experiments may be carried out on subjects such as water requirement of various crops under various soil and climatic conditions. Moreover types and amounts of amendments to be required for sodic lands, leaching requirement of saline soils, irrigation efficiencies for various conditions, determinations or control of drainage coefficients and various formulas to be used.

LACK OF DEPENDABLE OBSERVATIONS FOR SOME PROJECTS

Dependable observations are very important for hydrological and meteorological studies. Observation stations should immediately be established on rivers of all project areas.

LACK OF COORDINATON AND COOPERATION

Coordination and cooperation among the agencies concerned are of prime importance in the implementation of any project.

Problems and Difficulties Concerning Operation and Maintenance of Irrigation Projects

It is not possible to talk about good agricultural practices unless the major factors of soil, water and crops are put together harmoniously and ingeniously. In this respect everything depends entirely upon the farmer's effort.

This is especially true and important for irrigated agriculture. For this reason, if the water user is not aware of the importance of water use and if he does not know basic but vital facts such as how much water should be applied, how and when irrigation is done, proper fertilizer use, land preparation, on-farm drainage, etc., then no matter how good a system is established the optimum use and benefit can never be achieved.

Having considered this fact it can be said that for the expected development of water resources, the operation and maintenance with all its phases must be properly and fully realized.

In the following paragraphs difficulties and problems encountered in Turkey in relation to operation and maintenance are summarized:

1) For some of the systems lack of proper extension services is one of the main obstacles to getting the anticipated high yield to be derived from development.

   As a result of this situation some other unexpected conclusions become evident for the project. Important problems may be shown as follows :

   a) causing good lands to become saline
   b) washing fertility of soils in a short time
   c) making operation and maintenance inconvenient and expensive
   d) increasing need for drainage
   e) causing early rehabilitation of systems
   f) causing very low irrigation efficiency
   g) providing insufficient water for the lands at the lower end of the project.

2) Leaving of lands for fallow in spite of the availability and sufficiency of water, in some of the systems

3) Operation and maintenance with an insufficient amount of machinery, equipment and or trained personnel

4) In some cases, starting operation with an incomplete system

5) Beginning or continuing operation without having on-farm works and services, e.g. without leveling, on-farm drainage, etc.

6) Lack of authority to get the people to follow regulations due to the old laws and rules

7) Difficulties caused by the lack of coordination and cooperation among the related agencies.

INTEGRATING ECONOMIC, SOCIAL AND OTHER GOALS INTO A WORKABLE SYSTEM-THE ISSUES AND PROBLEMS

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As the title of this paper implies, the planning of agriculture needs to be based on more than wholly economic criteria. Meaningful policies can only be valid if, in addition to economic objectives, they embrace social and political aims. In addition to the income-creating potential of policies and projects, it is increasingly necessary to measure the employment impact and the income distribution effect of these policies. Problems of poverty and malnutrition are, clearly, closely associated with these factors. Then too, agricultural planners must inevitably be preoccupied with desirable or appropriate land tenure systems. Other objectives include such things as minimising risk at the farm level, famine and flood control.

"Policy making for rural development is becoming increasingly seen as a choice of strategies, not simply better to achieve the application of science to increase the product of natural resources, but which will also maximise the social advantages or minimise the social costs consequent upon the application of science. An important problem is the reconciliation of private, local and national objectives so that national objectives become the consistent whole of the set of regional, local and individual objectives." [1]

In this paper, consideration will be given to two of the socio-political objectives mentioned above--those of unemployment and income distribution. In fact, unemployment and the unequal distribution of income are very closely related. Unemployment is itself a big element in the explanation of the shape of income distribution. Not only does it deprive large numbers of people of income, it also depresses wage levels and causes many people to stay working on tiny farms or in small family businesses. The causal link works the other way too, because the distribution of income affects the pattern of demand. For example, the important content of consumption goods of the rich is high and this leakage considerably decreases the local demand for labour; from another point of view, it helps to explain the inadequacy of foreign exchange to cover all the capital goods and materials needed for the expansion of employment. [2]

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1. J. L. Joy and R. S. Porter, Seminar on Rural Development, Institute of Development Studies, University of Sussex, April 1970.

2. Dudley Seers, Income Distribution and Employment, I. D. S. Bulletin. Vol. 2, No. 4, 1970, University of Sussex.

In terms of the development models of Nurkse and Lewis, rural unemployment was looked upon as an economic asset rather than an economic evil. The former looked upon the rural labour surplus as a source of hidden savings which only required organization to turn this labour into capital. In the case of the Lewis model, further developed by Ranis and Fei, rural unemployment exists in the form of a labour surplus which, with proper organisation, can be removed from the land without reducing agricultural production. The existence of this labour surplus makes it possible to keep urban wages low which, in turn, encourages the use of labour-intensive technologies and encourages industrialisation by providing high profit margins which are reinvested in further capital accumulation. Urban employment is maximised through the encouragement of labour-intensive technologies and a high rate of capital accumulation by the entrepreneurial class. Thus the existence of rural unemployment provides favourable conditions for its own elimination through industrialisation, urbanisaton and development.3

This notion of the rural "labour surplus" being a potential asset has in recent years come under attack. First, it was quite clearly seen that the model did not fit the facts at all. Urban wages in the modern sector were not kept low by the low level of average rural incomes due the existing rural labour surplus. Urban wages, in fact, were several times greater than average rural wages. Also, the rural labour surplus did not remain contained in the countryside until urban employment opportunities were ready. Instead, large-scale migration from the countryside to the towns was experienced and with it the undeniable coexistence of both a rural and an urban labour surplus.

A more recently developed model by Todaro[4] takes a different and more pessimistic view of the development process. Rural unemployment in this model does not remain in the countryside, its difficulties overcome by the traditions of sharing within the extended family. High wages in modern industry present an obstacle to labour-intensive technologies, to rapid capital accumulation and high profits and so there is no built-in tendency for the labour surplus to liquidate itself, even though it may be more evenly distributed between town and country. This is a much more realistic point of view which recognises the overwhelming impact of population increase combined with the continuous progress of capital-intensive technology. The problem is not so much how to withdraw a labour surplus from the countryside for urban employment, without reducing agricultural output; this is essentially a static problem appropriate to an economy with a stationary population and slowly developing technology. In the present dynamic context, the problem is rather how to find increasing employment for a rapidly increasing rural population and to raise agricultural output more than in proportion to the increase in rural population, in order to reduce the impact of rural poverty. On top of this, we must also at the same time find increasing employment for an even more rapidly increasing urban population in the face of an increasingly capital-intensive technology. In short, the problem is not how to use the rural labour surplus to fill urban vacancies, but how to increase the number of rural as well as urban vacancies. This, above all, is the problem of the second development decade, as recognised by the FAO Indicative World Plan. The problem of rural unemployment and underemployment is now important, not in relation to what we must do to divert a rural surplus from the land, but, on the contrary, in relation to what we must do in order to provide productive employment for the labour surplus on the land itself.

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3. H. W Singer, Rural Unemployment as a Background to Rural-Urban Migration in Africa, Conference on Urban Unemployment in Africa, Institute of Development Studies, University of Sussex, September 1971.

4. M. C. Todaro: A Model of Labour Migration and Urban Unemployment in Less Developed Countries, American Economic Review, March 1969.

Planning to increase rural employment as well as rural incomes can indeed give rise to a problem of integrating economic and other goals into a workable system. Although output-increasing policies can increase the demand for labour, it is also possible for these objectives to be in conflict. In particular, income-increasing policies can increase rural unemployment and the unequal distribution of rural incomes. This is particularly true with policies giving rise to land tenure systems which favour large farms and estates, a system which is notable for its unequal distribution of rural assets, notably land. Singer[5] has noted six reasons why large farms tend to reduce the opportunities of rural employment:

1) Large owners may prefer to produce farm products which are not labour-intensive, for example cattle ranching.

2) Large farms are likely to have mechanised production processes and other labour saving devices for both economic and political reasons.

3) Large farms will employ wage labour so long as the marginal product of labour is not less than the present wage rate, whereas unpaid family labour can continue producing so long as there is positive marginal product.

4) Large land owners may hold their land for reasons of prestige, social power etc., rather than for income generation.

5) Absentee large land owners will want to minimise the number of people on their land.

6) Where large land units are rented out to sharecroppers, there may be no incentive for either the landlord or the tenant to provide cooperant inputs which are needed as factors complementary to employment.

Of course, excessively small holdings tend also to be of low productivity and also low employers of labour. Hence a determined attack on rural unemployment will, in some cases, only be possible following a rather significant degree of land tenure reform, involving the breakup of large land holdings into small holding of an appropriate size, to make use of a labour-intensive technology feasible and the provision of a reasonable farm income possible. Where tenure reform relates to large holdings falling into one of the first three categories mentioned above, it is possible that a reduced income is the cost of increasing employment.

One approach to the problem of incorporating noneconomic (in this case, employment) and economic goals into a workable system is to try and modify existing investment criteria to take employment generation into account. More precisely to modify conventional social cost-benefit analysis to deal with multiple objectives. As currently applied, social cost-benefit techniques value employment not as a benefit but as a cost--even in countries which have high unemployment rates. It views investment projects solely from the point of view of maximising national production and assumes that there are always some opportunity costs of employing labour which was previously unemployed. Even when the labour was previously totally unemployed, there will be costs of transporting, training and feeding the labour.

However, an increasing number of economists are coming round to the viewpoint that employment is desirable, not only because it increases production but

5. H. W. Singer. op. cit.

because it achieves no less important noneconomic objectives, such as a more equitable income distribution, social justice, political stability and so on. In short, it is increasingly considered that employment should be regarded not as a cost but as a benefit. Of course, the measurement of noneconomic values of employment, in money terms, is difficult if not impossible but that is no reason for ignoring them.

The proposition is, therefore, that social cost-benefit analysis should be able to take into account employment effects as well as income or efficiency effects. Implicit in this viewpoint is the fact that the assumption that an investment project, with multiple objectives rather than just a single objective, will involve on occasions conflict between the objectives, i.e. between efficiency and employment, and this in turn raises the problem of applying appropriate weights to these objectives. Various suggestions have been put forward to incorporate multiple objectives into conventional social cost-benefit analysis. One proposal is that the labour input of a project should be valued at a negative shadow price which is supposed to reflect the total benefit accruing to society from employing that labour. It certainly involves theoretical and practical difficulties and has not to my knowledge been attempted. Other suggestions have attempted to incorporate multiple objectives into appraisal techniques explicitly rather than implicitly as is the case with the negative shadow wage suggestion.[6] There is, for example, the McKean approach, illustrated by Constable, in which projects are ranked showing their efficiency contributions (the present value of net benefits per unit of capital employed) and their employment effects.

	Efficiency $ '000	Employment
Project A	80	50
Project B	90	70
Project C	110	60
Project D	120	50
Project E	130	40

With this schedule before them, the planners would then have to choose the project which coincides most nearly with their own subjective interpretation of society's preferences for efficiency as against employment. Presumably (a) would be eliminated by all planners as it has less of both benefits than (b) (c) and (d). The choice between the remaining four would be a matter of judgement and this would imply a trade-off between the relative values of efficiency and employment. For example, if project (c) is chosen, it implies that additional employment of 10 persons is worth at least $10,000, for this is the amount foregone by not choosing (d); on the other hand, this employment is not worth as much as $20,000, otherwise (b) would have been chosen. But really this approach is not sufficiently explicit in its weighting and can give rise to inconsistent choices.

Constable has tentatively proposed a more explicit weighting system which takes into account efficiency, equity (income distribution) and employment. For example, "If it is assumed that the present value from the benefit-cost ratio $\frac{(B)}{(C)}$, using shadow prices, adequately reflects efficiency considerations, this could

6. M. Constable, Promoting Employment Through Rural Project Selection, Staff Paper No. 95, Institute for Development Studies, University of Nairobi, 1971.

then be weighted by $\frac{(Y_i)}{(\bar{Y})}$ $\bar{Y}$ is the national median family income and Y_1 the regional median family income) in order to make some allowance for the equity objective. The basic criterion for the employment effects or projects could be the labour-capital ratio $(\frac{L}{K})$ and this could be weighted by some quantitative indication of the district employment situation, relative to the national employment situation. Thus projects could be selected on the basis of two criteria:

Efficiency - Equity $\quad (\frac{B}{C}) \cdot (\frac{Y_i}{\bar{Y}})$

and Employment $\quad (\frac{L}{K}) \cdot (\frac{\bar{E}}{E_i})$

Apart from the data problems attending the construction of weighted ratios, they do appear somewhat too mechanical and inflexible to take heed of political sensitivity relating to regional differences in income and employment.

From the foregoing remarks, it can be seen that considerations of noneconomic objectives (e.g. employment and income distribution), as well as the economic objective, in the planning process raises difficult problems which are by no means resolved. Not enough is known of the employment and distribution effects of different agricultural policies, in different situations, and therefore considerable research is necessary in this field. Joy and Porter have raised the following areas where our knowledge is inadequate:

1) Is there a genuine conflict between policies designed to maximise the growth of total output and the rate of growth of employment ?

2) If there is conflict, what would be the rational policy to follow:

   a) Maximise economic growth and regard the unemployment problem simply as an aspect of the general problem of income distribution to be dealt with by fiscal policies ?

   b) Deliberately adopt policies which will lead to slower overall rates of economic growth but more employment creation, with the further presumption that this will also lead to a more egalitarian distribution of incomes ?

3) To what extent is it feasible to design rural development as an answer to the dual problem of excessively rapid urbanisation and urban unemployment ?

   a) Would policies designed to maximise rural employment be consistent with the rapid expansion of food production which will be needed to satisfy the demand arising from population growth and the need to raise nutritional standards?

   b) What practical measures would be needed to secure the type of rural development implied by the answers to the above questions?

4) How far is it necessary to think in terms of more rapid industrialisation as a means of dealing with the problems of the developing countries? To what extent is there a choice of genuine techniques?

5) There will be a number of countries, with poor export prospects, which will find it difficult to sustain a rapid rate of growth. To what extent should aid be concentrated in these countries in order to sustain a rising standard of living?

These are clearly some of the questions which planners must be able to answer before they can rationally pursue income and employment objectives in their agricultural policies, and they are questions which I think we might usefully discuss in order perhaps to improve our understanding of these difficult but supremely important problems.

PAKISTAN'S EXPERIENCES IN PACKAGE PROGRAMMES

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Most developing countries face common problems in the development of their agricultural sectors. Generally, the average farmer is either unaware of the use of modern agricultural inputs or he is not familiar with their correct use in the right combinations and qualities as there are inadequate supporting institutions and facilities for assisting and advising him. The result is that agricultural growth in these countries tends to be slow despite the fact that the means are available for rapid development. The slow growth in agriculture, which is the largest sector of most developing economies, has adverse repercussions on their general economic development and balanced growth efforts.

In developing countries there is a general shortage of finances, skilled manpower and institutional organizations to provide off-the-farm support for agricultural development. Moreover, it may not be financially and organizationally feasible for governments of some developing countries to come out in general support of their farming communities. Under these conditions government support may be limited to particular areas or a particular class of farmers. In any case, the emphasis in government support is now gradually shifting in favour of the general body of agriculturists. The constraint in this respect is again in terms of resources as few developing countries can muster the resources to undertake such a formidable task. Usually most governments begin by testing a model of an agricultural support system in a pilot project area. This helps in developing an effective and viable system of agricultural support and for training of staff when similar projects are ultimately established all over the country. This methodology was used in East Pakistan where the Comilla Project for integrated rural development was under experimentation for about a decade before being applied to the rest of the province. In West Pakistan, also, a similar project is underway in the shape of the Khanewal Cooperative Farming Scheme.

For the quick development of the agricultural sector it is essential that the farmer should be fully acquainted with the latest technical know-how, agricultural research and the use of modern inputs. It is all the more essential that agricultural inputs be readily available in sufficient quantities and qualities along with complete information and guidance with regard to their use. Besides the provision of these off-the-farm inputs and services, it is equally important that the on-the-farm elements like sowing, weeding and harvesting practices are also given due attention. It is, therefore, increasingly realized that agricultural services to the farmers should be provided in the form of a package programme whereby various off-the-farm inputs are made available to the farmers by preferably one organization sup-

ported by the extension services of the Government. The emphasis on a single organization to provide all or a combination of most of the farm inputs may be noted. This is considered necessary in the interests of the farmers. If there are various agencies providing inputs, there arises the need for some form of coordination among them which may not be possible for the Government without considerable efforts. In practice, however, it is neither possible nor feasible to have one single organization providing all or most of the inputs and services. In due course there has to be a multiplicity of organizations, governmental and nongovernmental, specializing in the provision of particular inputs and services to the farmers. In Pakistan, the agriculture departments were required to provide all the off-the-farm inputs and services to the farmers in conjunction with the agricultural development corporations. This arrangement continued for some time and how the Government has decided to induct the private sector in order to make the distribution of agricultural inputs more efficient. In November 1967 the distribution of fertilizers in West Pakistan was handed over to the private sector and a similar arrangement with regard to the distribution of pesticides will be implemented this year. The private sector has also been allowed to distribute seeds along with the West Pakistan Agricultural Development Corporation (WPADC).

Some of the inputs and services which should be provided to the farmers for quick agricultural development are:

1) An organized and efficient extension service to acquaint the farmers with the use of modern inputs and the latest research in the field of agriculture, plus guidance on crop management, land utilization and cropping patterns

2) Provision of adequate supplies of production inputs like quality seeds and fertilizers

3) Credit facilities for the farmers, mainly short-term and medium-term

4) Other farm services like pesticides, machinery for land improvement, land reclamation and land levelling

5) Marketing and storage facilities

6) Consolidation of land holdings

7) Provision of adequate irrigation facilities.

To the above can be added a number of other inputs and services which contribute directly and indirectly to agricultural growth, e.g. transport and communication facilities, electrification, and banking services. However, a package programme is concerned primarily with those agricultural inputs and services which contribute directly towards increasing agricultural productivity. The food and Agricultural Commision set up by the Government of Pakistan In 1959 and which submitted its report in November 1960 recommended the use of the "Five Firsts" for increasing agricultural productivity. These are :

a) Better seed

b) Fertilizer

c) Plant protection

d) Better cultivation techniques

e) Short and medium-term credit.

These inputs and services have been so designated because they can all be applied without altering the present pattern of land use. For this reason the Commission excluded the other inputs and services as they involved some changes in the existing patterns of land use.

A noteworthy aspect of the Five Firsts is that they are interdependent and they can be brought within easy reach of the farmer in the form of a package deal. While every item is in itself capable of effecting some increase in production when applied individually, the best results and benefits are derived only when they are used in an optimum combination. Thus better seeds may not increase per acre yields very much unless fertilizer is applied, or if the land has not been properly prepared and weeding is done during the maturing of the crops. Fertilizer application alone would not produce the desired results unless more adequate water supplies are made available and the crops are protected against pests and disease. The use of these inputs may not be at the optimum level if the farmer cannot use them for lack of credit facilities. Thus, for example, in a recent fertilizer survey conducted in three districts of the Punjab it was found that only 17 percent of the farmers did not use any fertilizer, of which 77 percent mentioned that they would have purchased fertilizer if they had been able to arrange funds. Similarly, of the 83 percent of the farmers who used fertilizers, 68 percent stated that they would have used more if they had been able to arrange funds. This goes to show the importance of short and medium-term credit in promoting the use of agricultural inputs. Agricultural growth would, therefore, depend on the interdependence and combined effect of the elements constituting the Five Firsts since the nonavailability or weakness of one of them may have disproportionately adverse effects. The Commission, therefore, recommended that these elements may be provided in the shape of a coordinated programme, i.e. in a "package deal" to the farmers' doors. The Commission also recommended the setting up of an Agricultural Development Corporation in both wings of the country which would be assigned the responsibility of promoting the use of the Five Firsts in the agricultural sector of Pakistan. This recommendation of the Commission was accepted when the West Pakistan Agricultural Development Corporation was set up in 1961 and the promotion of the Five Firsts was included in its list of objectives. In East Pakistan also, an Agricultural Development Corporation was set up along similar lines.

The position with regard to the use of major agricultural inputs and services is as follows:

BETTER SEEDS

The use of better seeds is essential for improving the quality of the product and obtaining increased yields per acre. Efforts are being made to provide the farmer with good quality seeds for all major crops, seeds which are disease and pest resistant. Yields can be increased by 10 to 25 percent if improved seeds are used by the cultivators.

The position with regard to the supply of quality seed to the farmers improved during the Third Plan. Before that, the position in this respect was not entirely satisfactory. The details of seed distribution in Pakistan during the Second and Third Plans and the first year of the Fourth Plan are shown in Table 1. In order to ensure production and distribution of good quality seeds, eight seed testing laboratories were recently set up in West Pakistan.

TABLE 1

DISTRIBUTION OF IMPROVED SEEDS IN PAKISTAN DURING THE PERIOD 1960-61 TO 1970-71

Unit : 000 maunds *

Year	East Pakistan	West Pakistan	Total
1960-61	198	2,220	2,418
1961-62	211	1,394	1,605
1962-63	281	164	445
1963-64	186	710	896
1964-65	242	825	1,067
1965-66	204	1,474	1,678
1966-67	175	1,041	1,216
1967-68	155	1,518	1,673
1968-69	180	1,317	1,497
1969-70	113	768	881
1970-71	183	450	633

* 1 maund = 82.29 lbs.

The outstanding feature of the seed distribution programme has been the introduction of high yield dwarf varieties of wheat and rice during the Third Plan period. In 1965 Pakistan imported 50 tons of wheat seed of dwarf varieties from Mexico. In the following year a total of 41,720 tons of wheat seed was imported from Mexico--the largest-ever purchase of wheat seed. The area under Mexican varieties of wheat in West Pakistan increased from 331,000 acres in 1966-67 to 6.9 million acres in 1969-70 and 8.5 million acres in 1970-71. Similarly the area under dwarf varieties of rice in West Pakistan increased from 10,000 acres in 1967-68 to 1.23 million acres in 1969-70 and 2.4 million acres in 1970-71. The area under dwarf rice in East Pakistan is also increasing rapidly though not on the same scale as in West Pakistan.

The rapid adoption of the high yield varieties of rice and wheat have contributed significantly towards the dramatic increases in food production in Pakistan, especially of wheat in West Pakistan.

Fertilizers

Fertilizers are a crucial input for increasing agricultural production. The consumption of fertilizers has increased rapidly in Pakistan owing to: a) introduction of high yield dwarf varieties of wheat and rice on a large scale, b) increased water availability through installation of tubewells, c) adequate availability coupled with government subsidy on the sale price, d) promotional efforts of the agricultural extension services, and e) participation of private firms in fertilizer distribution from November 1967.

The consumption of fertilizer in Pakistan increased from 53,900 nutrient tons in 1960-61 to 439,980 nutrient tons in 1969-70. In West Pakistan, fertilizer consumption increased dramatically from 31,400 N tons in 1961-62 to 311,930 N tons in 1969-70. Details of fertilizer sales during the period 1960-61 to 1969-70 for both East and West Pakistan, are given in Table 2.

TABLE 2

FERTILIZER SALES IN PAKISTAN DURING THE PERIOD 1960-61 TO 1969-70

Unit : nutrient tons

Year	East Pakistan	West Pakistan	Total
1960-61	22,500	31,400	53,900
1961-62	22,500	37,500	60,000
1962-63	27,000	40,290	67,290
1963-64	49,000	68,700	117,700
1964-65	45,000	87,200	132,200
1965-66	54,200	71,000	125,200
1966-67	75,800	116,200	192,000
1967-68	100,600	189,300	289,900
1968-69	106,200	246,900	353,100
1969-70	128,050	311,930	439,980

In order to promote the application of fertilizer by the farmer the Government provided subsidy on the sale of fertilizers to the extent of 57.5 percent in East Pakistan and 35 percent in West Pakistan. So far we have had to rely greatly on imports of fertilizer from abroad. During the Fourth Plan (1970-75) Pakistan is likely to become self-sufficient in fertilizers.

PLANT PROTECTION

Pests and disease cause heavy damage to food and cash crops in Pakistan. To prevent this the Government has intensified plant protection activities through curative and preventive measures. The curative measures involve aerial and ground spraying pesticides while preventive measures consist of treatment of seeds against seed and soil-borne disease. As compared to other programmes of providing agricultural inputs to the farmers, the plant protection programme has remained quite weak. In order to improve the situation, efforts are being made to reorganize and streamline this work so as to make it more effective. Advance planning for the import of pesticides from abroad on the patterns of fertilizer imports has been initated. Moreover, in West Pakistan it has been decided to induct the private sector into the pesticides distribution programme.

The area covered by curative measures during 1969-70 was 6.7 million acres in Pakistan--5.1 million acres in East Pakistan and 1.6 million acres in West Pakistan.This compares favourably with the total plant protection coverage of about 2 million acres in 1960-61. Details of plant protection coverage for the period 1960-61 to 1969-70 are given in Table 3.

TABLE 3

PLANT PROTECTION IN PAKISTAN DURING THE PERIOD 1960-61 TO 1969-70
Pesticides - area covered

Unit: 000 actual acres

Year	East Pakistan	West Pakistan	Total
1960-61	743	1,242	1,985
1961-62	1,110	935	2,045
1962-63	2,626	1,530	4,156
1963-64	1,796	2,700	4,496
1964-65	2,240	3,228	5,468
1965-66	2,815	1,337	4,152
1966-67	2,887	1,123	4,010
1967-68	4,499	938	5,437
1968-69	5,238	1,821	7,059
1969-70	5,053	1,622	6,675

MECHANIZATION

Farm mechanization helps to improve efficiency and productivity through reclamation and improvement of land, diversify land from fodder to higher value crops, and increase cropping intensities. With the recent breakthrough in agriculture the farmers are making increasing use of farm machinery.

In 1969-70 there were 1,080 bulldozers and 167 tractors operated by government agencies in West Pakistan. In 1965-66 the number of bulldozers and tractors operated by these agencies was 227 and 74 respectively. The area levelled and improved by bulldozers in West Pakistan increased from 111,000 acres in 1965-66 to 397,000 acres in 1968-69. The area developed in 1969-70 was about 303,000 acres. In East Pakistan, government agencies used 100 tractors in 1969-70 for development and improvement of land. The area reclaimed in 1969-70 was 20,000 acres as compared to 4,000 acres in 1968-69.

The agriculture departments in West Pakistan are also providing tubewell boring facilities to farmers at subsidized cost. In 1969-70 the departments bored 3,500 tubewells in West Pakistan.

CREDIT

The farmers need medium and long-term credit for nonrecurring outlays like land improvement, tubewell installation and storage, and short-term credit to finance purchases of inputs and to provide working capital. Till recently the farmers needed credit mainly to synchronize their consumptive outlays with annual and seasonal income fluctuations. The recent technological breakthrough has, however, changed the nature and the size of the agricultural credit needs of the farmers who need large additional credit facilities for investment in fertilizer, pesticides, tubewell installation, tractors, threshers, etc.

At present most of the institutional long and medium-term credit is provided by the Agricultural Development Bank of Pakistan. Less than 20 percent of the ADBP loans are of short-term character. The ADBP charges interest at the rate of 7 percent for short-term credit and 8 percent for medium and long-term credit loans.

The recovery rate of medium and long-term credit is around 75 to 80 percent as compared to a recovery rate of 25 percent for short-term loans.

The Government also provides loans to farmers in the shape of taccavi loans. However, these taccavi loans are hardly sufficient even to meet a fraction of the total credit requirements of the farmers. Moreover, the recovery rate of taccavi loans is quite poor--about 70 percent.

Cooperative societies are another source of credit for the farmers. The primary societies have relatively little working capital and a small membership. The average size of loans is very small (about Rs. 300 in 1970). The primary societies do not check whether the loans are being used for productive purposes.

AGRICULTURAL EXTENSION

The extension staff of the Agriculture Department is responsible for advising and guiding the farmers on crop management, better cultivation techniques and the use of modern agricultural inputs. Besides, at one time they were also responsible for the sale of fertilizers and pesticides and for actual application of plant protection measures initiated by the Government. They are also expected to perform certain regulatory duties to assist the Government in obtaining compliance with laws and marketing regulations. They are also required to set up demonstration plots where the use of modern inputs and better cultivation techniques are demonstrated to the farmers.

With this multiplicity of functions the agricultural extension staff was hardly able to fulfill its duties efficiently and competently. They were weighed down by the responsibilities of procuring and distributing fertilizers and pesticides, keeping of accounts and filling of reports. The result was that the extension worker was usually tied to a fixed base with little or no mobility and was thus unable to perform his most important function, i.e. advising and guiding the farmer on better cultivation practices and the use of modern agricultural inputs. With the induction of the private sector into distribution of fertilizers and pesticides the agricultural extension staff should now be able to concentrate on their main function.

As regards the agricultural extension staff, in West Pakistan an experimental programme is underway to examine the possible use of professionals, i.e. degree holders in agriculture, for diffusing agricultural innovations. The selected graduates would be given intensive on-the-job training, increased mobility and closer supervision to enable them to be more useful to the farmers.

CONSOLIDATION OF HOLDINGS

Fragmented and scattered holdings adversely affect the proper use of resources by the farmers. It is not possible for them to adopt modern techniques of production and use modern agricultural inputs. In West Pakistan the Consolidation of Holdings Ordinance was promulgated in 1960 with the objective of accelerating the pace of consolidation. An area of about 5 million acres was consolidated by 1969-70.

In West Pakistan a considerable number of soil testing laboratories have been established where the farmers can get their soil samples tested. This enables the farmers to use inputs like seed, fertilizer and water in accordance with the nature of the soil. For the reclamation of salinity ridden areas, the Agriculture Department provides gypsum at subsidized rates to the farmers.

Some mention should also be made here of the support prices of major agricultural crops fixed by the Government. Thus, for instance, the Government has fixed support prices for wheat, rice and sugarcane. Recently some commercial incentives (bonus vouchers on exports) were given to rice, jute and cotton growers.

From the above analysis it is evident that the Government has made strenuous efforts to provide the farmers of Pakistan with modern agricultural inputs and almost all the related services. In most cases, it may be noted that the Government is still subsidizing the use of these inputs and services. The question of subsidies, their merits and demerits, has not been discussed as it is beyond the scope of this paper.

The Government has not been content to merely make this package of inputs and services available to the farmers. Every conceivable method is used to popularize their use and demonstrate to the farmers their benefits. Radio, television and the press are freely used to advocate their use. The agriculture departments produce brochures to advise and guide the farmers on the correct use of inputs. The departments also demonstrate this to the farmers by applying them at government farms. However, the extension staff of the agriculture departments of the provinces are making all efforts to guide and train the farmers.

Some mention at this stage should also be made of the total commitment of the Government to the package programme of inputs and services to the farmers. This began in West Pakistan with the preparation of the Food Self-Sufficiency Programme in 1965-66. Huge imports of dwarf wheat seed were made from Mexico in 1966 and the Government had to make payments in cash despite the tight foreign exchange position at that time. In April 1967 the Government fixed the support-procurement price of wheat at Rs. 17 per maund which was a great encouragement to the farmers and provided them with the incentive to use modern agricultural inputs and services to increase production. In order to streamline the distribution of fertilizers and to increase the number of sales points so as to bring them within easy access of the farmers, the Government handed over the distribution to the private sector in November 1967. This has proved to be a good decision and fertilizer sales in West Pakistan have increased very rapidly since then.

In addition to the provision of the above-mentioned inputs and services, a number of projects have been taken up in Pakistan for the integrated development of the rural areas. In these projects an effort is made to apply these inputs and services for the development of agriculture and provide them to the farmers in the shape of a package programme. Some of these projects are discussed below.

THE COMILLA EXPERIMENT

In 1959-60 the Government of East Pakistan, in collaboration with the Pakistan Academy for Rural Development, Comilla, evolved a cooperative programme for the solution of rural problems. This programme, which was started on an experimental basis in the Kotwali Thana of Comilla District, was soon quite a success. The Comilla Experiment, as it then came to be known, was accepted by the Government of East Pakistan as a means to the solution of the manifold problems in the agricultural sector and is gradually being applied to other districts of East Pakistan. The objectives of this scheme are :

1) To create physical facilities necessary for a productive rural economy through the mobilization of underemployed human resources. This was to be done mainly through the rural works programme, whereby employment opportunities for landless labour were to be created by implementing labour-intensive projects.

2) To organize farming units of an economically viable size with the aim of cooperative sharing of agricultural inputs and economic functions and to take advantage of modern agricultural technology.

3) To utilize the institutional credit facilities and to build capital through nominal compulsory saving (Rs. 0.50 per member per week).

4) Development of local leadership through participation in training programmes. The objective is to build up essential institutions, train personnel and promote discipline as preconditions to maximum utilization of opportunities created by various development programmes.

5) To facilitate better income distribution among the smaller farmers since they are the ones who are the most active participants and consequently the larger beneficiaries.

ORGANIZATION AND FUNCTIONS

There are primary cooperative societies for every village. The members are taught the use of modern machinery and equipment and are acquainted with improved agricultural techniques. Members meet weekly to discuss their problems. The elected representatives, i.e. chairman, manager, accountant, are sent out to the thana to learn the new techniques of agriculture, business management and principles of cooperation, etc. The other members in turn get their training from these persons. There is no collective ownership of land. The primary cooperative societies are organized preferably around concrete innovative implements requiring group action, for example, lift pumps, tubewells, tractors, etc.

The primary cooperative societies are federated at the thana level in the form of the Thana Cooperative Federation. The Federation supervises and guides the activities of primary societies and provides training to their representatives. Selected farmers are given training in the better methods and techniques of agriculture who then act as innovators and instructors. Information on adult education, family planning, animal husbandry, etc., is also imparted.

The training programme at the thana level is a significant feature of the whole scheme as the development of technical skill at the village level is a necessary precondition for launching any programme which also aims at improving the infrastructure in the rural areas.

The Federation has godowns for storing the produce of members and also provides marketing facilities to them. Loans are advanced against the produce of members which enable them to hold it till such time as they get a good price. The savings of the primary cooperative societies (Rs. 0.50 per week per member) are deposited with the Federation. This compulsory saving results in capital formation at the village level.

The Thana Federation has the size and resources to back up the primary societies with essential agricultural inputs, i.e. credit, services and supplies. The Federation procures resources from government agencies and supervises the use of these facilities by the village societies. It maintains and hires out agricultural machinery and distributes fertilizers, seeds, pesticides, etc.

The Comilla Experiment is currently in operation in 24 thanas of East Pakistan (21 in Comilla District and three in other districts.) For the Third Plan a scheme

to extend this cooperative programme to 20 thanas was approved at a cost of Rs. 50.2 million. This work was to be completed by 1968-69, but has now been scheduled to be completed by 1972-73. For the Fourth Plan a scheme was prepared to cover the entire province (413 thanas) of East Pakistan under the Comilla type programme. The scheme has recently been approved by the Executive Committee of the National Economic Council at a cost of Rs. 470 million. However, in view of organizational, training and manpower problems the coverage has been restricted to 315 thanas of 16 districts.

PROJECT AREAS OF THE WPADC

The West Pakistan Agricultural Development Corporation has been providing a package of inputs and services in its project areas, i.e. the Ghulam Mohammad Barrage and Guddu Barrage. The Corporation is responsible for the integrated development of agriculture covering irrigation, land development, provision of inputs, colonization, agriculture, animal husbandry, cooperatives, fisheries and forestry. It would thus be noted that the scope of functions assigned to the WPADC in these project areas was far more comprehensive than the mere popularization of the Five Firsts. The achievements of the WPADC in these projects areas are:

ACHIEVEMENT IN GHULAM MOHAMMAD AND GUDDU BARRAGE AREAS, UP TO MARCH 1971

	Ghulam Mohammad Barrage	Guddu Barrage	Total
a) Irrigation Development (000 acres)	2,413	2,806	5,219
b) Land development (000 acres)	319	131	450
c) Colonization (000 acres)	1,310	433	1,743
d) Roads constructed (miles)			
i) Metalled	236	92	328
ii) Unmetalled	223	29	252
e) Area brought under forests			
i) Irrigated plantations (acres)	14,186	6,708	20,894
ii) Roadside-canalside plantations (miles)	291	284	575
f) Fisheries development 1969-70			
i) Production (maunds)	38,250	31,162	69,412
ii) Income (000 rupees)	458	414	872
g) Cooperative societies organized	192	117	309
h) Farmers' extension service centres established	7	25	32

From the above it will be evident that the activities of the WPADC in the project areas encompass almost all facets of rural development. Through the farmers' extension service centres the use of the Five Firsts is advocated. Each centre has an attached farm of 100 acres for demonstration purposes and for on-the-job training of the farmers. The training programmes of the farmers cover the entire agricultural field, plant protection and other allied activities like maintenance of livestock, forestry and fisheries. Trainees are also given intensive training in cultural practices of different crops, plant protection measures, techniques of fertilizer application, soil reclamation and farm management.

The extension centres are also used as supply centres where all types of inputs required by the farmers are made available on a credit card system. The other services which are being provided are: 1) supply of fruit and forest plants, 2) water and soil testing facilities, 3) machinery for land development, 4) breeding of livestock and 5) mass vaccination against various animal diseases.

THE COOPERATIVE FARMING SCHEME, KHANEWAL

The Cooperative Farming Scheme was introduced in the Punjab in Multan District in 1948. The circumstances under which this scheme was formulated are quite different from those under which the Comilla programme was evolved. After the partition of the subcontinent in 1947 a large number of refugees migrated to West Pakistan. In order to rehabilitate the uprooted families in an organized manner so that they could make collective efforts in settling down with the minimum difficulties, this scheme was introduced. Compact blocks of 500 acres or more of state land were leased to the cooperative societies which allotted a unit of 12.5 acres of land to each member. The members of these cooperative societies were landless refugees and local tenants. The lease was initially for a period of five years and thereafter it was extended. One hundred and thirty-three societies were organized which acquired 140,000 acres of land out of which 120,000 acres have been allotted to 10,898 members. Twenty thousand acres account for roads, villages, pastures, irrigation channels, etc. The scheme was also envisaged to increase agricultural production by introducing improved methods of cultivation, providing credit and marketing facilities and supplementing canal irrigation by installing tubewells.

In 1961 it was decided to introduce partial mechanization in these societies. Individually, it was not possible for these societies to undertake mechanization. Consequently, in 1962 the farming societies federated into the Colony Cooperative Farming Union Limited, in Khanewal. Besides arranging all essential services like a supply of agricultural machinery, fuel, seed and fertilizers in bulk, the Union provides repair facilities for tractors and other agricultural machinery purchased by the societies. The Union has set up a full-fledged tractor repairing workshop at Vehari and two field repair shops at Khanewal and Chak 109/WB.

The Union also assists in arranging joint marketing of agricultural produce. On an average, joint marketing brings one to three rupees per maund more on cotton and wheat, the two main crops of the area. Credit is provided by the societies free of interest to members. The societies have also set up 201 tubewells in order to supplement canal irrigation supplies as a result of which the water supply is estimated to have increased by about 30 percent. Intensity of cultivation has increased to 120 percent as compared to 86 percent in the adjoining areas. The achievements of the Cooperative Farming Scheme during the last two plan periods are given below:

ACHIEVEMENTS

	Second Plan 1960-65	Third Plan 1965-70	Total
1) Tractors purchased	100	45	145
2) Area under partial mechanization	40,000	62,109	102,109
3) Number of societies mechanized	68	28	96
4) Number of tubewells installed	116	85	201
5) Improved seed used (maunds)	na *	na	15,745
6) Fertilizer sold by Cooperative (bags)	501,383	223,587	724,970
7) Insecticides used (lbs.)	1,890	4,020	5,910
8) Godowns constructed	na	na	96
9) Training of operators and mechanics from among the members	na	na	118
10) Training of farmers' sons as farm managers	na	na	80
11) Credit applied (million rupees)	1.30	1.44	2.74
12) Joint marketing (maunds)	97,248	99,172	196,420
13) Increase in production (percent)			
wheat	na	na	122
cotton	na	na	72
14) Intensity of cultivation (percent)	na	na	120

* Not available.

It is evident that the farmers in the cooperative farming area enjoy facilities which are not ordinarily available to small farmers of other villages. The societies have been responsible for introducing progressive and efficient farming in the villages by providing most of the off-the-farm inputs and services. The societies have helped in improving the irrigation system and the means of communications and transport by constructing new roads. The societies have also helped in the development of community facilities, e.g. schools, dispensaries, and adult education centres. The net result is that agricultural production in the cooperative societies, and therefore the income of the members, has increased significantly.

The Khanewal cooperatives are currently under evaluation by a high level government committee. The main objective is to assess the achievements and benefits of this experiment for integrated rural development and to determine whether it is possible to apply it to other areas of West Pakistan.

Weak Links in the Package Programme

It will be noted from the above discussion that a package of most of the modern inputs and services has been brought within easy access of the farmers. The weakest elements in this package appear to be: a) the lack of short and medium-term credit and b) marketing.

CREDIT

A successful credit system must ensure that the credit is put to productive use and is not utilized for consumption purposes or for discharging social obligations. More precisely, credit institutions should endeavour to spread technological advances, particularly among farmers on small and medium - size farms. A reference has already been made to the results of the fertilizer survey conducted in the three districts of the Punjab which reveal that the absence of credit was a major constraint in the greater use of fertilizer by the farmers. The table below gives the results of the survey according to the size of the holdings of the farmers:

Size of holding (acres)	Percentage of all farmers not buying any fertilizers because of credit constraint	Fertilizer-using farmers buying less fertilizer than they wanted because of credit constraint as a percentage of all farmers	Total
Up to 12.5	14	61	75
12.5 - 25	4	55	59
25 - 50	3	64	67
More than 50	2	37	39
All sizes	10	59	69

This table reveals that the smaller the holdings the greater is the constraining influence of lack of credit. This underlines the importance of building up credit institutions in Pakistan to help the farming community, the majority of whom are small and medium - size land holders. It is not necessary that loans should be provided at soft interest rates as otherwise there would be every likelihood of their misuse. A good agricultural credit system should also tend to obtain funds by mobilizing rural savings. This would eliminate reliance on government revenue as a source of agricultural credit.

At present the credit requirements of the farmers are mostly by middlemen who sell inputs on credit and then market or process their produce. This system works to the extreme detriment of the farmers who have to pay exorbitant rates of interest and are forced to contract before the harvest the sale of their produce. It is not difficult to understand why the average farmer still persists in going to the middleman for his credit requirements. The loan can be obtained immediately and without any formalities. If institutional facilities are to be established so as to free the farmers from the clutches of the middleman, somewhat similar facilities will have to be provided by the credit institutions.

It may, therefore, be concluded that if institutions for providing short-term and medium-term credit to the farmers are evolved, the weakest element in the package of service to the farmers will have been overcome. A good agricultural credit system would promote the use of modern agricultural inputs and services by the farmers and thereby bring about a far more rapid advance in agricultural production than had been experienced during the last few years.

MARKETING

A farmer's economic well-being is as much dependent on what value he obtains for the surplus produce that he markets as on the total produce that he obtains from

his land. In a free market situation the prices of agricultural commodities are determined by the forces of supply and demand over which he has absolutely no control. The result is that prices of commodities are very low immediately after the harvest and increase gradually till they touch a peak just before the new harvest. The average farmer has little staying power and cannot wait till prices have reached a reasonable level. Even if he is willing to wait till better prices can be obtained, he is handicapped on account of lack of storage and credit facilities, and the means of transport and communications. Legal enactments have been promulgated in both wings of Pakistan in order to regulate the function of markets of agricultural commodities so as to ensure a fair return to the growers. Unfortunately, the functioning of the market committees set up under these enactments has not been very satisfactory. Their membership is dominated by big landlords or nongrowers who are little interested in the welfare of the general cultivator.

The problem of marketing to ensure fair returns to the growers is engaging the attention of the Government. Cooperative societies are being encouraged to undertake joint marketing. The Government is providing a subsidy to them to enable them to construct their own storage godowns. Support-procurement prices of major crops like wheat, jute, rice and sugarcane have been fixed by the Government. However, a lot still remains to be done. In order to ensure a fair return to the growers, it is necessary that their staying power should be increased. This can only be done through the provision of adequate short-term credit facilities and the construction of storage accommodations. Cooperative marketing of produce will have to be encouraged further.

Conclusions

In order to promote rapid agricultural growth all efforts have been made by the Government to provide the farmers with modern agricultural inputs and services. This package of services that is now available to the farmers has never been officially designated as such, though in practice these services have been provided in that form. There was complete coordination of government actions and policies at the highest possible level with regard to the provision of inputs and services to the farmers. The Government has not only ensured availability of these elements but has made considerable efforts to promote and popularize their use.

Plans are currently being prepared to demonstrate the proper application of advanced techniques of production and use of modern inputs and services through the integrated rural development of particular areas. The West Pakistan Agricultural Development Corporation is planning to undertake the integrated development of a project area in each province of West Pakistan, which would include the supply of inputs, supervised credit, farm mechanization, production planning, farmer training, storage, transportation and marketing. A noteworthy aspect of these plans is that the Corporation would be implementing them with the active assistance of the private sector. Somewhat similar projects will also be implemented through the cooperative movement.

Despite the "Green Revolution," West Pakistan still has a great potential for increasing agricultural production. Our yields per acre of various crops are still far below the yields obtained in advanced agricultural economies. West Pakistan has a well established irrigation system, and climatic conditions are ideal for agriculture. With better services and facilities to the farmers West Pakistan can achieve an agricultural revolution of a far greater magnitude than has ever been experienced anywhere in the world.

PLANNING FOR THE CONSERVATION OF IRAN'S NATURAL RESOURCES

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In 1964 the forests and forest lands as well as rangelands, and the natural groves of the country were declared national property. This was the second article of the White Revolution which received the approval of the people.

In 1967 the Ministry of Natural Resources was estabished according to which forestry and range management activities were transferred from the Ministry of Agriculture to the newly formed Ministry of Natural Resources. Consequently the Ministry of Natural Resources became responsible for the protection, conservation and utilization of the natural resources of the country.

Generally speaking, the Ministry's policy in the field of forestry development is basically founded on two principles:

1) Systematic exploitation of forests along the Caspian Sea based on appropriate management plans and with due regard to their capacity in order to ensure a systematic and sustained yield, coordinated with forest protection, conservation and regeneration activities.

2) Protection, conservation and regeneration of forests in other areas of the country in order to benefit by their positive infuence on the climate and in order to increase humidity, surface and underground water resources, as well as to enhance water and soil protection, and to create game reserves and recreational parks and finally, so as to exploit in the best way possible the byproducts of the forests.

Iran's forests cover an area of approximately 18 million hectares of which 3,400,000 hectares are situated along the Caspian Sea. These forests are the most productive as well as the most valuable of Iran's forest cover. Of this area, 1,400,000 hectares are commercially exploitable and the species are mainly constituted by Quercus castaneifolia, Fagus orientalis and Acer insigne.

The remaining 14,600,000 hectares are spread on the Zagros Range and in the Fars and Kerman Provinces as well as along the Persian Gulf and the Omman Sea and finally in the central desert zone. These forests comprise Quercus spp. and wild Pistacia.

The main benefits from forests are essentially twofold, on the one hand wood, and on the other various physical and social effects frequently termed "forest influ-

ence." In many instances the latter transcends in importance the significance of forests as producers of wood. Indeed, over much of the earth's surface forests and associated vegetation are the protecting covers which secure the maximum absorption of rainfall, regular streamflow, and help prevent flooding and silting. Thus they improve the efficiency with which water resources are used for almost all of man's activities, irrigation, domestic water supplies, industry, and hydroelectric works, to mention but a few.

However, though this forest influence indirectly reflects itself in all man's environmental activities it has no direct effect until proper forest utilization is begun, that is to say a forestry plan put into operation which uses all modern technical, economical and sylvicultural achievements, with the main characteristic being inventory, mapping road network, construction, and balanced sorting for full utilization of the growing stock. At this particular juncture the impact of forestry development on industrial development becomes effective, and as a chain reaction to forestry development proper industrial activities begin.

The trouble is that while almost everyone accepts at least in theory the indispensable role of the forest in all the connections I have mentioned, yet governments, economists and planners conveniently forget about it and assign to forest investment a far lower priority than it deserves, because foresters have not yet succeeded completely in measuring the value of this influence in monetary terms. The FAO's Mediterranean Development Project studies produced many catastrophic consequences which threaten a large number of countries as a result of inadequate provision of funds and priorities for the restoration and maintenance of adequate forest cover for its utilization and protective purposes.

On the other hand, planners and economists often tend to give a low priority to forest development, because they believe that trees must always take 100 years to grow and are low yielding, long-term investments. They overlook the fact that quick growing plantations can reduce the growth cycle to 10 to 20 years, especially for the supply of pulpwood and fuelwood, and they fail to appreciate that forest development usually starts with natural forests which, unlike agricultural crops, do not have to be grown, but only need to be made accessible, put under management and cut.

In consequence of what has been stated, we are thus led to the conclusion that for a number of well known reasons forests, especially in developing countries, are not progressing at the rate which appears desirable and even needed. Unless this situation is changed and the tempo of forest and forest industry development greatly stepped up, we are bound to experience three equally serious difficulties in our development process. These are: first, that inadequate supplies of paper, building timber and other forest products will act as a real bottleneck in achieving a better standard of living and raising national incomes; second, that even the artificially reduced amounts of paper, timber, and so on, which still have to be imported will act as an increasingly serious drain on currency reserves which should be directed instead to the purchase of capital goods; this consequently leads to a balance-of-payments problem.

The third difficulty which may confront us and disrupt our development process is that this somewhat artificial shortage of forest products will lead invariably to overexploitation and destruction of accessible forests. Therefore there is no doubt that with the gain of momentum in industrialization, the impact on forest utilization will be forcefully noticed. On the other hand, the result of a lack of coordination between forestry development and industrial development in general would be

either slowing up the industrial development activities due to a shortage of wood products or its greater dependance on importation of steel material for construction activities, etc. or, as described, over exploitation of forests.

Consequently one thing of paramount importance stands out: economic planning, for it is in planning that the interrelation between forestry development and other economic sectors, and in particular its impact on industrial development, and the balance of payments can be felt. If I may, I would like to put it in other terms; as most of the forest influence cannot be valued in monetary terms, it is only through the industrial development of forests and wood utilization that extremely high investment for infrastructure development such as road building and management plans can be justified.

It is the magnitude of this impact which has led Iran's Ministry of Natural Resources to plan and implement an integrated forest industry development, with the hope that the implementation of wood-based industries and the opening up of northern forests would act as a good catalyst in inducing private entrepreneurs to look with more interest into this sector of the economy. Naturally planning poses more problems in forestry, and especially in large forest areas like Iran with a stretch of approximately 1,000 km. than in most activities owing to the long life span of trees, geographical extent and uncertainties of nature and the market.

The Iranian forests were nationalized in 1964 as part of the White Revolution programme. Careless exploitation was stopped and forest management expanded. The main task of the Ministry in this field was to make a detailed feasibility study of the northern forests with the intention of planning and implementing integrated forest industry projects. Detailed studies were undertaken in selecting the type and size of industries, which took into consideration market needs, particularly in the field of housing and general construction with the emphasis on consumption of paper and its increase in educational and illiteracy programmes of the country.

Basic reasons for the integrated industries are the following: better utilization of raw materials and residue, saving in capital and labour, improvement in the quality of products and diversification of production programmes; for example, it is a prerequisite of a pulp mill's operation that a continuous flow of raw material to the mill be secured on economic terms, while hardly any large size sawmill would be economical without the utilization of residue in the manufacture of pulp and paper.

Fuller utilization of the forest resources results in lower costs of forest development investment and logging per unit of wood removed. Therefore, planning of integrated forestry and forest industries is justified not only in the exploitation of the existing natural forests, but has also a decisive influence on the management of forest plantations.

Savings in capital and labour through integration may be accomplished by reduced working capital tied up in raw materials and by reduced fixed investment in equipment and buildings.

Product improvement through integration may be brought about by adding auxiliary production facilities (for example, adding a veneer plant to a furniture plant which requires veneer for the final product). Diversification is a safeguard against the market fluctuations. Most of the forest products, besides pulp and paper, are intermediate goods and are affected by the short-term market fluctuation if not enough diversification exists. However, integration must be restricted to main products having a long-term future market, because changes in the technology may cause serious troubles in plants which are a link in an integrated industrial complex.

The Caspian forests of Iran cover a total area of 3,400,000 hectares, which as a matter of interest for comparison, is equal to the whole of forests in Austria, which has the third largest forest cover in Europe. Of the 3,400,000 hectares, 1,180,000 hectares are suitable commercial forests with a standing volume of 284,000,000 cubic meters, which can be used in industry.

The standing value of these commercial forests, as raw material, is more than $6 billion and if we assume a minimum annual growth of 2 cubic meters per hectare, it would have an annual yield of 2,800,000 cubic meters of different kinds of wood of a value of $ 72 million. It should be stated that with development of well organized management plans for forests the yield of 2 cubic meters per hectare can be increased to 8 cubic meters per hectare. Taking into consideration the fact that in the wood industry added-value is as high as 700 percent in a simple processing of raw material into plywood, which still is an intermediate product, the income value of forest development and its effect on the overall economy of the country can be visualized.

The entire Caspian forest area geographically has been divided into two influx areas for the implementation of the integrated forest industry programme. These are the Rasht and Sari influx areas, with Chalus on the border between them.

The Rasht influx area comprises of the northwestern forests, which are more developed and are more accessible. The area of this influx is about 497,500 hectares with a sustained assortment increment of over one million cubic meters per annum.

With the stated assortment of yield in this area, it would eventually be possible to set up a pulp and paper mill of the capacity of 200,000 tons per year as the main unit of an integrated forest industry of this influx. Realization of this project in particular would greatly aid our balance of payments, as in 1968 we had to import over 114,000 tons of a variety of pulp and paper goods in the value of over $36 million. A better assortment of this influx will be fed into existing private plywood, fiberboard and chipboard factories and also future industries.

At present, for further utilization of this influx, a paper and pulp factory with a capacity of 150,000 tons per annum is envisaged. Preinvestment studies have been completed, and it is hoped that construction will commence within a year. Also a new plywood and veneer factory with an impregnation plant for improving the standard of wood is foreseen for this area. In order to make better use of government saw mill residue in this influx area, with the cooperation of the Bulgarian Ministry of Forestry and Forest Industries, a dry wood distilling plant producing active carbon, acid acetic, formaline acetone and inhibitor will be established.

For realization of the first phase of integrated forest industry for this influx area approximately half of the commercial forests--about 232,000 hectares--will have to go under management plans, and 3,000 km. of forest roads built over a period of 10 years.

This first phase of forest industry development will not only provide wood for the 150,000-ton pulp and paper factory, but will also annually provide a 377,000-cubic meter assortment of wood with a raw material value of $10 million per annum.

The Sari influx area, which is in the northeastern part of the country, comprises of 682,500 hectares of broad leaved forests with approximately a 1,344,000-cubic meter increment per year.

At present an industrial complex with the cooperation of financial and technical assistance of the Romanian Government is envisaged for this area. This complex would utilize 250,000 cubic meters of wood for the following productions:

1) Sawmill and prefabs with a yearly capacity of 93,000 sawn timber 5,000-cubic meter packages, and chests and parcels of 1,490 cubic meters
2) A plywood and veneer factory with a yearly capacity of 12,000 cubic meters of plywood and 4,000,000 square meters of decorative veneer
3) A chipboard plant which would produce 18,000 tons per year
4) A furniture and wood working factory with a yearly output of 5,000 standard furniture sets, 200,000 pieces of bentwood chairs and 85,000 square meters of doors, windows and panels. The implementation of this project has begun and the complex will start production next year.

Implementation of only three of the planned projects, that is to say, the pulp and paper mill, the distilling plant and the wood complex, would bring in an annual income of U.S. $40 million and employ over 12,000 workers in forest and industry activities.

I should like to emphatically state here that in planning and implementing our integrated forest industry development the role of existing private industries and their future development has been taken into consideration.

RANGELAND

A detailed, authoritative statement describing Iran's range situation in qualitative terms is quite impossible. The total range area that is regularly grazed by livestock, for example, is a basic statistic, but there is no agreement as to its magnitude among those who have studied the problem. In any event, it is generally estimated that native range area covers 40 million hectares, and that, in addition, there are 12 million hectares of forest grazing land, making a total of 52 million hectares of natural grazing land in the country.

About 88 percent of the total feed requirements of all the country's livestock is provided by natural forage. The severe overgrazing and devastation has been pointed out by every range expert, foreign or Iranian. Research has failed to locate a single range that can be classified as in better than fair condition. It has been estimated that range animals total 65 million sheep units and that the carrying capacity of the usable range amounts to about 5 million sheep units. The grazing load thus appears to be 12 times the grazing capacity.

In addition to excessive livestock numbers and overgrazing, the ranges have suffered from other destructive management practices. Most ranges are grazed too early in the spring before the forage plants have had a chance of build up food reserves. The studies of the problem of grazing range management resulted in the conclusion that the successful undertaking of programmes of grazing control and restoration on Iran's rangelands without complete disruption of her livestock industry can only be accomplished if there are greatly increased supplies of other sources of nutrition for the animals. To accomplish this, the area now under forage and fodder crops must be doubled to something over 300,000 hectares in the next few years.

In order to expedite this programme a Fund for Fodder Range Improvement has been created under the Ministry of Natural Resources to give loans and seed for the cultivation of fodder crops. The programme and development plan that have been prepared and are under implementation follow:

1) Range Improvement Programme

This programme is basically for protection, reseeding, interseeding and fencing.

2) Range Management

This programme is being carried out in stages. After some experience and study, it was realized that due to social reasons it was difficult to prepare a complete technical management plan for the rangeland of the country. Consequently, we shall have a transitory range management programme.

3) Primary Range Management

At this stage, which will take two years, all of the grazing permits issued for the rangeland of the country will include a map of the rangeland. By the end of this year 20 percent of this programme will be completed.

4) Secondary Range Management Plan

This programme will take five years, during which results of the research stations will be completed. Area photography will be carried out and the previously issued permits corrected.

5) Advanced Management Plan

Cooperatives will be established, and the management plan will be highly technical and advanced.

AFFORESTATION AND PARKS

The programmes of afforestation and seedling growth have been drawn up and executed, having in view climatic conditions, rain fall in the north and other parts of the country in order to achieve various objects which might differ in different regions. In regions except in the north, the aim of afforestation has been the creation of a green belt, parks and public recreation around the towns and encouragement of plantation of noncommercial forests. In northern regions the aim has been the introduction of various softwoods in general and coniferous spp. in particular. For materialization of the above objects and in order to meet the possible requirements of the paper mill, various coniferous seeds have been imported into Iran from Europe and the U.S.A. and distributed among nurseries mainly in the north. The seedlings then have been transferred to afforestation and reafforestation centers. During the past five years over 2,000 hectares annually have been afforested. This programme will continue with greater momentum during the Fifth Development Plan, when in addition to the creation of parks and green belts around towns 23,000 hectares of land in the Caspian region will be afforested with poplar and coniferous species for the production of pulp.

SOIL CONSERVATION

Soil conservation programmes have been carried out under two distinguished projects :

1) Sand dunes fixation in all desert areas
2) Mulch.

SAND DUNES FIXATION

The sand dunes fixation project initiated some years ago on a pilot basis has been extensively followed since then. Storms of sand endanger the lives of the people and destroy thousands of hectares of cultivated lands, gardens and farms and create sand hills around villages. In certain areas such artificial hills close up railways and roads and cut off communication lines. In certain regions such as Sabzevar, Kashan and Yazd, storms of sand suddenly appear as a most dangerous calamity and with a thickness which darkens the sunlight to an extent that a lamp or light is put on.

Due to the effective measures which have been taken during the past five to six years 200,000 hectares of threatened areas in the northern Khorasan Province have come under management in such a way that grazing is prohibited, bush cutting stopped and the introduction of various types of vegetation for afforestation and reafforestation of the area practiced. To minimize wind velocity and eventually to prevent movement of sand dunes, hundreds of kilometers of windbreak belts have been established and about 10,000 hectares planted. The planted spp. are native ones suitable for the local topographical and climatical conditions.

The results of the execution of the above mentioned project have been met with great success and have received the approval and encouragement of Iranian and international scientific and technical authorities.

In certain areas like Abardezh, Bafgh and Zarand, where the storms of sand used to threaten the railway and road network and cause heavy damage to the Railway Department and the National Iranian Steel Corporation, various native spp. resistant to salt desert areas have been planted with excellent results.

MULCH

Bitremen mulch has proved to be another effective means of stopping sand movement quickly. About 3,000 hectares in the western and southern parts of Iran have been treated. The major difficulty lies in maintaining sufficient operating equipment to enable large areas to be treated. Because treatment of this kind in Iran is only one and a half years old, it is too early to state how long this treatment will remain effective.

Native plant species will emerge through mulch but young newly emerged plants are killed if covered by the mulch, so the timing of the mulch operation is critical. The Natural Resources Research Centre of the Ministry is making a detailed study and analysis of this new programme.

For ensurance of a sufficient water supply for irrigation and power for industrial development and general consumption, in recent years 13 dams have been built in the country. These dams now play a most important role in development projects and have a great share in the betterment of the country's economy. Rivers and streams directed to the lakes of these dams carry washed soils, sands and gravels and eventually cause mud sedimentation, which will be much stronger during snowfall, rain, shower and flood and will still be more violent when overgrazing and human interference are practiced. The washed away articles make a thick sediment in the dam lakes, as a result of which, the electricity production due to the decrease of water level and lack of necessary pressure would fall and the life span of the lake decrease. For instance, an estimate shows that 70 million tons of sediment are directed into Shahbanou Farah Dam every year and if safety precautions are not taken the age of the lake will be reduced considerably.

Fortunately certain effective measures for conservation of soil in watershed regions in Shahbanou Farah (Sefid-Rud) and Amir Kabir (Karaj) Dams have been taken.

At present watershed management programmes are being carried out in three large dams of the country, and eventually will be carried out for all the dams. This particular programme has received great attention from His Imperial Majesty and this year's development budget has been increased to twice that of last year. The initial programme for implementation of this project has been to find and select the dangerous areas of the watershed of rivers running into the dams from the point of grazing and to start reafforestation and eventually declare the selected areas as "Reserved Areas."

As the second step and in order to minimize the water speed on slopes and to prevent soil erosion the following are practiced :

1) Construction of banquettes and terraces
2) Creation of flood prevention bunds and earth dams
3) Plantation and reseeding wherever suitable
4) Improvement of farming methods, change of the kind of cultivation practiced and purchase of those areas where reafforestation and protection measures should take place.

ON-FARM WATER DEVELOPMENT AND SOIL CONSERVATION

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General Information

The Water and Soil Conservation Service (TOPRAKSU) was established in 1960 according to Law No.7457 for solving soil and water conservation problems in Turkey.

The functions of the General Directorate of TOPRAKSU can be summarized as follows :

a) To stop erosion in the areas suitable for agriculture, to prevent the damages of the flood waters, to preserve the water in the soil and to maintain the productivity of the soils

b) To render suitable for agriculture the wild olive groves, the carob yards, the orchards of mastic trees, the heaths,, the maquis lands, the natural pasturages, the rocky, acidulous and alkaline lands of turbaries and drained areas which are under the power of disposition or the private property of the state

c) To secure the realization of the services related to the use of water for agriculture in irrigated farming areas such as land leveling, on-field irrigation and drainage

d) To build the necessary structure on waters where the need for irrigation water is up to 500 liters per second, to supply, improve and expand the present installations and to maintain their operation

e) To classify the soils, to prepare soil maps and to make the necessary surveys and soil analyses related to productivity, irrigation, drainage, land clearing, improvement, land consolidation and use capability

f) To conduct the necessary experiments and research related to soil conservation, maintenance of soil productivity, land improvement and farm irrigation; to provide training and technical aid, and to carry out demonstrative practices

g) To implement the land consolidation work as required by the regulations under conditions imposed by the soil conservation and farm irrigation techniques

h) To establish districts, associations and operational units with revolving funds, and if necessary, with a juritical character, for the performance of the services such as farm irrigation, soil conservation and land improvement.

The General Directorate of TOPRAKSU includes 18 regional directorates, 62 work unit chief engineering positions, three training centers, two research institutions, one Directorate of Cartography, and one Directorate of Machinery Supply.

Up to 1970 TOPRAKSU, made soil surveys over an area of 11,784,041 hectares as well as 15,899 irrigation, drainage and soil conservation surveys.

The aim of these soil surveys was to secure the proper use of our soils according to their capacities, to make an inventory of the lands and to map the irrigable lands, pasture areas, forest areas, grasslands, swamps and improperly drained areas.

On the other hand, soil surveys are helping to determine the natural productivity of soils and the fertilizer types and amounts to be applied.

In addition to soil surveys, surveys are made on other subjects such as small watershed management, irrigation, drainage and soil conservation.

Soil analysis laboratories have been established within the TOPRAKSU regional centers to make the necessary soil, water and plant analyses related to the services such as maintaining and increasing the soil productivity, soil and water conservation, farm irrigation and land improvement. These laboratories supply the farmer with knowledge on fertilization and irrigation and also carry out field and greenhouse experiments. In these laboratories 421,919 soil analyses and 28,311 water analyses have been made.

Investments

SMALL WATERSHED WORKS

The development of small watershed resources includes the construction of installations such as dams, galleries, tunnels, aqueducts, siphons, culverts, reservoirs, ponds, wells and pumps of which the discharge is less than 500 liters per second.

The aim of small watershed works is to develop the small surface water resources and the underground water resources and to irrigate the lands near big surface water resources by partial diversion and pumping until the irrigation installations of high capacity are constructed.

The development of small watershed resources provides irrigation facilities for farmers who live in upper watersheds and have a limited income and also prevents unemployment and migration from villages to cities by securing the realization of agricultural and economic development.

To summarize, up to 1970, there have been 2,699 watershed projects constructed, covering 208,524 hectares with 286,060 farmer families benefiting.

ON-FIELD IRRIGATION DEVELOPMENT WORKS

On-field irrigation development works including land leveling, on-field drainage, irrigation and water control systems, and land preparation for irrigation, are carried out to increase yield per unit area to the optimum level on arable lands under the DSI and TOPRAKSU constructed irrigation systems.

On-field irrigation development works are stimulated by two special projects: the Lower Seyhan Project and the Gediz Project.

The works under these projects include the construction of efficient irrigation systems, surface drainage, checking the groundwater table, saline land improvement, deep drainage, land consolidation, land leveling, tile drainage, and further, providing the farmers with technical assistance and training in these fields of work.

Two hundred and seventy-two on-farm development works have been completed and continue over an area of 257,241 hectares with 80,833 farmer families benefiting from those projects.

DRAINAGE AND ARID LAND IMPROVEMENT WORKS

Drainage and land improvement constitute an important part of the TOPRAKSU activities. The high groundwater table due to improper irrigation methods and natural conditions is decreased, and saline and alkaline soils which are formed due to improper drainage are improved by leaching and chemical soil amendments.

Approximately 3,243,500 hectares in Turkey require drainage and land improvement.

Menemen, Tarsus, Adana and Cumra plains, the most productive areas in Turkey, decreased in fertility due to improper drainage facilities, thus justifying drainage on arable lands.

In this work TOPRAKSU completed 185 projects over 66,843 hectares with 33,674 farmer families benefiting.

SOIL CONSERVATION AND WATERSHED DEVELOPMENT WORKS

Soil conservation measures are taken to control water and wind erosion, to prevent the damage of flood waters, to hold water in the soil, and to maintain soil fertility on arable lands.

The TOPRAKSU General Directorate, under various soil conservation programs, has taken measures to prevent erosion, has established orchards, undertaken pasture, soil and watershed improvement works, and has constructed ponds and reservoirs.

Wind erosion is a problem of great importance in Central Anatolia, especially in Karapınar town of Konya Province. The problem area, at a distance of 100 km. from Konya, has an annual average rainfall of 250 mm. The dominant wind direc-

tion is from south to north and north to south, and the wind velocity sometimes reaches 120 km. per hour. In the Karapınar area, which is erodible in view of climatic and soil properties, approximately 1,030,000 hectares are affected by wind erosion of varying severity.

The number of projects completed is 509, covering 144,020 hectares with 88,071 farmer families benefiting.

CREDITS AND COOPERATIVES

The supervised agricultural credit system aims at supporting farmer investments for the development, conservation, improvement and maintenance of soil and water resources.

Irrigation efficiency is low in our irrigated areas at present. Efficiency of irrigation and investments made by the Government for irrigation development can be increased by farmer cost-sharing in TOPRAKSU farm planning works. Farmers' cost-sharing would be realized by giving them medium and short-term credits through which an increased yield and standard of living can be attained.

The supervised TOPRAKSU credits supplied from the yearly budgeted allocations on account of the Agricultural Bank funds, stimulates individual investment which supplements public investments for reaching the maximum agricultural productivity, an aim that can be reached by the efficent means of projected and supervised credits.

SOIL AND WATER COOPERATIVES

Farm irrigation, soil conservation and land improvement cooperatives with limited responsibility (soil and water cooperatives) are being established, based on the general provisions of Turkish Commercial Law No. 6762 and additional provisions of Cooperatives Law No. 1163.

Objectives of the soil and water cooperatives are:

1) To construct farm irrigation systems such as head ditches, on-farm irrigation and drainage canals with regard to the use of water to be supplied from the formerly constructed systems to serve the development of surface and groundwater resources

2) To consolidate lands where the soil conservation and farm irrigation procedure requires land consolidation, by making use of the TOPRAKSU technical assistance

3) To conserve soil and soil productivity and, where necessary, improve lands

4) To provide the members of cooperatives with the necessary knowledge on TOPRAKSU fields of activity

5) To supply machinery and equipment necessary for crop production

6) To take measures such as joint surety for enabling the small farmers to benefit efficiently from the TOPRAKSU loans

7) To provide farmer cost-sharing to the TOPRAKSU investments.

PROJECTED TECHNICAL ASSISTANCE

The projected technical assistance aims at accelerating nationwide development by directing the work and financial power of both the farmer and farmer groups to the implementation of works under the planning of soil and water resources.

The projected technical assistance by TOPRAKSU is generally grouped in three parts:

1) Technical assistance projects covering individual farmers, districts and associations

2) Designing plans and projects for the part of agricultural cooperatives credits, for which the TOPRAKSU is responsible, supplied to farm planning under the protocol signed with the Agricultural Bank

3) Study and approval of the TOPRAKSU projects implemented under the Fund for Promotion of Village Enterprises.

TRAINING ACTIVITIES

The aim of the training activities is to develop the knowledge, skill and experience of newly employed professional and subprofessional personnel and provide them with improved techniques; to train the farmers in improved farming methods so that the TOPRAKSU activities are realized more efficiently.

Training activities form an important part of the general management program of the TOPRAKSU General Directorate, and principally can be grouped in two parts:

1) Training of professionals (on-the-job training)

   a) basic training
   b) improvement training

2) Farmer training

   a) training of irrigation and soil conservation foremen
   b) training of farmers in farmer training camps
   c) training of staff of soil and water cooperatives
   d) farmer training by demonstrations.

Twenty to thirty professionals participate in training programs in foreign countries for 6 to 12 months each year. An average of 40 professionals are sent to foreign countries to attend short-term seminars and courses each year. The trainning period in foreign countries is shorter in the case of academic programs.

Extension Service in Lower Seyhan Project 1967-70

This part of the paper deals especially with the Extension Service of the Lower Seyhan Project as one of the main features of farm development activities.

The overall area of the Stage I project comprises 65,000 hectares of which 56,093 hectares are under cultivation.

Cotton was the main crop, accounting for more than 75 percent of the whole cultivated area.

In the last four years the cotton yield reached 353 kg./per decare from 173 kg./per decare and net income reached 508 TL/per decare from 37 TL/per decare, and in the commencement year (1967) the service began to work in 23 villages but today this number is 61 with 2,300 cooperator farm families.

For this service, 5 million TL has been spent to date, and 15 specialists and 54 foremen are working with the coordination committee of the State Planning Organization, the Extension Service, TOPRAKSU, DSI, the Farmers' Organization, the Plant Protection Institute, the Research Station and the Livestock Station in the Lower Seyhan Project.

ABSTRACTS

The extension work, accomplished according to the Emergency Program in 1967, brought an average yield increase to the participating farmers.

The goal was to teach them how to get higher profits not only from bigger yields but also how to lower production expenses, especially in plant protection.

In order to achieve this goal, intensive extension work had to be directed toward teaching modern agricultural techniques.

The agricultural potential of the Seyhan Plain is excellent. The region has a year-round growing season, good topography, a plentiful supply of agricultural labor and capable farmers who have achieved a great deal by themselves. The farmers have shown that they can adapt to modern agricultural techniques.

The main objective of the Extension Service work plan is to provide the framework for bringing new methods and ideas to the farmers, and thereby to evolve an agricultural industry in the Adana Plain which will be the most advanced in Turkey. In view of last year's experience, these objectives are within reach of the people, and we believe that the objectives will be achieved.

The program is concentrating on two main levels:

1) Agriculture, including all field crops, horticulture, and livestock as well as auxiliary branches of irrigation, plant protection and farm machinery.

2) Agricultural economics, including farm economics, analysis of crops and practices, evaluation of new crops and farm enterprises from the economic point of view, and assistance in agricultural marketing.

ORGANIZATION

The main basis of the organization in the Extension Service is the coordination and cooperation working at the farmer's level. In 1967 the program was fulfilled through the use of all resources at the Adana and Ankara levels. At the

beginning, the service had one director, one expatriate cotton specialist, four cotton, irrigation, plant protection and cotton research specialists and 23 instructors (foremen) in 25 villages with 20 participating farmers from each village.

Cooperative official and unofficial officers were Regional Directors of the Agricultural Bank, the State Hydraulic Works, the Extension Service, the Farmers' Organization, the Plant Protection Institute, the Research Station, and TOPRAKSU.

In 1967 a proposed organizational chart was prepared for the 1967-72 period and today this organization is working on a 92,000-hectare area on the Lower Seyhan Project.

TABLE 1

LOWER SEYHAN PROJECT FIVE-YEAR EXTENSION PROGRAM

Position	Number of Personnel According to Year and Estimate of Irrigated Area				
	1968 50,000 Ha.	1969 64,000 Ha.	1970 68,000 Ha.	1971 92,000 Ha.	1972 100,000 Ha.
Director	1	1	1	1	1
Assistant Director	-	-	1	1	1
Cotton and cereals specialists	2	3	3	3	3
Plan protection specialists	2	3	3	3	3
Irrigation specialists	2	3	3	3	3
Information specialists	1	1	1	1	1
Cotton research specialists	1	1	1	1	1
Livestock specialists	1	1	1	2	2
Fruit (citrus) specialists	-	1	1	1	1
Vegetable specialists	1	1	2	2	3
Forage crop specialists	-	1	1	1	1
Farm economics specialists	1	1	1	2	2
Farm machinery specialists	1	1	2	2	2
Expatriate specialists (Continuous)	1	1	1	1	1
Expatriate specialists (Short visits)	2	4	4	4	4
Foremen	43	50	50	50	50
Secretary	1	1	1	1	1
Drivers	6	7	8	10	10

GENERAL INFORMATION ABOUT TRAINING PROGRAM

INDIVIDUAL INSTRUCTION

Every foreman is engaged in direct instruction to 20 farmers in his village. These 20 farmers have been selected jointly by the instructor specialist and the village leader, with the agreement of the villagers.

The instructor divided the 20 farmers into five groups, four men per group, and specified on what day he would be visiting them, each in his own field.

The order of visits has been specified in advance for every week throughout the season, so that every farmer can expect the instructor's visit at the predetermined date.

In every village notices are issued listing the names of the farmers to be visited and the dates of the instructor's visit. All farmers from the village are invited to be present during the instructor's visit to one of the fields, and every farmer, according to his choice, is given an opportunity to obtain instruction in his neighbor's field even if is not his turn.

Every instructor determines a place and a time where he can be found every day at a certain hour, and the farmers interested can see him and ask questions concerning their work in the field, or even invite him for a special urgent visit to their fields.

SPECIALISTS' VISITS

Each specialist makes a fortnightly plan of visits to the villages to meet with the extension foremen. The extension foremen will form groups of three or four farmers who will be visited by the specialists at predetermined places as shown in the fortnightly plan of visits. The work plan should be so organized that each extension foreman will have a specialist visit his area each week at the very minimum.

GROUP INSTRUCTION

In each village, about three evening lectures have been given by the specialists during the growing season. Every farmer has the opportunity to visit a demonstration plot at least twice during the season. Every extension foreman provides regular group activities throughout the year.

MASS INSTRUCTION (COMMUNICATION)

Prior to the growing season, the specialists publish leaflets with simple instructions, listing the major problems involved for the coming season. These contain recommended schedules of operations and rates of chemical applications. Specialists give daily five or ten-minute instruction broadcasts for farmers.

TRAINING OF EXTENSION FOREMEN

Special stress is applied to the training of instructors so that they continuously receive additional agricultural knowledge. One full day a week is devoted to the training of instructors. The program is determined by the director and the

expatriate specialists assisted by the agronomist who is responsible for presenting the theoretical and practical material. One half of the day is taken up by theoretical studies and the other half by field demonstrations and inspections.

RECORDS TO BE KEPT

Every specialist and instructor keeps regular records of the program and implementation of his work as follows:

1) Daily work program
2) Follow-up work
3) Fortnightly review of conditions in the field.

Every specialist prepares two copies of a daily work program form for the following fortnight. One copy is submitted to the director eight days in advance, and he informs the instructors about the times and places of the scheduled visits. The programs of all the specialists are coordinated with the said daily work programs.

FIELD EXPERIMENTS AND OBSERVATIONS

Every instructor carries out at least one field experiment or a series of observations per season. These experiments are conducted according to the Research Station specialists' instructions and their results are recorded and analyzed in writing.

COURSES

Emphasis is given to inservice training of both foremen and specialists. The main objective of the courses is to provide them with new techniques and knowledge in their particular field of work. Courses are held for the farmers, especially the local farmer-leaders, in order to give them an opportunity to learn more intensively and thereby help disseminate modern agricultural techniques to their neighboring farmers.

Extension Activities of 1967-70

The main objective of the Seyhan Irrigation Project Extension Service Program for 1967 was to improve the standard of living of cotton growers by increasing their income. This was achieved in the first year of the program through the concerted efforts of TOPRAKSU, the Extension Service, the Research Institutes, the Plant Protection Institute and DSI. Specifically, cotton yields in the project area covered by the program (about 10,000 hectares) were increased from an average of 173 kilograms per decare in 1966 to an average of 220 kilograms per decare. In adjacent villages not covered by the Extension Service Program, the yields in 1967 were similar to those in the project area prior to the inception of the program, namely 173 kilograms per decare, on an average.

The cotton area under Extension Service supervision was 9,483 hectares in 1967. The net profit increased from 37 TL per decare to 92 TL per decare.

TABLE 2

AVERAGE COTTON YIELD IN VILLAGES COVERED BY EXTENSION PROGRAM

Location	Number of Cotton Growers	1966 Areas (Ha.)	1966 Yields (kg/dec.)	1967 Areas (Ha.)	1967 Yields (kg/dec.)
Tarsus Plain (17 villages)	328 Total	6,727 Total	182 Average	6,793 Total	216 Average
Yüregir Plain (6 villages)	96 Total	2,532 Total	151 Average	2,690 Total	230 Average
Extension Program Area (23 villages)	424 Total	9,259 Total	173 Average	9,483 Total	220 Average

The service had 23 foremen and four specialists and 521,711 TL ($34,000) was spent for this work.

The 1968 extension program was a direct continuation of the 1967 program.

The most important achievement of the first year's extension program was to establish farmer confidence in the validity of the extension foreman's advice and the reliability of his scheduled visits. Consequently in 1968 the foremen were able to expand their sphere of influence beyond the 20 cooperating farmers who received detailed weekly consultations in each village. The foremen's guidance was apparent throughout the villages. The impact of their efforts boosted the cotton yields of extension-served villages to well above the regional average for irrigated lands.

Again in 1968 cotton was the main crop in the project area, accounting for more than 85 percent of the cultivated lands. The extension program, consequently, was directed primarily to the needs of cotton farmers.

The area was composed of 22,966 hectares in 43 villages with 50 foremen and seven specialists.

The average yield reached 280 kg/per decare and the net profit was 190 TL per decare.

TABLE 3

1967-68 EXTENSION SERVICE COOPERATORS' AREA

	Number of Villages	Cooperators' Cotton Area (ha.)
Yüregir Plain		
1967	6	2,690
1968	25	14,684
Tarsus Plain		
1967	17	6,793
1968	18	8,281
Total		
1967	23	9,483
1968	43	22,965

TABLE 4

1968 EXTENSION SERVICE VILLAGES' CROP AREAS, TRACTORS AND FARM FAMILIES

	Total Area Decares	Cotton Percent	Wheat Percent	Other Percent	Cooperators' Cotton Decare	Cooperators' Area %	Tractors	Farm Families
Yüregir Plain	423,900	87	11	2	146,824	40	702	1,244
Tarsus Plain	267,000	84	8	8	82,814	37	423	1,244
Total 1968	690,900	86	10	4	229,638	38	1,125	2,488

If we compare the 1967-68 season by the cotton production: the area was 9,483 hectares in 1967, but increased to 22,965 hectares in 1968. The total cotton yield was 20,860 tons in 1967 and 64,442 tons in 1968 in the Extension Service's area.

In 1967 production costs covered 75 percent of gross income, which was 43.8 million TL at that time. Production costs were 32.7 million TL, but in 1968, production costs were 89.7 million TL and the gross income was 133.3 million TL. Production costs were 67 percent of gross income.

A dominant factor in the soccess of the 1968 season was the excellent cooperation among the participating government agencies.

The cotton yield (as an average of the villages in the project) for the first time passed the level of 300 kg. per decare, reaching 307 kg. per decare in full irrigation in 1969. It is interesting to see the distribution of yields according to levels. Fifty-six percent of all farmers and villages cultivating 64 percent of the sown area have reached a yield of 300 kg. per decare and above, and only 5.5 percent of the farmers in the total area belong to the lower group.

The Extension Service has extended its work by increasing the number of villages, farmers and cotton areas in 1969, and reached 254 percent while the cotton yields were increased within the last three years by 27 percent, 62 percent, and 77 percent accordingly,

In 1969, the staff of the Extension Service was composed of 53 foremen and 14 specialists.

The net profit was raised from 2,000 TL/Ha. to 2,180 TL/Ha.

In 1969 the Extension Service began to work with wheat, livestock, vineyards and vegetables. Also in 1969 the number of villages increased to 58 with 2,200 cooperating farmers. The cooperators' area was 32,267 hectares in 1969, 57.5 percent of the total Stage I area. In 1969 cotton was covering 24,309 hectares, 55.5 percent of the total Stage I area. (There were 56,093 hectares under cultivation in the Stage I area.)

The cotton yield was over 300 kg. per decare for the first time in 1969. Table 5 shows yield and percentage of the area, and the number of farmers and villages.

TABLE 5

DISTRIBUTION OF COTTON YIELD IN FULL IRRIGATION 1969

Yield Kg. per decare	Area Decares	Area Percent	Farmers Percent	Villages Percent
Less than 250	12,911	5.5	5.6	5.5
250-300	71,893	30.7	37.2	38.9
300-350	129,935	55.5	47.5	46.3
More than 350	19,509	8.3	9.7	9.3
Total	234,248			
Percent		100.0	100.0	100.0

Income rose and reached 157 million TL in this year.

By 1970 the staff of the Extension Service consisted of 54 foremen and 15 specialists in 61 villages.

That year cotton was the principal crop in the area covered by the Extension Service and the average yield was increased to 353 kg. per decare. At that time the Extension Service introduced certain new cultivation methods which have so far not been employed. They are:

1) Deep cultivation by subsoilers
2) Cultivation and drainage with ridges
3) Furrow irrigation to control the amount of water and its distribution in the field.

The total 1970 area in cotton was less than the area in 1969 (17,430 hectares). This reduction of cotton cultivation occurs everywhere in the whole project area. Farmers are realizing the importance of crop rotation as a means of soil sanitation. Also, farmers are interested in TOPRAKSU leveling their land and this is done on only noncultivated lands, and in summer and autumn months.

In 1970 production costs per decare were 445 TL, income was 953 TL per decare, and net profit was 508 TL per decare.

Next year's efforts will not initially be limited to cotton growing.

Assistance is given on a large number of subjects including field crops, vegetables, citrus fruits, vineyards, livestock, and agricultural practices.

EMPLOYMENT INTERDEPENDENCY AMONG SECTORS OF THE TURKISH ECONOMY

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Introduction

The First and Second Five-Year Development Plans of Turkey (covering the period 1963-1972) aimed at achieving a 7 percent growth rate per annum in the economy. Employment, on the other hand, is taken to be a dependent variable in both plans. That is, efforts to create employment are treated as a result of the rapid growth of the economy. Employment creation is not to be considered as an independent goal outside the general development.

However, in the light of experiences observed from the implementation of both plans, despite an overall growth rate in GNP of 6.5 to 7 percent per annum, employment has not increased at a rate fast enough to meet the rapidly increasing labor supply of the country. As a result underemployment and open unemployment have continued to increase.

The phenomenon that a high growth rate in production is not necessarily followed by a sufficient growth in employment is not strange to many development economists.[1] Additional employment creation is known to depend among many factors upon the types of technology employed, the output mix produced and the special steps such as public works programs taken by the public sector.

While the technology and public works programs are important determinants of additional employment both have their own problems. Technology has to do with the production structure and its choice is generally made not strictly in relation to economic criteria such as comparative advantages related to factor endowments in the country but in relation to some noneconomic considerations such as national prestige from owning the most modern machinery and equipment available. The strong desire to modernize the economy in a short period of time makes it difficult for the decision modernize the economy in a short period of time makes it difficult for the decision makers to choose the more labor-intensive technology among alternatives. Moreover, even if the decision is made to employ technologies which would provide for more employment, it is still a time consuming process and thus a long-range problem. Added to this is the fact that alternative technologies are not always available to developing countries, which import technology.

On the other hand, public works programs with the aim of expanding employment are both costly and are only temporary remedies in character.

1. Eicher et al 1970, Harbison and Reynolds 1965, Hamurdan and Demir 1971.

Even though the technology is given and assumed to be constant, there should be a certain mix of output in the economy which provides for a maximum employment level under certain restrictions, while it also maintains the 7 percent growth rate in GNP as is assumed by the development plans of Turkey. In a Leontief economy where a product is produced by a certain sector this would mean selection of those sectors for production which not only contribute to aggregate output at the desired level, but also induce in the economy directly and indirectly the highest level of employment. Each sector in the economy requires a certain amount of labor directly in order to produce a unit level of its own output. On the other hand it induces employment indirectly in other sectors from which its inputs come. The indirect employment induced continues in a chain reaction through the interaction among sectors until the inducement becomes zero.

Objectives of This Paper

The general objective of this paper is to study sectoral employment generated directly and indirectly by increases in deliveries to final demand sectors.

Specifically, we present and discuss :

1) Direct employment per unit of products of 37 sectors

2) Direct and indirect employment generated by unit value of final consumption

3) Employment interdependency among the 37 sectors of the Turkish economy

4) Policy implications of the empirical results.

Theoretical Framework

The framework used in this paper is the well known Leontief's input-output model. Leontief describes the economy as consisting of a number of interrelated industries. Each of the industries produces a single commodity which is distributed to both final consumers (private and public consumption, private and public capital formation, exports and changes in stocks) and intermediate industries. Intermediate demand for a commodity is the amount of that commodity used in the production of other commodities within the system. Hence the initial form of input-output (I.O.) model is essentially a set of "accounting equations," each of which depicts how the total gross product of an industry in a given period is divided up between intermediate and final uses. That is for n industries :

$$(1) \quad X_i = \sum_{j=1}^{n} x_{ij} + f_i \qquad i, j = 1 \ldots\ldots\ldots n$$

Where X_i denotes total output of industry i within a given period of time, x_{ij} is that portion of output produced by industry i and entered as an input in the production of industry j and f_i is the portion of commodity i delivered to final consumers.

With proportionality assumption that the input of any factor is directly proportional to the production :

$$(2) \quad X_{ij} = a_{ij} X_j$$

Where a_{ij} is the proportionality or technical coefficients, the set of balance equations (1) can be written as :

$$(3) \quad X_i = \sum_{j=1}^{n} a_{ij} X_j + f_i$$

or in matrix form:

(4) $X = AX + F$

Where : X =vector of gross outputs of order (nx1)
F=vector of final demands of order (nx1)
A=matrix of technical coefficients of order (nxn)

The system (4) can be solved for X in terms of F :

(5) $\overset{nx1}{X} = \overset{nxn}{(1 - A)}^{-1} \overset{nx1}{F}$

The matrix $\overset{nxn}{(1 - A)}^{-1}$ is called the interdependency or multiplier matrix whose elements, defined as r_{ij}, show the output of sector i required directly and indirectly to satisfy one unit of final demand for commodity of sector j.

For the primary inputs, such as labor, one can also define an average labor coefficient with proportionality assumption :

(6) $L_j = b_{oj} \; X_j$

Where L_j stands for the employment level of the factor in industry j and b_{oj} is the primary factor required per unit of output by industry j which may be named average employment coefficient of sector j.

The Leontief interdependency matrix premultiplied by a diagonal matrix of average employment coefficients denoted by $\hat{B}$:

(7) $\overset{nxn}{\bar{B}} = \overset{nxn}{\hat{B}} \; \overset{nxn}{(I - A)}^{-1}$

called employment interdependency matrix provides the basis for answering questions of special interest to this paper. That is how much of employment is required directly and indirectly to satisfy any specified final demand. The sum of all elements on column j of matrix $\bar{B}$ provides us with total employment required directly and indirectly by sector j in order for sector j to make a unit level of delivery of its own product to final demand. A change in the production level of any industry not only creates a direct demand for labor within that sector but also induces indirect demands for labor on industries which supply inputs to the former sector. The matrix $\bar{B}$ provides the means for converting the projections of final demand for goods and services into estimates of industry employment requirements. Thus labor employment interdependency matrix is helpful in analyzing the impacts upon the economy of alternative policies designed to alter the existing labor employment pattern. Alternative policies may be investigated, in turn, through the manipulation of the various final demand vectors such as government expenditures, exports and household consumption. 2

Multipliers for employment can also be obtained by dividing the column sums of an employment interdependency matrix $\hat{B}\,(I - A)^{-1}$ by direct resource coefficients (b_{oj}). The results measure the impact upon employment needs induced by a change

2. The relationship (7) can be postmultiplied by final demand vector $b = B\,(I - A)^{-1} F$ to give total employment as a function of final demands. This latter can then be maximized subject to several constraints such as balance equations and sectoral labor supplies. It becomes then an employment optimality model which can be solved by linear programming technique (see Kurihara 1964).

n final demand for the products of a sector in relation to direct employment requirements of this latter sector. The employment multipliers in matrix form are:

$$(8) \quad \overset{1xn}{K_r} = \overset{1xn}{l} \; \overset{nxn}{\bar{B}} \; \overset{nxn}{\hat{B}^{-1}}$$

Where K_r is a (1xn) order vector of employment multipliers, $l=(l, l, \ldots\ldots l_n)$ and all other terms are as defined above. A sector whose production requires intermediate inputs that are heavily embodied with labor is normally expected to have larger employment multipliers, unless that sector consumes unusually large amounts of labor directly. The higher the employment multiplier, the greater the effect is of a change in final demand on the use of labor.

It should be noted, however, that the employment requirements obtained from equations (7) do not give any explicit consideration to the relative sizes of various sectors in the economic system. A sector having a large employment requirement, for example, may produce only a fraction of the total output of the economy. Therefore regardless of its sizeable employment requirement this small sector's impact (in absolute terms) upon the existing employment level would be small.

In order to reflect the size differentials of sectors, the sums of direct and indirect requirements for labor ($l\,\bar{B}$) are weighted by uniform changes in final demands for the products of the respective sectors. Let $\Delta\hat{F}$ stand for diagonalized incremental vector of final demand, then the expression:

$$(9) \quad \overset{1xn}{\hat{K}_r} = \overset{1xn}{l} \; \overset{nxn}{\hat{W}} \; \overset{nxn}{(1 - A)^{-1}} \; \overset{nxn}{\Delta\hat{F}}$$

provides the vector of weighted employment requirements per given change of final demand.

Empirical Findings

Using the theoretical framework outlined above and a mass volume of data obtained from several sources, preliminary results on employment are derived. Some of these empirical findings are presented and discussed in the following sections.

DIRECT EMPLOYMENT PER UNIT OF OUTPUT

Tables 1 and 2 present direct employment coefficients by 37 sectors in 1967 and 1972.[3] They were obtained by dividing the total number of persons employed in the sectors by gross domestic outputs of the respective sectors. Estimates of total employment by sectors (numerators of the ratios) and the gross domestic outputs by sectors (denominators), are estimated for 1967 and 1972 (both in 1967 prices) in the State Planning Organization of Turkey.[4] Ceofficients are expressed in the number of employees per million TL of gross domestic output. Estimates of total labor employed in 1967 were obtained for agricultural and nonagricultural sectors independently. The figures for agricultural sectors (sectors number 1 and 3),

3. The years 1967 and 1972 are the termination periods of the First and Second Five-Year Development Plans of Turkey.

4. Total productive employment in 1967 was estimated at 12,750,163 persons. This total is divided between major sectors as follows: Agriculture (1-3) 9,085,700; Mining (4-6) 100,920; Agricultural Processing (7-14) 623,234; Manufacturing (15-27) 471,512; and Service Sectors (28-37) 2,468,797.

have been estimated in man hours as required for all agricultural operations for 1967 crop and livestock production. The results were then converted into number of men on the basis of several assumptions as to the working time, etc. The figures for agricultural sectors, therefore, exclude those of underemployed in agriculture. Information on employment for manufacturing and service sectors was taken mainly from census and other statistical sources. From Table 1, for example, in the "agriculture" sector 246 persons were used per million TL of gross domestic output (GDO) of agricultural products and in "leather and products" 78 persons were used per million TL of its own GDO.

TABLE 1 *

DIRECT EMPLOYMENT COEFICIENTS, TURKEY, 1967
(Number of Employees per Million TL of GDO)

Sector Number	Sector Title	Coefficients	Rank
1.	Agriculture	245.9	1
3.	Animal husbandry and fishery	120.6	2
23.	Metal products (including appliances)	116.3	3
14.	Leather and products	78.4	4
28.	Railway transportation	70.1	5
4.	Coal mining	59.6	6
12.	Wood products (including furniture)	53.8	7
33.	Professions, personal services, etc.	53.6	8
36.	Public services	51.0	9
34.	Building construction	44.9	10
5.	Iron ore mining	39.3	11
30.	Trade	37.5	12
31.	Communications	35.9	13
2.	Forestry	35.7	14
6.	Other mining and quarrying	32.6	15
13.	Paper printing and stationery	31.6	16
19.	Ceramics, glass, etc.	28.7	17
26.	Transportation equipment	25.5	18
25.	Electrical machinery and appliances	24.2	19
35.	Nonbuilding construction	22.4	20
8.	Tobacco, processing and products	21.7	21
29.	Other transportation	14.9	22
32.	Banking insurance and cooperatives	12.8	23
24.	Agricultural and nonelectrical machinery	12.8	24
9.	Alcoholic beverages	11.9	25
20.	Cement	11.8	26
11.	Textiles and apparel (excluding shoes)	11.5	27
22.	Nonferrous metals	11.3	28
21.	Iron and steel (including metallurgical coke)	10.6	29
16.	Chemicals and pharmaceuticals	9.7	30
17.	Fertilizers	9.7	31
10.	Other food products	9.4	32
15.	Rubber, plastic products	7.9	33
27.	Electricity	7.5	34
7.	Sugar	3.4	35
18.	Petroleum refineries	0.7	36
37.	Ownership of dwellings	-	37

* Tentative results.

TABLE 2 *

DIRECT EMPLOYMENT COEFFICIENTS, TURKEY, 1972
(Number of Employees per Million TL of GDO)

Sector Number	Sector Title	Coefficients	Rank
1.	Agriculture	228.3	1
3.	Animal husbandry and fishery	109.2	2
23.	Metal products	98.2	3
14.	Leather and products	66.0	4
28.	Railway transportation	62.7	5
4.	Coal mining	50.2	6
33.	Professions, personal services, etc.	49.1	7
36.	Public services	46.9	8
12.	Wood products (including furniture)	45.3	9
34.	Building construction	41.2	10
30.	Trade	34.4	11
2.	Forestry	34.0	12
5.	Iron ore mining	33.1	13
31.	Communications	32.9	14
6.	Other mining and quarrying	27.4	15
13.	Paper, printing and stationery	26.6	16
19.	Ceramics, glass, etc.	23.8	17
26.	Transportation equipment	21.5	18
35.	Nonbuilding construction	20.5	19
25.	Electrical machinery and appliances	20.4	20
8.	Tobacco processing and products	18.3	21
29.	Other transportation	13.3	22
32.	Banking, insurance and cooperatives	11.7	23
24.	Agricultural and nonelectrical machinery	10.8	24
9.	Alcoholic beverages	10.0	25
20.	Cement	9.9	26
11.	Textiles and apparel (excluding shoes)	9.7	27
22.	Nonferrous metals	9.5	28
21.	Iron and steel (including metallurgical coke)	8.9	29
17.	Fertilizers	8.2	30
16.	Chemicals and pharmaceuticals	8.2	31
10.	Other food products	7.9	32
15.	Rubber, plastic products	6.7	33
27.	Electricity	6.7	34
7.	Sugar	2.9	35
18.	Petroleum refineries	0.6	36
37.	Ownership of dwellings	-	37

* Tentative results.

Since the coefficients are expressed in labor per unit of output, they indicate roughly the relative labor intensities of Turkish sectors. The agricultural sectors are more labor intensive than manufacturing and service sectors at present states of technologies. Table 1 reveals that in 1967 the top five labor-intensive sectors are "agriculture," "animal husbandry and fishery," "metal products," "leather and products," and "railway transportation." On the other hand, the five least labor-intensive sectors (roughly the most capital intensive ones), are "petroleum refineries," "sugar," "electricity," "rubber, plastic products" and "other food products."

Direct employment coefficients for 1972 presented in Table 2 are projected from those of 1967 on the assumption of labor productivities as suggested by past trends. Labor became more productive in agriculture as new and capital-intensive technologies are introduced. More irrigation, increased use of fertilizers and more machinery and equipment are the basic causes of increased productivity. In addition, migration from the agricultural sector is also part of the reason why productivity of those remaining in agriculture may increase. For nonagricultural sectors the causes of increased labor productivity are basically the same. More capital accompanying and/or substituting labor, higher education and experience by doing are a few of the factors. Rates of increase in labor productivity were assumed to be highest in manufacturing, next in agriculture and third in the service sectors. Therefore, the 1972 employment coefficients thus obtained reflect different rates of labor attrition for different sectors.

EMPLOYMENT INTERDEPENDENCY AMONG SECTORS

Labor interdependency matrixes for the years of 1967 and 1972 are presented in summary form in Tables 3 and 4. These tables are the results of the 1967 and 1972 Leontief Inverse matrixes premultiplied by diagonal matrixes of direct employment coefficients of the respective years. (Tables 1 and 2) As mentioned above, employment coefficients are in numbers of employees per one million TL of GDO for each sector and the elements of the Leontief Inverse indicate Turkish liras of direct plus indirect requirements for products of the Turkish sectors per one Turkish lira of final demand for products of delivering sectors. Elements in employment interdependency tables, therefore, indicate numbers of employees required directly and indirectly from the sectors listed on the left (Tables 3 and 4) by the sectors listed at the top in order for the latter sector to make a delivery of one million TL of its own product to final demand sectors. Thus, the employment interdependency tables form a comprehensive and consistent set of estimates of employment transactions that occur directly and indirectly between supplying and purchasing sectors of the Turkish economy per million TL shipment from any one of the sectors to final demands.

To read the information from summarized employment interdependency Tables 3 and 4, one merely chooses the sector listed at the top and notes the figures listed in this column. Entries in the first rows of Tables 3 and 4 show total employment required directly and indirectly from all sectors, by the sector listed at the top. They are simply the column sums of the full employment interdependency matrixes which are not presented in this paper. The second and third rows of the tables indicate how the total employment requirements are split between direct and indirect requirements. The remaining rows (the lower portions of Tables 3 and 4), present the distribution of indirect employment requirements by sectors of origin. For example, the No. 14 "leather and products" sector is estimated to require in 1967 (see Table 3), 138 persons directly and indirectly from all its input supplying sectors and in itself for every million TL delivery of leather and products to final demand sectors. Of this number, 78 persons are needed directly by the "leather and products" sec-

tor for its own production and 60 persons are needed indirectly in sectors that supply inputs to "leather and products." Of this 60, those needed indirectly, following the 14th column downwards, we see that 40 persons would have to be employed in agricultural sectors to produce the raw material for "leather and products," 12 persons in agricultural processing especially in "textiles and apparel" and in "leather and products" itself,[5] one person in manufacturing sectors and six persons in the service sectors in "trade," "transportation," etc. Similarly all other 36 sectors could be studied both for 1967 and 1972 in terms of their employment creation potential and the sectoral distribution of employment in the economy.

Analysis of Tables 3 and 4 reveals a wide range of differences in total employment (direct plus indirect) requirements attributable to the sales from various sectors to final demands. The figures in 1967 range from 287 persons by sector "agriculture" to three persons by sector "ownership of dwellings." An interesting observation to point out from Tables 3 and 4 is that for several sectors direct employment requirements are much smaller than those induced in other sectors by the former sectors. To quote an extreme case, sector No. 7 "sugar" induces 33 times as much employment in other sectors as that required by itself directly. These aspects are studied in more detail in the following sections.

EMPLOYMENT MULTIPLIERS BY 37 SECTORS

The column sums of Employment Multiplier matrixes are tabulated and ranked in Tables 5 and 6 in order of decreasing magnitude for 1967 and 1972. The purpose of these tables is to point out those sectors which generate the most job openings for every million TL shipment of their own products to final demands in Turkey. The sectors "agriculture," "animal husbandry and fishery," "other food products," "leather and products" and "metal products including appliances" rank the first five in 1967. In fact, the 10 top sectors in terms of total labor requirements per million TL of final demands are located mostly in agriculture and agricultural processing sectors.

It is noted that sectors ranking high in terms of total labor requirements per million TL deliveries are those also with high direct labor coefficients as observed in Tables 1 and 2.

It is interesting to note from the lower portion of Table 5 that, on the average, 66 persons were employed in Turkey in 1967 for every million TL of final demand. Of this number 37 persons (56 percent) were required directly per purchasing sector making the shipments to final demands and the remaining 29 persons (44 percent) were in the supporting industries. This study projects that in 1972 each additional million TL shipment to final demands will create on the average (see Table 6), 59 jobs in Turkey of which 33 persons (55 percent) will be required directly by the industries whose products are delivered to final demands and 27 persons (45 percent) in the supporting industries.

One can derive two conclusions from the above figures: 1) for the country as a whole, demand by final consumers will not create as much employment in 1972 as it used to create in 1967, indicating the increasing dependence of production on capital at the expense of labor, and 2) on the average, a TL final demand will generate relatively more jobs in the supporting sectors (indirectly) in 1972 than in 1967, suggesting an increasing degree of employment dependency among Turkish sectors.

5. This indirect requirement generated by a sector internally is what we call the feedback effect of multiplier.

TABLE 3

SUMMARY OF EMPLOYMENT INTERDEPENDENCY MATRIX, 1967 */
TURKISH ECONOMY
(Number of Persons Per Million TL of Delivery to Final Demand)

Purchasing Sector	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37
Total employment required	287	48	237	71	54	41	102	109	53	157	59	86	45	138	16	27	25	13	43	32	31	23	133	22	35	44	23	90	27	42	44	20	34	70	34	53	3
Directly required	246	36	121	60	39	33	3	22	12	9	12	54	32	78	8	10	10	1	28	12	11	11	117	13	24	26	8	70	15	38	36	13	54	45	22	51	-
Indirectly required	41	12	116	11	15	8	99	87	41	148	47	32	13	60	8	17	15	12	15	20	20	12	16	9	11	18	15	20	12	4	8	7	30	25	12	2	3
Supplying Sectors	DISTRIBUTION OF INDIRECT EMPLOYMENT																																				
1-3 Agriculture	39	1	114	2	-	-	91	81	27	140	40	14	5	40	1	6	-	-	1	1	-	-	-	-	-	1	-	2	2	1	-	-	20	2	1	-	1
4-6 Mining	-	-	-	-	-	1	1	1	-	1	-	-	-	-	-	2	3	7	4	5	3	2	2	1	-	2	6	6	1	-	1	-	1	2	2	-	-
7-14 Agric. Processing	-	-	1	-	-	-	-	1	2	1	1	7	2	122	2	2	1	-	1	2	-	-	1	1	-	1	-	3	-	-	-	2	2	4	1	1	-
15-27 Manufacturing	-	2	-	4	6	2	1	-	4	-	-	2	1	1	-	2	3	2	3	5	5	6	7	3	6	8	4	4	2	-	2	1	2	6	3	-	-
28-37 Services utilities construction	1	8	1	4	8	4	4	3	6	5	4	9	4	6	4	5	7	3	6	6	11	3	6	3	4	5	4	5	6	2	5	4	5	11	4	-	2

*/ Entries in the first row show total employment (number of persons) required directly and indirectly from all sectors by the sector listed at the top in order for the latter sector to make a delivery of one million TL of its own product to final demand sectors.

The second and third rows indicate how total employment requirements are split between direct and indirect uses.

The lower portion of the table tells us how indirect employment is distributed among groups of sectors listed on the left.

TABLE 4

SUMMARY OF EMPLOYMENT INTERDEPENDENCY MATRIX, 1972*/
TURKISH ECONOMY
(Number of Persons Per Million TL of Delivery to Final Demand)

Purchasing Sector	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37
Total Employment required	264	45	226	62	43	36	93	72	59	153	55	75	41	120	17	30	24	9	35	25	28	23	113	22	33	41	20	80	27	39	40	18	85	63	33	49	3
Directly required	228	34	109	50	33	28	3	18	10	8	10	45	27	66	7	8	8	1	24	10	9	10	98	11	20	22	8	63	13	35	33	12	49	41	21	47	-
Indirectly required	36	11	117	12	10	8	90	54	49	145	45	30	14	54	10	22	16	8	11	15	19	13	15	11	13	19	12	17	14	4	7	6	36	22	12	2	3
Supplying Sectors	DISTRIBUTION OF INDIRECT EMPLOYMENT																																				
1 - 3 Agriculture	31	2	109	3	1	2	83	48	36	136	36	13	5	54	1	11	4	-	1	-	-	-	1	-	1	1	-	2	1	1	1	-	25	3	2	-	1
4 - 6 Mining	-	-	-	1	-	-	1	-	1	-	-	1	-	1	1	2	1	4	3	4	3	2	2	1	-	1	5	5	1	-	1	-	-	1	2	-	-
7 -14 Agric. Processing	1	-	1	-	-	-	-	1	1	2	2	1	2	2	-	2	1	-	1	2	-	-	1	1	-	1	-	2	-	-	-	2	4	3	2	1	-
15-27 Manufacturing	1	2	1	4	3	2	1	-	4	1	2	3	4	3	2	5	7	1	2	4	4	4	5	5	5	11	2	3	3	1	2	1	2	6	5	1	-
28-37 Services utilities construction	2	7	2	4	6	5	5	5	7	6	4	9	2	8	5	1	3	3	5	5	12	5	5	3	4	5	4	5	7	2	3	3	3	9	1	.	2

*/ Entries in the first row show total employment (number of persons) required directly and indirectly from all sectors by the sector listed at the top in order for the latter sector to make a delivery of one million TL of its own product to final demand sectors.

The second and third rows indicate how total employment requirements are split between direct and indirect uses.

The low portion of the table tells us how indirect employment is distributed among groups of sector listed on the left.

TABLE 5

DIRECT PLUS INDIRECT EMPLOYMENT INDUCED BY A MILLION TL DELIVERIES TO FINAL DEMANDS, TURKISH ECONOMY, 1967

Sector Number	Sector Title	Direct and Indirect Employment	Rank
1.	Agriculture	288.77	1
3.	Animal husbandry and fishery	237.05	2
10.	Other food products	157.15	3
14.	Leather and products	138.23	4
25.	Metal products (including appliances)	132.60	5
8.	Tobacco processing and products	108.63	6
7.	Sugar	102.00	7
28.	Railway transportation	89.93	8
12.	Wood products (including furniture)	86.47	9
33.	Professions, personal services, etc.	84.29	10
4.	Coal mining	70.78	11
34.	Building construction	69.56	12
11.	Textiles and apparel (excluding shoes)	58.80	13
5.	Iron ore mining	53.84	14
36.	Public services (including water and gas)	53.36	15
9.	Alcoholic beverages	53.15	16
2.	Forestry	47.55	17
13.	Paper, printing and stationery	45.10	18
26.	Transportation equipment (including repairs)	44.33	19
31.	Communications	43.75	20
19.	Ceramics, glass, etc.	43.22	21
30.	Trade	41.56	22
6.	Other mining and quarrying	41.14	23
25.	Electrical machinery and appliances	34.57	24
35.	Nonbuilding construction	33.55	25
20.	Cement	31.90	26
21.	Iron and steel (including metallurgical coke)	31.03	27
29.	Other transportation	27.19	28
16.	Chemicals and pharmaceuticals	27.01	29
17.	Fertilizers	25.29	30
22.	Nonferrous metals	23.35	31
27.	Electricity	23.06	32
24.	Agricultural and nonelectrical machinery	22.31	33
32.	Banking, insurance and cooperatives	19.91	34
15.	Rubber, plastic products	15.72	35
18.	Petroleum refineries	12.55	36
37.	Ownership of dwellings	3.43	37

Average employment per sector	65.70	100	%
Direct employment per purchasing sector	37.10	56	%
Employment in supporting sectors	28.60	44	%

TABLE 6

DIRECT PLUS INDIRECT EMPLOYMENT INDUCED BY A MILLION TL DELIVERIES TO FINAL DEMANDS, TURKISH ECONOMY, 1972

Sector Number	Sector Title	Direct and Indirect Employment	Rank
1.	Agriculture	263.93	1
3.	Animal husbandry and fishery	226.11	2
10.	Other food products	153.25	3
14.	Leather and products	120.19	4
23.	Metal products (including appliances)	113.18	5
7.	Sugar	93.20	6
33.	Professions, personal services, etc.	84.41	7
28.	Railway transportation	79.70	8
12.	Wood products (including furniture)	74.74	9
8.	Tobacco processing and products	71.70	10
34.	Building construction	62.57	11
4.	Coal mining	61.80	12
9.	Alcoholic beverages	58.64	13
11.	Textiles and apparel (excluding shoes)	54.55	14
36.	Public services	49.12	15
2.	Forestry	44.82	16
5.	Iron ore mining	42.88	17
26.	Transportation equipment	40.91	18
13.	Paper, printing and stationery	40.56	19
31.	Communications	40.33	20
30.	Trade	38.79	21
6.	Other mining and quarrying	36.04	22
19.	Ceramics, glass, etc.	35.06	23
35.	Nonbuilding construction	32.65	24
25.	Electrical machinery	32.61	25
16.	Chemicals and pharmaceuticals	30.32	26
21.	Iron and steel (including metallurgical coke)	27.46	27
29.	Other transportation	26.59	28
20.	Cement	25.34	29
17.	Fertilizer	23.79	30
22.	Nonferrous metals	23.34	31
24.	Agricultural and nonelectrical machinery	22.30	32
27.	Electricity	19.41	33
32.	Banking, insurance, cooperatives	18.08	34
15.	Rubber, plastic products	16.86	35
18.	Petroleum refineries	8.84	36
37.	Ownership of dwellings	3.38	37

Average employment per sector	59.40	100 %
Direct employment per purchasing sector	32.80	55 %
Employment in supporting sectors	26.60	45 %

Direct and indirect employment requirements per unit value of final demands presented above do not reflect the relative sizes of the sectors. They designate only the extent of the impact upon the country's employment per one million TL change in final demand. However, as mentioned earlier, the relative sizes of different sectors differ considerably. To reflect the relative impact of sectors upon labor employment a set of "weighted employment multipliers" are computed and the results, along with their ranks in the order of decreasing magnitude, are included in Tables 7 and 8.

The weighted employment multipliers are products of direct plus indirect requirements for labor from Tables 5 and 6, and a 10 percent change in final demands of the respective sectors. Thus, the weighted employment multiplier for sector No. 8 "tobacco processing and products," for example, indicates an impact of 24,224 more (or less) employees on the nation's employment level caused by a 10 percent increase (or decrease) in final demands for tobacco processing and products in 1967. Likewise, information in Table 7 reveals that the top four sectors in terms of employment requirements per 10 percent final demand change are "agriculture," "animal husbandry and fishery," "other food products," and "professions, personal services." The sectors "building construction" and "other transportation" and "metal products" rank ahead of any other nonagricultural sectors. Those sectors having small impact on general employment level are "iron ore mining," "cement," "fertilizer," and "iron and steel (including coke)."

In a similar way, from Table 8, one can note those sectors inducing high employment in 1972 for a 10 percent increase in their final demands. The ranking for 1972 is, in general, the same as that of 1967.

Before closing this subject, it is also of some interest to note that the total employment (direct plus indirect) per million TL of final demand for a sector as presented above is the price of that sector's product in terms of labor. That is, it costs, for example, 102 man years of labor to produce one million TL worth of sugar as can be observed from Table 5. If labor is taken as the real cost, agricultural production and agricultural processing, therefore, are more expensive to society than others.[6]

Tables 9 and 10 include employment multipliers for 37 Turkish sectors in 1967 and 1972. These multipliers are ratios of direct plus indirect labor requirements from Tables 5 and 6, to direct labor requirements from Tables 1 and 2. A high multiplier indicates that the sector requires relatively small amounts of labor directly compared to the labor required by sectors which supply inputs. A Turkish sector with a high multiplier generates relatively high indirect employment in response to change in its final demand. The sectors "sugar," "petroleum refineries," "other food products," "textiles and apparel, excluding shoes" and "tobacco processing and products" have the largest five labor multipliers relative to their direct labor. Relatively high labor multipliers are observed throughout the agricultural processing sectors. Except for "petroleum refineries," the top six places are occupied by five agricultural processing sectors. This is due to the fact that

6. When we speak of the labor content of a product we usually mean total labor embodied in that product regardless of the time period the labor was used. However, some fraction of the total labor may have already been embodied earlier than the production year in question. This happens, for example, when part of machinery (depreciation) or stocks, are used in current production. However, this fraction of labor used earlier is not likely to account for more than 10% of total labor.

TABLE 7

WEIGHTED EMPLOYMENT MULTIPLIERS *
FOR THE TURKISH ECONOMY, 1967

Sector Number	Sector Title	10 percent of 1967 final demand (Unit : 1,000 TL)	Weighted Multipliers	Rank
1.	Agriculture	1,418	406,640	1
3.	Animal husbandry and fishery	971	230,176	2
10.	Other food products	1,080	169,722	3
33.	Professions, personal services	706	59,509	4
36.	Public services	907	48,398	5
34.	Building construction	684	47,579	6
11.	Textiles and apparel (excluding shoes)	781	45,923	7
29.	Other transportation	1,292	35,129	8
8.	Tobacco processing and products	223	24,224	9
23.	Metal products (including appliances)	167	22,144	10
30.	Trade	446	18,536	11
7.	Sugar	162	16,524	12
35.	Nonbuilding construction	457	15,332	13
14.	Leather and products	71	9,814	14
26.	Transportation equipment	175	7,758	15
12.	Wood products (including furniture)	67	5,793	16
16.	Chemicals and pharmaceuticals	189	5,105	17
24.	Agricultural and nonelectrical machinery	199	4,440	18
28.	Railway transportation	47	4,227	19
32.	Banking, insurance and cooperatives	178	3,544	20
9.	Alcoholic beverages	58	3,083	21
25.	Electrical machinery and appliances	82	2,835	22
19.	Ceramics, glass, etc.	60	2,593	23
13.	Paper, printing and stationery	42	1,894	24
4.	Coal mining	23	1,628	25
31.	Communications	35	1,531	26
2.	Forestry	27	1,284	27
37.	Ownership of dwellings	350	1,201	28
15.	Rubber, plastic products	57	896	29
27.	Electricity	38	876	30
6.	Other mining and quarrying	21	864	31
18.	Petroleum refineries	57	715	32
22.	Nonferrous metals	17	385	33
21.	Iron and steel (including coke)	7	230	34
17.	Fertilizers	3	76	35
20.	Cement	n	42	36
5.	Iron ore mining	n	11	37

n: Not significant

* Direct plus indirect requirements from Table 5 multiplied by 10% of the respective final demand.

TABLE 8

WEIGHTED EMPLOYMENT MULTIPLIERS *
FOR THE TURKISH ECONOMY, 1972

Sector Number	Sector Title	10 percent of 1967 final demand (Unit : 1,000 TL)	Weighted Multipliers	Rank
1.	Agriculture	1,700	448,681	1
3.	Animal husbandry and fishery	1,272	287,612	2
10.	Other food products	1,306	200,145	3
36.	Public services	1,576	77,413	4
34.	Building construction	1,193	74,646	5
33.	Professions, personal services	811	68,457	6
11.	Textiles and apparel (excluding shoes)	934	50,950	7
29.	Other transportation	1,257	33,424	8
30.	Trade	796	30,877	9
35.	Nonbuilding construction	809	26,414	10
23.	Metal products (including appliances)	212	22,976	11
7.	Sugar	181	16,869	12
8.	Tobacco processing and products	288	16,348	13
26.	Transportation equipment	116	12,478	14
14.	Leather and products	86	10,336	15
16.	Chemicals and pharmaceuticals	254	7,701	16
12.	Wood products (including furniture)	100	7,474	17
9.	Alcoholic beverages	83	4,867	18
24.	Agricultural and nonelectric machinery	203	4,527	19
28.	Railway transportation	49	3,905	20
25.	Electrical machinery and appliances	116	3,783	21
32.	Banking, insurance, cooperatives	171	3,092	22
13.	Paper, printing and stationery	74	3,001	23
19.	Ceramics, glass, etc.	85	2,980	24
2.	Forestry	56	2,510	25
6.	Other mining and quarrying	55	1,982	26
37.	Ownership of dwellings	556	1,879	27
31.	Communications	46	1,855	28
4.	Coal mining	26	1,607	29
15.	Rubber, plastic products	70	1,180	30
22.	Nonferrous metals	47	1,097	31
27.	Electricity	51	990	32
18.	Petroleum refineries	87	769	33
20.	Cement	15	380	34
21.	Iron and steel (including coke)	12	330	35
17.	Fertilizers	n	25	36
5.	Iron ore mining	n	11	37

n: Not significant

* Direct plus indirect requirements from Table 6 multiplied by 10% of the respective final demands.

TABLE 9

WEIGHTED EMPLOYMENT MULTIPLIERS *
FOR THE TURKISH ECONOMY, 1972

Sector Number	Sector Title	Unweighted Multipliers	Rank
7.	Sugar	30,000	1
18.	Petroleum refineries	17,929	2
10.	Other food products	16,718	3
11.	Textiles and apparel (excluding shoes)	5,113	4
8.	Tobacco processing and products	5,006	5
9.	Alcoholic beverages	4,466	6
27.	Electricity	3,075	7
21.	Iron and steel (including metallurgical coke)	2,927	8
16.	Chemicals and pharmaceuticals	2,785	9
20.	Cement	2,703	10
17.	Fertilizers	2,607	11
22.	Nonferrous metals	2,066	12
15.	Rubber, plastic products	1,990	13
3.	Animal husbandry and fishery	1,966	14
29.	Other transportation	1,825	15
14.	Leather and products	1,763	16
24.	Agricultural and nonelectrical machinery	1,743	17
26.	Transportation equipment	1,738	18
12.	Wood products (including furniture)	1,607	19
33.	Professions, personal services, etc.	1,573	20
32.	Banking, insurance and cooperatives	1,555	21
34.	Building construction	1,549	22
19.	Ceramics, glass, etc.	1,506	23
35.	Nonbuilding construction	1,493	24
25.	Electrical machinery and appliances	1,429	25
13.	Paper, printing and stationery	1,429	26
5.	Iron ore mining	1,370	27
2.	Forestry	1,332	28
28.	Railway transportation	1,283	29
6.	Other mining and quarrying	1,262	30
31.	Communications	1,219	31
4.	Coal mining	1,188	32
1.	Agriculture	1,166	33
23.	Metal products (including appliances)	1,137	34
30.	Trade	1,108	35
36.	Public services	1,046	36
37.	Ownership of dwellings	-	37

* Direct plus indirect requirements from Table 5 divided by the respective direct employment coefficient from Table 1.

TABLE 10

UNWEIGHTED EMPLOYMENT MULTIPLIERS *
FOR THE TURKISH ECONOMY, 1972

Sector Number	Sector Title	Unweighted Multipliers	Rank
7.	Sugar	32,138	1
10.	Other food products	19,399	2
18.	Petroleum refineries	14,733	3
9.	Alcoholic beverages	5,864	4
11.	Textiles and apparel (excluding shoes)	5,624	5
8.	Tobacco processing and products	3,918	6
16.	Chemicals and pharmaceuticals	3,698	7
21.	Iron and steel (including metallurgical coke)	3,085	8
17.	Fertilizers	2,901	9
27.	Electricity	2,897	10
20.	Cement	2,560	11
5.	Iron ore mining	2,516	12
32.	Banking, insurance and cooperatives	2,457	13
3.	Animal husbandry and fishery	2,071	14
24.	Agricultural and nonelectrical machinery	2,065	15
29.	Other transportation	1,999	16
26.	Transportation equipment	1,903	17
14.	Leather and products	1,821	18
33.	Professions, personal services, etc.	1,719	19
12.	Wood products (including furniture)	1,694	20
25.	Electrical machinery and appliances	1,599	21
35.	Nonbuilding construction	1,593	22
32.	Banking, insurance and cooperatives	1,545	23
13.	Paper, printing and stationery	1,525	24
34.	Building construction	1,519	25
19.	Ceramics, glass, etc.	1,473	26
2.	Forestry	1,318	27
6.	Other mining and quarrying	1,315	28
5.	Iron ore mining	1,296	29
28.	Railway transportation	1,271	30
4.	Coal mining	1,231	31
31.	Communications	1,226	32
1.	Agriculture	1,156	33
23.	Metal products (including appliances)	1,153	34
30.	Trade	1,128	35
36.	Public services	1,047	36
37.	Ownership of dwellings	-	37

* Direct plus indirect requirements from Table 6 divided by the respective direct employment coefficient from Table 2.

sectors supplying inputs to the agricultural processing sectors are more labor intensive (per TL of output basis) than the processing sectors themselves. This last point can be readily seen from a glance at direct labor coefficients in Tables 1 and 2. While reasons for high multipliers in the manufacturing sectors such as "electricity," "iron and steel," "chemicals and pharmaceuticals," etc. are similar to these for agricultural processing sectors, the low multipliers observed throughout agriculture, mining and service sectors are because of the lesser dependence of these sectors on indirect labor.

Policy Implications of the Results

Granting that one of the objectives of government may be to maintain full employment, a policy question that immediately arises is "How should the present and future unemployment be reduced?" The approach may be either one or a combination of the following: shorter hours of work, discouragement of rural-urban migration, choice of technology which complements labor rather than substitutes for it, increasing use of fiscal policies in the form of public works, etc. While all these measures are important, the subject of employment interdependencies among sectors through their backward and forward links is of considerable interest and is the main focus of this paper.

Empirical estimates of employment interdependency tables and employment multipliers provided above supply a great deal of information towards the goal of achieving full employment and preparing a labor force to meet the changing requirements of sectors. First, variations in employment in response to a given change in any one of the final demands helps, via employment interdependency tables, to evaluate alternative policy proposals designed to alter the present employment pattern. A uniform 10 percent increase in final demand was shown in Tables 7 and 8, to have considerably different impacts upon the nation's employment level. Obviously agricultural sectors have the highest impact under existing technology because of their large share in the economy. However, many nonagricultural sectors such as food processing, textiles and apparel, building construction, metal products, and sugar production do have considerable impact upon the employment level. In other words, outside agriculture, several manufacturing and service sectors are found to have considerable employment creation potential. This last point is of significance in terms of employment creation to planners and decision makers who basically desire to modernize the economy by taking industry as the leading sector.

Second, a change in final demand is translated not only into an additional number of employees but at the same time into types of occupations that would be required by the changing structure of production. Relatively more production in machinery and equipment means relatively more employment and this would require more engineers and technicians. Economic development motivated by technological changes displaces many people from their occupations. Laborers in agriculture seek jobs in the urban areas. Workers in manufacturing and the like, where capital-intensive production is increasingly observed, shift to trade, personnel, business, educational and medical services as well as to other government agencies. In the light of these structural changes in employment which can be observed from Tables 3 and 4 and by the help of an occupational distribution matrix, much information can be derived for manpower training and education programs to prepare these people for new jobs, all important public issues.

Implications of the findings and uses of these findings can be many depending upon the objectives and imagination. One must not forget, however, before any use of such findings, that many data problems and limitations of input-output techniques may exist and these ought to be taken into account.

PROGRAMMES FOR FACTORS CONTRIBUTING TO INCREASED AGRICULTURAL PRODUCTION

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Introduction

It is a very well known fact that presently there is a population boom in Turkey as well as throughout the world. In order to supply food products and other agricultural goods required by this additional population, it is very important to emphasize the development of overall agricultural production.

One of the main factors of production in Turkey had been to improve yields through the enlargement of area sown. However, this opportunity has shown a considerable decrease during the past few years. Now we are faced with only one solution to the problem and that is to increase the yield per unit. This, however, could be achieved by means of a scientific approach and effective planning in the utilization of economic inputs like seeds, fertilizers, machinery, and credit.

In most underdeveloped countries, and especially in Turkey, where the size of the farm units is rather small and productivity is comparatively low, the investment possibilities of the farmers themselves are very limited. In addition to this, the farmer cannot even buy the necessary inputs like fertilizers, improved seed, feed and chemicals. On the other hand, according to the International Colloquium that met in Ankara in relation to the Second Five-Year Development Plan, the contributions of some factors in the improved production of agriculture was estimated to be: 20 percent improvement in irrigation facilities, 43 percent for the use of fertilizer, 11 percent for improved seed, 13 percent for decreasing fallow land, and 13 percent for others. Increase in livestock production, however, was to be the result of improved feeding, 50 percent, increasing the number of animals, 24 percent and improvements in animal health, 26 percent. Thus, fertilizers and irrigation seem to be the most important factors contributing to the increase in crop production, while proper feeding accounts for the highest share of increase in the livestock production.

Fertilizer and improved seed, being the most important inputs that help to increase the productivity in agriculture, are considered under two different programmes by the Ministry of Agriculture. Now, I will try to present some highlights of input programmes carried out by the Ministry of Agriculture in these fields.

The preparation and application of the fertilizer and improved seed programmes are strongly emphasized by the Ministry of Agriculture. Every year these

inputs need to be provided and distributed among the farmers at an increasing rate, which calls for extensive efforts on the part of the Government. Both input programmes are prepared and supervised by special commissions established within the Ministry of Agriculture, where producers, distributors and financing agencies are also represented. The amounts domestically produced and the level of imports, the planning of activities for distribution and the names of organizations to be responsible for these tasks are outlined in the detailed programmes which are prepared and published by these special commissions in accordance with the fertilizer and seed consumption targets estimated in the five-year plans and annual programmes. The application of these programmes is subject to discussion in the meetings that are held periodically or when required. Necessary measures and proposals are determined for any problem that may arise. Such a method of programme preparation and implementation was initiated by the five-year plans.

Agricultural loans are the most effective means in the acquisition and distribution of fertilizer and improved seed for farmers. We are faced with two different types of financial requirements in the implementation of these programmes. The first is the financial needs of the distributing agencies in order to supply both of the inputs. The increasing demand for fertilizer and improved seed requires increasing amounts of loans every year for purchases from domestic producers, to finance imports, and to meet the costs of transportation, storage and distribution. Generally, the responsible agencies being in no condition to meet these financial requirements, they turn to official credit institutions for loans. The main source of credit is the Agricultural Bank which , with its limited possibilities, cannot supply these loans at the required time and level.

The second and even more important one is the credit required for farmers themselves to purchase these inputs. The only credit agency of the country in this respect is the Agricultural Bank, and credits extended are in kind. In this way, upon presentation of a document acquired from the Agricultural Bank, the farmers can purchase their needs from the distributing agency, who in turn will be paid by the Bank. The programming and implementation of this type of distribution is carried out in coordination by the local agricultural agencies, the Agricultural Bank, Chamber of Agriculture and farmer cooperatives.

Fertilizer Programmes and Implementation

We have mentioned previously that fertilizer is one of the inputs that largely affects agricultural production. Various research activities and demonstrations on-farm have been underway for a long period of time so as to determine the direct effects of fertilizers on production in Turkey.

The results of the demonstrations carried out with regard to wheat production are presented in Table 1. These research activities were implemented by the Ministry of Agriculture in coordination with the United Nations Food and Agriculture Organization. A close look at the table would show that among approximately 20,000 demonstrations, the effects of fertilizers on wheat production is between 31.8 and 80.9 percent.

As a result of demonstrations carried out by the same two organizations, it was determined that fertilizer affects the yield of other products at the rates shown in Table 2. As evident from the figures in this table, the effect of fertilizer

on yields has been lowest with 30 percent on citrus products, grapes, olives and other fruits, while the highest is on tea with 100 percent.

On the other hand, the wheat production and average yield studies made by the State Farms for a number of years indicate some valuable data about the effects of fertilizers on production levels. It can be seen clearly in Table 3 that production has shown large variations until 1962 when the use of fertilizers was 100 percent for the first time. The average yield per decare for the 12 years before 1962 had been 89 kilograms, while this figure increased to 134 kilograms for the seven-year period between 1962 and 1968.

The use of fertilizers has shown a rather impressive rate of increase starting with 1963, the first year of the First Five-Year Development Plan. Table 4 shows the amount of fertilizers distributed to the farmers over the period covering 1963-70. Table 5, however, indicates the targets and realized consumption levels of fertilizer, and the percentage of increase over the same period.

It is quite clear in these tables that the fertilizer consumption in 1970 was seven times as much as the amount consumed in 1963. In spite of this rapid increase, starting with 1967 the fertilizer actually distributed showed a decrease as compared with the total programmes. The reasons behind this deficit in realizations are fourfold: 1) the financial means and credit facilities could not meet the rapidly increasing demand, 2) due to a shortage of foreign exchange, imports did not reach a sufficient level nor were they timely, 3) domestic fertilizer factories could not achieve the production targets of the Plan, and the new establishments could not start production as programmed, 4) there were other organizational problems connected with distribution.

In line with the increasing use of fertilizers in Turkey, the extension activities are also emphasized so that the farmer can be provided with the technical know-how in this field.

Needless to say, in spite of the rapid increase in the use of fertilizer, at the national level the statistical figures for Turkey still remain at a very low level. In 1967, fertilizers used on the total agricultural land consisted of 18 percent for nitrogen and 24 percent for phosphates. These percentages are at such a low level that they cannot be expected to affect the total production. During the same year, the amount of fertilizer in net nutrient per hectare was 7.2 kg. in Turkey.

Another important aspect of fertilizer is its price policy. In spite of the efforts of the Turkish Government to reduce the prices of fertilizer at various times, ratios of fertilizer prices to output prices have always been higher compared to those of Western countries. The cost of fertilizer produced by domestic companies is very high. Thus, in order to provide a balance for the import prices, the Government subsidizes the domestic production of nitrates.

The latest devaluation of the Turkish lira in 1970 has resulted in an inevitable increase in fertilizer prices. This was the most important factor that led to a lower realization level than planned in the use of fertilizers in 1970.

TABLE 1

RESULTS OF DEMONSTRATIONS OF WHEAT AND FERTILIZER CARRIED OUT

BY THE MINISTRY OF AGRICULTURE AND FAO

(Research for 1961-62 and 1967-68)

Crop	Fertilizer Content (Kg/Ha) N	Ph	K	No. of Demonstrations	Average Production Without Fertilizer on Control Plot	Average in Yields with Use of Fertilizer (Kg/Ha)	Increase in Yields (o/o)	Net Income (TL/Ha)	Ratio of Expense vs. Income
Wheat (dry)	0	40	0	7,687	996	317	31.8	138.20	2.27
"	0	60	0	4,098	863	496	57.4	233.50	2.46
"	20	60	0	287	937	668	71.3	344.70	2.72
"	40	60	0	2,300	1,104	634	57.4	252.10	1.91
"	50	60	0	112	1,227	993	80.9	501.20	2.65
"	40	40	40	233	925	573	62.0	146.30	1.47
"	40	60	40	82	1,149	806	70.2	354.90	2.05
"	20	40	0	36	971	498	51.3	255.20	2.56
"	40	40	0	5,752	1,105	692	62.6	315.10	2.35
Wheat (irrigated)	60	60	0	312	1,209	758	62.7	347.20	2.07
"	60	60	60	279	1,243	1,021	82.1	459.20	2.05
"	0	60	60	233	1,088	441	40.5	273.95	2.92
"	40	60	0	23	1,314	805	61.3	515.80	3.06

TABLE 2

EFFECTS OF FERTILIZERS ON VARIOUS CROP PRODUCTION

Crop	Increase in Yield %
Wheat, barley, maize	40
Cotton	50
Sugarbeets	40
Potatoes	80
Sunflower	30
Tea	100
Citrus, grapes, olives and other fruits	30

TABLE 3

WHEAT PRODUCTION AND YIELDS FOR 1950 - 68

Years	Production (Tons)	Yields (Kg/dk)
1950	83,429	106
1951	81,236	105
1952	90,731	96
1953	115,618	104
1954	55,878	62
1955	71,610	80
1956	68,525	81
1957	86,549	104
1958	83,980	104
1959	51,088	63
1960	65,081	87
1961	66,081	77
1950-61 Average for these 12 years		89
1962	100,401	119
1963	127,725	141
1964	93,987	108
1965	118,992	134
1966	118,547	151
1967	148,997	161
1968	119,524	126
1962-68 Average Yield for these 7 years		134

Source : State Farm Organization

TABLE 4

FERTILIZER CONSUMPTION (1963 - 70)
(Unit : Tons)

Year	N % 21)	P_2O_5 % 16-18)	K_2O % 48-52)	Total
1963	186,760	218,661	21,000	426,421
1964	258,000	265,000	9,000	532,000
1965	350,125	452,037	10,750	812,912
1966	468,000	546,000	12,000	1,026,000
1967	676,000	844,000	15,000	1,535,000
1968	918,957	1,177,424	20,259	2,116,640
1969	1,167,457	1,256,835	24,129	2,448,421
1970	1,157,106	1,024,915	23,204	2,215,225

TABLE 5

FERTILIZER CONSUMPTION TARGETS AND REALIZATION
(1963-70)
(Unit : Tons)

Year	Plan Target	Realization	Percentage of Target	Percent Increase Over Previous Years	1962=100
1962		295,321		-	100
1963	466,000	424,421	92	-	144
1964	665,000	532,000	80	25	180
1965	860,000	812,912	95	53	275
1966	980,000	1,026,000	105	26	347
1967	1,700,000	1,535,000	90	50	520
1968	2,540,000	2,116,640	83	38	717
1969	3,440,000	2,448,421	71	16	829
1970	3,845,000	2,215,225	58	-8	766

Fertilizer is one of the leading commodities imported into Turkey in relation to foreign expenditures. The establishment of new domestic fertilizer plants has been included in the five-year plans and annual programmes so that the demand could be decreased for the already limited sources of foreign exchange. In this respect, one of the current plants was enlarged and in addition the Plan had projected that four new plants be established, two of which have already started producing in some units. Upon completion and production of other additional units, it is estimated that the domestic production of fertilizers would reach about 2 million tons in 1971. With three more new units to be completed in 1972, this figure is then expected to show an increase of 2.5 million tons and reach around 4.5 million tons in total. However, considering the rapid increases in the consumption figures, some measures should be lined up now to increase the domestic production still further in the future.

Organization

By means of annual programmes the Ministry of Agriculture duly determines the amounts of phosphates and nitrates to be used throughout the country according to the crop production and the area to be fertilized for each crop to be produced.

As mentioned earlier, the amount of fertilizers being produced in Turkey cannot yet meet the need in this respect. Thus the public and private sectors have no other choice but to try and provide as much as they can from the domestic production, and the rest of their needs must be compensated from the import fertilizer, which is limited by certain factors like quotas.

There are two types of institutions or agencies that we can spot in the provision and distribution of the fertilizers to the farmers. The first consists of cooperatives and associations formed by the farmers themselves, the second being the public sector organizations formed to answer all of the farmers' needs.

The cooperatives and associations like the Agricultural Credit Cooperatives Support Association, TARIŞ, ÇUKOBİRLİK, ANTBİRLİK, tea farmers' cooperatives, and the Akçaabat Tobacco Producers' Cooperative, are responsible for providing the fertilizer requirements of the farmers who are members of their organization, by either domestic or import facilities. One important point that should be emphasized here is that if one does not buy the amount of fertilizer that he is told by the Ministry of Agriculture to buy, he is not eligible for permission to import any other kind of fertilizer as such.

The fertilizer needs of the farmers who produce sugarbeets, who are not included in any of the organized cooperatives or associations, are provided by the Sugar Company and another public sector agency, the Agricultural Supplies.

The credit requirements of the public and private sector organizations in the procurement of fertilizers, either domestic or imported, are partly provided within their own organizations and partly compensated for by the special Fertilizer Financing Fund and the Fertilizer Financing Support Fund of the Agricultural Bank. These funds, however, are established by the organizations involved in the fertilizer procurement activities when they invest 85 percent of their annual profit in the Agricultural Bank to be used for his purpose.

The credit requirements of the farmers who are supposed to obtain their fertilizer needs from the Agricultural Supplies Organization, are also supplied by the Agricultural Bank, to a limited extent. The Agricultural Supplies Organization

has established an organization, a special agency, to answer the needs of the farmers, and this organization is extending its activities to be useful to the farmers throughout the country.

On the other hand, the Ministries of Agriculture, Industry and Commerce, and Finance are responsible for establishing the factory sales prices and retail prices throughout the country for commercial fertilizers, which are in turn subject to final determination and publication at the request of the Ministry of Agriculture and the decision of the Council of Ministers.

Improved Seed Programmes and Implementation

As is the case with fertilizer, improved seed programmes are also carried out by related directorates under the general responsibility of the Ministry of Agriculture through specific annual programmes.

With the present production pattern, Turkey's need of improved seed reaches a total of about 2 million tons per annum. Of this total, cereals account for 1.9 million tons of which 1.4 million tons are wheat seeds.

Because of biological and genetic characteristics, some seed varieties need not be renewed every year. To bring this point into account, the annual requirement of improved seed and controlled seed of various types has been put at 400,000 tons in the First and Second Five-Year Development Plans. In arriving at this target for domestic seed requirements, the assumption was made that seeds of locally produced cereals would have to be renewed every four to five years.

The certified and controlled seed programmes prepared annually by the Ministry of Agriculture set out the ways and means for the production, acquisition and distribution of improved seeds in the country, and covered 17 crops classified under 10 groups. The names of the crops in their proper order are: wheat, barley, oats, corn, rice, cotton, sunflower, sugarbeets, potatoes, sesame, peanuts, soya beans, alfalfa, sainfoin, and wild vetch, grass seeds and vegetable seeds. The responsibility for the production of the original seed category is assumed entirely by the Public Research Institutes whereas the next step, that is producing the certified and controlled seed just before its final distribution to regular farmers, is generally taken partly by public agencies and partly by private sector farmers on a contract basis.

Problem areas, such as which varieties to produce, what the regional distribution should be, certification and control principles and prices, are all tackled and discussed and regulative rules are determined by the National Improved Seed Committee every year. Within the framework of these regulative rules, the annual implementation programme is then prepared by a commission whose members come from various parties implementing the programme, such as producers, distributors and financing agencies.

Table 6 indicates the amounts of improved seeds distributed to farmers for the years between 1963 and 1970.

In addition, Table 7 shows the programmed and realized seed distribution with the percentages of realization for the years between 1963 and 1970. With the exception of the years 1963, 1966 and 1967, the realization percentages in the implementation of the seed programmes have been around 60 percent. Regarding this

TABLE 6

DISTRIBUTION OF MAJOR IMPROVED SEED VARIETIES (Tons)

Year	Cereal Seeds	Cotton	Sunflower	Sugarbeets	Sesame, Peanuts, Soy Beans	Alfalfa Sainfoin Wild Vetch	Grass Seeds	Others	Total
1963	67,427	22,313	97	3,350	15	1,063	25	-	94,290
1964	63,748	24,812	806	4,750	9	1,434	113	-	95,672
1965	55,482	30,412	1,081	4,500	7	1,694	90	-	93,266
1966	138,244	33,488	891	4,500	82	1,848	107	-	179,160
1967	224,344	29,904	1,063	3,100	53	1,430	72	31	259,997
1968	177,764	30,368	1,807	3,123	62	2,181	88	75	215,468
1969	243,490	27,476	1,230	3,200	305	761	90	538	277,090
1970 *	93,132	24,495	2,393	2,191	102	769	120	696	123,898

Figures for 1970 are provisional.

unimpressive level of achievement, the 1970 distribution target has been set more realistically at a moderate level.

If one considers the assumption usually made that improved seed alone contributes 10 to 12 percent to the increase in production, then there are good grounds for making every effort to identify and remove problem areas and bottlenecks in the distribution and use of improved seeds.

The improved seed programmes have been very helpful in distributing those varieties to farmers which are best adapted to local conditions, and have facilitated the expansion of high yielding varieties to traditional farm areas.

For the first time in 1967, the high yielding Mexican varieties for coastal areas and Russian and American varieties for dry farming areas had been imported and distributed to farmers under this programme. The results from these varieties have been very promising. However, these new varieties have not yet been accepted by farmers to the extent desired by the Government. There is no doubt that continuous efforts in this field will eventually prove that the new varieties will increase the total wheat production in Turkey by substantial amounts.

TABLE 7

IMPROVED SEED PROGRAMMES AND DISTRIBUTION

(Tons)

Year	Programme	Realization	Realization % of Programme)	Index 1963=100
1963	100,000	94,290	94	100
1964	165,000	95,672	58	101
1965	200,000	93,266	47	99
1966	200,000	179,160	90	190
1967	200,000	259,997	130	276
1968	400,000	215,468	54	228
1969	400,000	277,090	69	293
1970 *	400,000	123,898	32	131

* 1970 figures are provisional.

At present, the Ministry of Agriculture has already developed a project to increase the wheat production in 34 provinces, with the use of Mexican varieties in coastal areas covering 19 provinces, and with the use of other high yielding varieties in arid and semi-arid regions covering 15 provinces. Under this project, farmers will be provided with other complementary inputs like fertilizers and pesticides, in addition to improved seeds, through various loans from the Agricultural Bank as well as with the help of extension services for modern farming techniques. If this nationwide project is applied successfully, it is very likely that the present wheat shortage will be eliminated completely.

Let us now mention a few of the reasons why the targets set in the development plans for the certified and controlled seed distribution programmes were not achieved as planned :

1) For some years, the production of certified and controlled seeds has been at lower than expected levels mainly due to unfavourable conditions of climate.

2) The targets set with an optimistic point of view have been too high to be realistic.

3) The organization of the distribution activities has not been efficient.

4) Seed prices were also set too high to be realized.

5) The availability of loans and credits to both the supplying organizations and to the purchasing farmers has not been sufficient for their needs.

A substantial portion of the improved seed supply in Turkey is provided by the State Farms. Since these farms do not possess the capacity to meet the total seed requirements of the country, some farmers are asked to participate in seed production on a contract basis. Here, too, there have been financial problems in connection with the acquisition of improved seeds from the contractor farmers.

Seed prices are generally fixed at a level that is 20 to 30 percent higher than the regular wheat prices. Although the Government subsidizes part of the transportation costs, the farmers still complain that the prices for seeds are too high, and that efforts of the public organizations to lower the prices still further would probably be very helpful in increasing production as a whole.

On the other hand, as in the case of fertilizers, the farmers need to be provided with sufficient credits and financial loans if the seed distribution system is to be successful in the future. At the present time, the inadequacy of financial sources seems to be the major bottleneck in this respect. Recognizing this problem, efforts are underway to reorganize the Agricultural Bank, which is the only supplier of agricultural loans in Turkey, so that the present conditions and the needs arising from these can be handled in a better way in the future, with additional sources of credits extended for the requirements.

Agricultural Credits and Implementation

In Turkey, two-thirds of the population is employed in the agricultural sector. About 82 percent of the total exports, on the other hand, consists of agricultural products. For this reason, the agricultural sector plays a very important role in the economy of the country as a whole.

The contribution of agriculture in the net national product, however, is around 27.2 percent. This indicates that the bulk of the population is within the low income group of the community. Due to overemployment in the agricultural sector and the low level of income per capita, there is almost no chance of savings for people in this section of the population. One of the major reasons for the low income level in the agricultural sector is insufficiency of agricultural investments and the share of these investments being very small in the total investment rate. Thus we are

naturally faced with an inadequacy and shortage of capital as a whole. As a result of all these problems, it can be deduced that the only factor that affects the solution of the basic bottlenecks in the agricultural sector is the availability and use of credits in this field.

Due to a lack of adequate capital, especially in the small farm units in Turkey, agriculture in the country cannot develop in a modern way, and unfortunately we are still faced with the problem of traditional and historical machinery and tools being used in agricultural activities. This is all because capital is a very important factor in the development of agricultural units and the overall improvement of production in Turkey. On the other hand, a basically well operated credit system is urgently needed in Turkey. Such a system would largely affect factors like provision of necessary inputs for agricultural activities, evaluation and marketing of products, and the improvement of production to that level that was long since projected. In the same way, the poor or low income farmers could make some improvements and investments in their establishments only by means of available credits as such.

The organizations or agencies that provide credits to the agricultural sector in Turkey could be classified under two headings:

1) Unorganized credit facilities, consisting mainly of individuals. Credits acquired from such sources usually have very high interest rates, and thus are defined as harmful rather than helpful to the farmer.

2) Organized agricultural credit agencies. Under this we could include:

   a) Agricultural Bank

   b) Agricultural credit cooperatives

   c) Agricultural sales cooperatives.

Actually, these three different types of sources are interrelated organizations. For example, the cooperatives mentioned as such are completely under the supervision and implementation of the Agricultural Bank.

The Agricultural Bank, however, can be said to be the only government organization that extends credit to the farmers.

The Agricultural Bank gives three types of credit to the farmer: a) short-term credit, b) medium-term credit and c) long-term credit. Thus, Table 8 shows a distribution of agricultural credits provided by the Agricultural Bank for the period of 1965 to 1969, by subsector classification.

With the present resources, the Agricultural Bank is not in a situation to answer all the needs of the Turkish farmer as to the credit problems. On the other hand, it is a fact that the bulk of the available sources of credit is already allocated under the present circumstances.

Consequently, a close evaluation of Table 9 would indicate that although the Agricultural Bank has allocated the bulk of its credit facilities to the agricultural sector, only a very small percentage of the credit needs in this sector can be met by these means.

TABLE 8

CREDITS GIVEN BY THE AGRICULTURAL BANK BETWEEN 1965 - 69

(Unit : Million TL)

Short-term Credit	1965	1966	1967	1968	1969
Water products	10	15	20	20	20
Artificial fertilizers	120	225	300	469	730
Livestock	130	180	220	300	340
Certified seeds	20	75	240	300	350
Priority export products	335	370	400	450	500
Agricultural protection chemicals	-	-	100	100	100
Others	445	465	501	588	600
TOTAL	1,060	1,330	1,781	2,227	2,640
Medium and Long-term Credits					
Farm machinery and equipment	305	426	501	611	750
Water products	23	33	33	33	33
Agricultural protection machinery and equipment	12	13	35	44	46
Livestock	75	130	170	254	255
Draft animals, carts and equipment	5	5	5	5	5
Others	220	223	258	250	165
TOTAL	640	830	1,002	1,197	1,254
GENERAL TOTAL	1,700	2,160	2,783	3,424	3,894

TABLE 9

AGRICULTURAL CREDIT

(Unit: Million TL)

	1965	1966	1967	1968	1969
Estimated sources and facilities	5,171	6,145	7,659	9,679	12,074
Agricultural credits	3,278	3,992	5,160	6,924	8,789
Rate of Agricultural credits versus sources and facilities (in percent)	63.6	65.5	67.4	71.5	72.8

PROBLEMS CONFRONTED IN THE PROVISION AND USE OF AGRICULTURAL CREDITS

Since the Agricultural Bank is the only government agency that extends credits to the farmers, and since the organizational rules and regulations of that agency decree that the needs of the small farmers for credit allocation should be given priority, the procedure should be in this parallel. Unfortunately, it is not, and only a very small portion of the small farmers with small farm units receive their requests for credits, while most of the time these poor farmers spend this limited amount of money that comes their way for purposes other than agricultural investment. For this reason, the pay-back possibility of the farmer gets leaner all the time and the bank facilities are consequently frozen.

There are many bottlenecks in Turkey in the field of provision, distribution and payments of agricultural credits. Major issues in this respect are :

1) Insufficiency of the credits allocated to farmers to meet their farming needs

2) Inefficiency of timing in requesting the farmers to make payments on the credits allocated to them

3) Misuse of credits by the farmers, basically failing to use them for agricultural purposes

4) Inadequate pay-back facilities of the farmer caused by the fact that he tends to sell the seeds and fertilizers and other inputs provided to him in kind, and make profits by lower sales prices rather than using these items for agricultural production

5) Insufficiency of bank resources

6) Inefficient time-consuming procedures, and red tape in the farmers' requests for credits from the Bank

7) Impossible rates of guarantee asked from the farmer in return for credit allocations, and problems of the farmers in trying to meet these requirements

8) Very high rate of interest based on the farmers credits.

THE ROLE OF TIMELY PROVISION OF AGRICULTURAL INPUTS IN THE PROGRESS OF AGRICULTURAL PROJECTS

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The Importance of Agricultural Planning

For the successful performance of every enterprise, whether in agriculture, development or industry, it is first necessary to prepare appropriate plans with due attention to the objectives to be realized and the results to be gained. Each enterprise that is governed by a specific program and executed with care and supervised in its different stages has a greater chance of a successful end. The countries that have started their project on a daily, or even an annual, basis without preparing a long-term and reasonable program have, at last, come to the conclusion that such activities may only meet with casual success, and that in most cases, because they do not bear successful results, they have to be abandoned or work has to be discontinued.

It is better to prepare long-term or mid-term plans for agricultural development projects, as the long-term programs can be prepared in a more detailed, fundamental and useful way and, as such, can give better results, with due attention to the country's general interest and policy.

Points to be Included in Essential Planning

On the whole, the following points may be considered in the agricultural planning :

1) Maximum utilization of available possibilities and correct exploitation of land and water, consistent with the results already obtained from studies and research activities.

2) Utilization of possibilities that may be provided by the reclamation of new land, provision of facilities, in particular, facilities of water and power available for agricultural use.

3) Preparation of suitable plans for farming and animal husbandry in different areas, with due consideration of the area potentialities and economic agricultural policies, in such a way that they may cover the national needs, and also ensure a responsible income.

4) Efforts should be exercised to prepare and provide the local needs, such as food for the people and the livestock, and also the requirements of the industrial concerns of the country.

5) Production of valuable agricultural products for export.

6) Setting up of the policies, appropriating funds for the inputs and running agricultural expenses for the execution of short-term and long-term plans.

7) Providing adequate manpower in different fields for the operation of desired plans.

The primary objective of the presentation of this paper is to initiate discussion on the timely provision of the inputs for the farmers, in particular the production factors; therefore, this fact will be elaborated a little more.

Although correct farming calls for a suitable plan, timely provision of land, timely cultivation with due consideration to irrigated and dry farming as well as assiduity from the time of cultivation to that of the harvest, still, the timely provision of equipment and materials needed by the farmers and appropriation of required funds for running expenses are some factors that will ensure the successful operation of the projects.

INPUTS REQUIRED FOR THE OPERATION OF AGRICULTURAL PROJECTS

On the whole, the equipment and materials required by the farmers for the operation of agricultural projects can be summarized as follows:

1) Machinery and equipment for leveling of the land and preparing it for cultivation, maintenance and harvesting, in large-scale mechanized farming

2) Small-sized machinery and tools for the operation of small holdings

3) High yielding improved seeds

4) Suitable fertilizers for the cultivation of various crops

5) Pesticides and sprayers for controlling plant pests and diseases.

Appropriation of a budget adequate to cover the current expenses should also be remembered, as this is essential for the smooth running of the projects.

THE WAYS OF SECURING THE FARMERS' REQUIRED "INPUTS"

In order to secure the requirements of the farmers and provide them with facilities for obtaining the needed equipment and materials, it is possible to act in one of the following ways:

1) Grant of short-term loans for securing the inputs

2) Provide the inputs through the cooperative societies

3) Provide the inputs through the farm corporation

4) Provision of inputs by the government department stores on credit

5) Provide inputs through the organization responsible for increasing agricultural products (impact program).

In general, a major portion of the funds given directly to the farmers for the procurement of inputs is expended on other than agricultural needs. It is, therefore, more advisable to aid the farmers in kind or with materials, as this act, accompanied by proper supervision, will produce a more satisfactory result.

Besides, the granting of loans to the farmers is not enough by itself, since it is possible that the farmers may not be able to procure their requirements in time or that they may not be able to procure their goods at reasonable prices or of good quality.

If low yielding seeds are procured or if the sowing and cultivation are carried out late in the season, how can one expect high production ? Similarly, if suitable fertilizers are not procured and used in time, no satisfactory results can be expected. Can spraying of pesticides prove useful after the pests have damaged the crops ?

On the whole, it appears that in long-term agricultural programs the establishment of well managed cooperative societies and farm corporations, the storing of materials and equipment required by the farmers and provision of adequate funds to meet their overhead expenses, will best serve the purpose.

If it be intended to activate short-term projects and bring them to a satisfactory end in a comparatively short time, it would be wiser to provide the farmers with their requirements through the government departments, stores on a credit basis or through the organization set up for impact projects.

In Iran in the Fourth Five-Year Agricultural Plan started in 1967 to end in 1972, provisions have been made for impact projects and timely procurement of the farmers' requirements. The results so far obtained, are both speedy and satisfactory from the point of average yield per hectare. These projects cover the studies made in wheat, cotton, rice, forage and sugarbeets and have been well received by the farmers and are being developed every year. In order to clarify methods used to operate the projects and to meet the requirements of the farmers, the following instances covering the wheat and rice projects are dealt with in more detail.

BACKGROUND OF THE WHEAT PROJECT

In Iran grain is one of the most staple foods of the people. Rice in the north and wheat in the form of bread in other areas of the country form the food of the majority of the population. In order to provide wheat for a population that is increasing at the rate of 2.6 percent per annum, and taking into consideration the fact that the per capita consumption of wheat in the country is estimated at 130 kilos per year, projects have been prepared to increase the wheat production by obtaining a greater yield per hectare.

Satisfactory results obtained from the cultivation of Mexican seeds which have a high yield, a comparatively good resistance to rust, response to fertilizers,

resistance against stooping, suitability for bakery use and a maximum yield of about 6 tons of wheat per hectare, have caused the development of Mexican seed cultivation in the tropic and subtropic areas of the country. The Bezostaia wheat is used in the colder regions of the country.

The yields of various wheat crops are as follows :

The maximum yield of Mexican wheat known as Panjamo 62 in 1969-1970 equalled 6 tons per hectare in the Kermanshah region. The maximum yield of wheat known as Inia 66 equalled 6.300 tons per hectare in the Gonbed Kavoos region.

The maximum yield of wheat known as Bezostaia equalled 5.714 tons per hectare in the West Azerbaijan region.

The average yield of Mexican wheat has been estimated at 2.500 tons per hectare in 1969-1970.

OBJECTIVES

The objectives of the projects are :

1) Increase wheat production by increasing the yield per unit of land cultivated, through distribution of high yielding improved seeds and suitable fertilizers, to the extent of 1.5 to 2 tons per hectare.
2) Multiply and increase the mother seeds with a view to attaining self-sufficiency and stopping importation of seeds.

RESULTS AND BENEFITS DERIVED FROM THE OPERATION OF THE IMPACT PROJECTS

1) Provide the elementary requirements of the population of the country.
2) Raise the income of the farmers.

METHOD OF OPERATION

1) The seeds provided for the operation of these projects are the Mexican (Panjamo 62 and Inia 66) for tropic and subtropic regions, Bezostaia seeds for the cold regions as also the locally improved seeds. The seeds and the fertilizers are transported to the area concerned and distributed among the farmers on site.
2) The farmer contractors, whether engaged on seed multiplication or production increase, would receive the following quantities of seeds and fertilizers per every hectare of their cultivated land :

Mexican wheat

Seeds : 100 kilos minimum and 150 kilos maximum
Urea : 100 kilos minimum and 185 kilos maximum
Ammonium phosphate : 100 kilos to 125 kilos maximum

Bezostaia wheat

Seeds : about 180 to 200 kilos for irrigated lands
Urea : about 150 kilos for irrigated lands
Ammonium phosphate : about 120 kilos for irrigated lands

Locally improved seeds

Seeds : about 150 kilos
Urea : about 100 kilos
Ammonium Phosphate: about 60 kilos

ACTIVITIES CARRIED OUT FOR OPERATING THE WHEAT IMPACT PROJECT

1) Training the personnel engaged on operating the projects (extensionists and extension corps).

2) Selection of suitable lands with the cooperation of the Plant and Seed Improvement Institute, the Extension Service Organization and the Soil Fertility Institute.

3) Transportation of seeds to pertinent sites and their treatment (treatment of the seeds is always carried out gratis).

4) Conclusion of contracts with the members of cooperative societies, farm corporations and the farmers who operate mechanized agriculture, for a maximum plot of land of 500 hectares for one farmer, institute or organization. Based on the terms of the agreement concluded, seeds and fertilizers will be provided as loan in kind and the contractor farmers will undertake to carry out the technical instructions of the experts and the extensionists as, also, of the extensio corps throughout the course of cultivation, maintenance and harvesting.

5) Visiting and supervising the farms by experts, technical agents, extension corps and extensionists for guiding and offering technical services to the farmers.

VOLUME OF THE PROGRAM
(Unit : Hectares)

Year	Contract for Seed Multiplication	Contract for Increasing Production	Total	Quantity of Seeds
1970	32,038	67,966	100,004	9,200 tons
1971	50,000	300,000	350,000	35,000 "

It should be noted that in 1971, the actual cultivation carried out has been on a land surface of 200,000 hectares with Mexican, 50,000 hectares with Bezostaia and 100,000 with native treated wheat seeds.

Twenty percent of the price of fertilizers and 10 percent of the price of seeds, delivered to the projects set up for increasing the products by cultivating Mexican, Bezostaia and locally improved seeds, have been computed as discount and the 3 percent usually charged to cover the expenses incurred for the collection of the cost of seeds and fertilizers delivered by the Government, in the shape of loans in kind was also paid by the Government.

ECONOMIC VALUE OF THE OPERATION OF WHEAT IMPACT PROJECTS

The economic value of the above projects can be determined by the fact that an increase in production of an additional 525,000 tons valued at 3,150,000,000 rials

amounts to 2,394,949,000 rials corresponding to $31,306,524 after deducting the cost of fertilizers, running charges, 10 percent discount on seeds, and 5 percent banking charges.

PROVISION OF THE REQUIREMENT OF THE RICE CULTIVATORS THROUGH THE OPERATION OF RICE IMPACT PROJECTS

Projects similar to those set up for wheat have also been activated for 300,000 hectares of rice. Before the operation of these projects the yield of rice per hectare has, on the average, been 2,800 tons. The objective of the above projects is to increase the rice production per unit of land by providing improved seeds, use of fertilizers, grant of cash loans to the farmers, timely operation of the projects and control of plant pests as well as making technical assistance available through experts, extensionists and extension corps for familiarizing the farmers with modern methods of farming.

A part of the price of seeds and chemical fertilizers is considered as a discount to encourage the farmers. This discount is curtailed gradually every year so that the discount which, in the beginning of the operation was 33 percent, will in the last year amount to only 15 percent. The Cooperative Bank also grants cash loans for a period of 9 months for preparing the lands, meeting the running expenses and controlling the plant pests. The result of these activities in 1970 has been an additional yield of 115,000 tons in 125,000 hectares, that is to say 900 kilos per hectare.

RECOMMENDATIONS

The methods adopted for increasing wheat and rice production are, generally speaking, efforts exercised in providing inputs, or in other words, providing facilities in seeds and fertilizers and granting cash loans to meet the running expenses as well as the technical assistance and supervision by the experts. These measures have brought about bright results and clearly demonstrate the part played by the timely provision of the inputs in the development of agriculture in Iran. Needless to say, these aids will also be extended to similar short-term and mid-term activities if and when necessary.

MAXIMIZING ECONOMIC RETURNS TO PUBLIC RESOURCES IN AGRICULTURAL DEVELOPMENT

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Economic planning is a systematic attempt to allocate resources in order to achieve specified development objectives. Most often, in developing countries, the major planning problems centre around the allocation of scarce capital resources to achieve greater national productivity. It is a well understood principle that the most effective type of development occurs when these scarce resources are employed in such a way as to give maximum production over time. Planning agencies can influence the composition of development either directly through allocation of public sector resources, or indirectly through government policies which are ultimately transmitted to the private sector through price and market mechanisms. The agricultural sectors of most developing countries are particularly responsive to these types of stimuli, and indeed much of the economic development which has been enjoyed by the countries represented here today can be attributed to successful planning efforts in the agricultural sector.

In my succeeding remarks I shall attempt to illustrate a few of the types of problems which are typical of those agricultural planners must face. The solutions are not always obvious nor is there always agreement as to which alternative represents the best course of action. What is important is to emphasize that where several alternatives are available, careful analysis should precede the planning decision.

Economic Incentives for Increasing Agricultural Production

One of the most important instruments of public policy for increasing agricultural production is the provision of economic incentives to farmers. The major economic incentives include subsidies on key agricultural inputs and guaranteed market prices for selected agricultural commodities. In recent years, the provision of the above economic incentives greatly facilitated the spread of new seed-based technology in the CENTO countries. For example, wheat production in Pakistan increased by nearly 60 percent between 1967 and 1969.

The economic incentives are, no doubt, powerful instruments of public policy for increasing agricultural production, but the financial aspects of providing economic stimuli create new problems which need to be watched and forestalled. The provision of subsidies on agricultural inputs involves heavy public expenditure and with the expansion in programme the subsidy bill increases over time. For example, the total subsidies directly provided to the agricultural sector in Pakistan (fertilizer, seed, plant protection, mechanization) increased from Rs. 116.7 million in

1965-66 to Rs. 188.1 million in 1969-70. Hence, it becomes increasingly difficult for the Government to continue the subsidies. The role of subsidy is educational. It should be programmed for a limited period and phased downward. The support prices present another dilemma. So long as a country is producing more food to meet its own food requirements, any level of price support can be maintained. But when an exportable surplus develops, competition with other countries creates a whole range of problems.

Public Versus Private Distribution of Farm Inputs

Lack of adequate and timely supply of agricultural inputs such as chemical fertilizers, seeds and pesticides is a limiting factor in the development of agriculture in less developed countries. The procurement and distribution of these inputs has generally been assumed to be the responsibility of the Government. However, government arrangements often prove grossly inadequate in procuring the right types and quantities of inputs and their distribution at the right time and place. Government agencies charged with the responsibility of procurement and distribution of farm inputs suffer from bureaucratic delays and shortage of technical staff. Private agencies can play an important role in the distribution of farm supplies provided the Government promotes and encourages private enterprises, especially those which produce the inputs. First, the private agencies who are guided by a profit motive would make concerted efforts to know the prospective customers and their input requirements. It also would be in their interest to see that sufficient stocks are available to meet the demand for inputs. Secondly, the private agencies have to necessarily maintain advisory services in order to expand their volume of sales. The farmers are also prone to ask the advice of the supplier with respect to the quality of inputs and the requisite quantities to be applied as also the time and method of input application. The distributor is supposed to know the properties, the advantages and disadvantages of their merchandise. It has been observed that the producers of agro-chemicals have an extensive research establishment for testing their products and also maintain advisory services to assist in educating and training dealers and their customers. Finally, competition among private suppliers of farm inputs would ensure a timely supply to the farmers.

There are distinct advantages to the Government in transferring much of the responsibility of input distribution to the private sector. Government funds and administrative talent which are involved in the input distribution arrangement could be freed for other development activities. This would also enable the Government to do a more effective job of forward planning for the procurement of farm inputs as well as quality control.

In Pakistan, public agencies were exclusively responsible for the distribution of fertilizer prior to 1964. This arrangement was inefficient in providing timely supplies of fertilizer to the farmers. The distribution work was partly entrusted to the private sector in 1964. Within the next few months thereafter the stock position changed dramatically from a surplus of 250,000 tons to a deficit (unfilled orders) of 125,000 tons. Thus the introduction of the private sector in the distribution machinery led to a significant increase in fertilizer consumption in the country. At present four firms are engaged in the distribution work. They distributed 80 percent of the total fertilizer sales during 1970-71.

Institutional Reforms

In less developed countries lack of agricultural credit facilities acts as an important impediment in the development of agriculture. The inadequacy of credit stems

directly from the absence of well organized and coordinated institutional farm credit systems. The existing credit institutions such as the agricultural banks and the cooperatives continually face financial difficulties in meeting the credit needs of the farmers and rely heavily on government support. It is, however, obvious that public resources are too limited to meet the total credit requirements of agriculture. In most of the less developed countries a large proportion of agricultural credit is provided by private agencies which are often characterized by high interest rates and other questionable practices. The major problem in the less developed countries is, therefore, to create conditions favourable for the development of credit machinery which is not only adapted to the needs of developing agriculture, but also appropriate for channelling private capital for investment into agriculture so that the need for public funds is lessened gradually and possibly even eliminated. Hence the agricultural credit policy of the Government needs to be oriented towards: 1) creation of conditions favourable to the marketing of bonds and debentures by agricultural credit institutions for the purpose of channelling private capital into the agricultural sector, and 2) licensing and regulating private credit agencies. The private credit agencies will continue to dominate the rural credit picture for some time in the future. The exclusion of private moneylenders from the pattern of future agricultural credit will reduce the supply of credit. The private moneylenders, no doubt, charge high rates of interest, but they also undertake great risks. Licensing and regulating private credit would provide security to the lenders resulting in reduced rates of interest.

Public Investment in Technology and Land Development

Broadly speaking, there are two ways to increase agricultural production: 1) extension of cultivated areas, i.e. bringing new land under cultivation, and 2) increase in yield per acre through the use of non-land inputs embodying new technology such as chemical fertilizers, improved seeds, plant protection materials, modern implements, management skills, and improved cultural practices. Many less developed countries had recourse to the first alternative, i.e. bringing new land under cultivation. This strategy reflects traditional thinking that increased agricultural production is synonymous with increased acreage. The development of land raises questions regarding the suitability of new land for cultivation, the cost of reclamation, and the rate at which land can be brought under cultivation. The reclamation of land requires considerable time and government resources for providing irrigation and transportation facilities. Furthermore, the extension of cultivated areas usually means moving with marginal lands where soil and climatic conditions give a poor return.

For purposes of national policy, it would be necessary to provide a sound empirical basis for choosing between the two above mentioned alternatives, i.e. whether to invest in new technologies or in reclamation of land. Various resources embodying new technology serve as a replacement or substitute for land either in producing a given level of agricultural output or increasing agricultural production. The magnitude of the rates of substitution of new technological inputs for land provides the basis for a choice between the alternatives. One important substitute for land is chemical fertilizer. This input is usually used on a given amount of land to increase output. However, it can also be used to reduce the need for land or its development so that a given level of output can be produced with less land and more fertilizer. Ibach and Lindberg[1] estimated that, at the average extent and level of fertilizer

1. U. S. Department of Agriculture, The Economic Position of Fertilizer Use in the United States, Agricultural Information Bulletin No. 202, 1958

use existing in 1954, one ton of plant nutrients substituted for the production obtained from 10.7 acres of cropland in the United States. To put it in another way, the use of about 93,500 tons of plant nutrients represented the equivalent of adding a million acres of cropland capable of producing an average yield level that existed in 1954. However, the estimates of marginal rates of substitution between fertilizer and land would vary due to many factors involved in crop production such as soil type, level of fertilization, type of crop, climate and other environmental factors. According to another investigation,[2] one ton of plant nutrients substitutes for 101.55 acres of land for producing wheat at Bhagwai in India.

We can now answer the question of whether to invest in new technology or in land reclamation. As mentioned earlier, one ton of fertilizer substitutes for the production obtained from 101.55 acres of land for the specific location. Hence the choice between the two alternatives depends on the cost of one ton of plant nutrients compared with the cost of developing 101.55 acres of new land for cultivation. In view of the large capital outlay required for the reclamation of land, the former alternative may represent an optimal development programme. However, the potentialities of substitution may not be realized unless farmers are given necessary incentives which may favour substitution of fertilizer for land. One of the obvious incentives is favourable prices of inputs relative to outputs and favourable fertilizer/land price ratio.

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2. Khan, Riaz Ahmad, Marginal Rates of Substitution Between Fertilizer and Land in Production of Wheat and Paddy Rice, Unpublished Ph. D. thesis, Iowa State University, 1965.

AGRICULTURAL CREDIT IN IRAN

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Introduction

As the result of a far reaching program of agrarian reform, implemented during the past decade, the land tenure system in Iran was transformed from a predominately share-cropping to an owner-operator system. Consequently, at present there are three major categories of land ownership, corresponding to three types of farming operation in Iran. First, the subsistence farming, carried out by traditional farmers on small holdings which belong to them. This type of operation comprises the largest part of the Iranian agriculture from area, volume, and value of farm production. Second, the commercial farming which is mostly operated by the previous landlords, consisting of mechanized farms and orchards. Third, large-scale farming enterprises, which are formed either as agricultural corporations by bringing together the subsistence farmers with their land as their share capital contribution, or large tracts of government land which become productive due to construction of storage dams and irrigation networks which are rented for farming.

Agriculture is the most important sector of the Iranian economy: it provides 21 percent of GNP, employs 37 percent of the labor force, and supplies more than 50 percent of the non-oil exports of Iran. The economic development of Iran is, therefore, greatly dependent on the full exploitation of the development potential in agriculture. In recent years, however, because of adverse weather and constraints and obstacles inherent in the change of the land tenure system, the growth of agriculture has been poor. This, however, does not indicate lack of development potential, or that the problems are insurmountable.

The success of the land reform program has set the stage for the emergence of a modern, broadly based, commercially oriented agricultural sector. Increased farm production and agricultural development are now dependent on the availability of better knowledge, credit and other inputs, as well as proper outlets for farm products. The discussion of the problems, related to agricultural credit in Iran is the purpose of this paper.

Sources of Credit

At present, credit for Iranian agriculture is supplied from the following sources:

1) Rural cooperatives and related organizations
2) Agricultural Cooperative Bank of Iran (ACBI)

3) Agricultural Development Fund of Iran (ADFI)

4) Special government programs

5) Processors of agricultural products

6) Commercial banks

7) Noninstitutional credit.

Organized credit represents approximately one-third of the total amount of the loans obtained by the farmers. The remaining two-thirds is obtained from private moneylenders, middlemen traders, and relatives. These loans generally carry very high interest rates (estimated to range between 24 and 48 percent); they are not production oriented; the terms are usually 6 to 12 months, and they often include foresale of the crops at disadvantageous prices, specially when traders are the lenders. The only advantage and the reason for success of this type of credit is its ready availability and freedom from red tape. It is expected that gradual education of farmers about the cost of noninstitutional credit, and the availability of organized credit with greater relative ease, will gradually reduce the importance of noninstitutional credit from private moneylenders.

The sources of organized credit in Iran are described briefly in the following paragraphs.

RURAL COOPERATIVES

The number of active rural cooperatives during the past crop year (1970-71) was 8,300 with membership of 1.6 million which is approximately 50 percent of the total number of subsistence farmers. Total capital and reserves of all the rural cooperatives was Rls. 2,380 million in 1970-71, and the total amount of loans advanced was Rls. 6,310 million in cash and in kind.

The main function of the rural cooperatives is granting of medium and short-term loans. The noncredit functions include: supply of agricultural inputs, assistance in the construction of irrigation facilities and stores, distribution of consumer goods, and to a small extent assistance in marketing of the members' produce. The resources available to rural cooperatives include: government capital, credit from the Plan Organization, credit from the Agricultural Cooperatives Bank of Iran (ACBI), as well as their own capital and reserves.

The rural cooperatives are controlled and supervised by a government agency named the Central Organization for Rural Cooperatives (CORC) which is an organ of the Ministry of Cooperatives and Rural Affairs. Rural Cooperative Unions (RCU) are formed by share partnership of rural cooperatives to provide supply and marketing functions to their member cooperatives. At present there are 118 such unions formed with 7,650 member cooperatives and Rls. 992 million aggregate capital.

With the wide coverage of the rural cooperatives, they are in the best position of assisting the subsistence farmers in providing credit, inputs, and marketing outlets, thus reducing the dependence of cultivators on the moneylenders. The past performance indicates relative success in these areas. At present, the main problem with the credit functions of the rural cooperatives is that the size of each loan is not related to the area under cultivation and the crop for which it should be used, and thus falls far short of the farmers' needs. The supervision of the loans is generally inadequate, thus the use of credit for productive purposes is generally uncertain. Finally, the cooperatives credit, because of its limited supply, has not contributed significantly towards the financing of on-farm investments.

In order to achieve the aims of the cooperatives movement in Iran, the rural cooperatives must expand to include all the subsistence farmers in the country. For cooperatives which have overlapping areas of authority, or those that are not economically viable units, merging is necessary. Finally training of the cooperatives personnel in business management, and providing the necessary resources are key elements in the future success and expansion of the rural cooperatives.

AGRICULTURAL COOPERATIVE BANK OF IRAN (ACBI)

This bank is the oldest and most widely represented credit institution for agriculture. Its purpose is to provide short, medium, and long-term credit to individual farmers and rural cooperatives. It also finances special government programs for improvement of agricultural production. During the 1970-71 crop year, ACBI has advanced loans in the aggregate amount of Rls. 8,909 million. About 90 percent of the loans were short-term for current agricultural operations. The recipients were rural cooperatives 75 percent, individual farmers 15 percent, and government programs 10 percent. In the past, most of the credit from ACBI was given to the individual farmers, but with the recent changes in the charter of the Bank and the emphasis placed by the Government on further development of rural cooperatives, a greater portion of ACBI's financing is expected to be channelled toward cooperatives. This would invariably mean less activity in financing individual commercial farmers, who at present depend solely on ACBI for short-term financing as well as smaller long-term loans.

The main weakness of the ACBI's lending operation for individual farmers is that the sanction and the size of each loan is related more to the collateral security offered than economic viability, repayment capacity, or the intended purpose of the loan. The loans to individuals are not supervised adequately, and because of the concessionary rate of interest, the use of the loan for the stated agricultural purpose is often the subject of doubt. In financing the rural cooperatives, lack of sufficient credit supervision is the main cause of the present shortcomings.

To be most effective, ACBI should continue to finance short-term credit requirements of the commercial farmers. It should also be prepared to increase the maximum size of its long-term loans, up to the lower limit of the loans made by another credit institution described later. The procedure for appraisal and the supervision of loans, both to cooperatives and individual farmers need to be improved.

AGRICULTURAL DEVELOPMENT FUND OF IRAN (ADFI)

This recently established credit institution was created for providing long-term financing for commercial agricultural projects. Although its share in the total volume of agricultural credit in the country is small, it handles the major portion of the institutional long-term credit for agriculture. During its three years of operation ADFI has approved about 70 projects for financing. Total investment in these projects was Rls. 3.5 billion, out of which the contribution of ADFI was Rls. 1.4 billion. The average size of a loan during this period was about Rls. 15 million. The borrowers were commercial farmers or companies engaged in agricultural activities.

The main weaknesses in the operation of ADFI are the large size of loans, lack of representation in the provinces and field organization, inability to finance short-term credit, and finally high interest rates. These factors limit the clientele of the Bank to only large size commercial farmers, who constitute a relatively small part in the total spectrum of agricultural production units in Iran.

To be more effective, ADFI should reduce the lower limit of its loans. With the planned expansion in the operation, establishment of a field organization will be essential. Measures should be taken to provide, even if not directly, the short-term requirements of the projects financed by ADFI. Finally, mobilization of more resources and expansion of the operation of this Bank is necessary to provide a greater portion of the term credit requirements of commercial agriculture in Iran.

COMMERCIAL BANKS

The banking system in Iran is comprised of the Central Bank of Iran, seven specialized banks, and 20 commercial banks. The largest commercial bank is Bank Melli Iran, which is owned by the Government. The banking activity has been steadily expanding; at present the total deposit with commercial banks is approximately Rls. 150 billion, and there are about 5,000 bank branches throughout the country.

The credit activity of the commercial banks for agriculture is a minor part of their total lending operation (in 1349 only about 10 percent). In the absence of a production credit system for agriculture, most of the commercial bank's finances which end up in agriculture are in the form of credit to big agriculturalists, processors, merchants, exporters, etc., which is sub-lent to the farmers at stiffer terms. Only Bank Melli and Bank Saderat, which have the biggest network of branches, are active in any significant scale in agriculture. The loans from the commercial banks are totally unsupervised, short-term, and not oriented toward production purposes.

The activity of commercial banks in agriculture needs to expand rapidly, for providing short-term credit requirements of the farmers. This involvement is the most important change which should take place in the agricultural credit system of Iran in the future. Transformation in the banking attitude, as well as changes in legal and operational aspects will be required before much of commercial banks' credit can be channelled to agriculture. The Central Bank should provide the necessary incentives for this important change.

OTHER SOURCES OF CREDIT

Credit is also provided to farmers under certain special government programs and agencies. The channels are regional development authorities (i.e. Ghazvin and Khuzestan), ACBI and Rural Cooperatives, a special organization concerned with individual crops (such as tea, tobacco, sugarbeets, and cotton), and government agencies in charge of the distribution of farm machinery and fertilizer. The programs for which credit is provided aim generally for improved production practices of special crops, encouragement in the use of modern inputs, and enhancement of general development of agriculture in special areas. The most important positive aspect of these types of credits is the production orientation and the concessionary rates. By providing most of this credit in kind, their use in the intended purposes is guaranteed. The main disadvantage of direct government credit is its high cost and the relative difficulty in its supervision.

Another source of credit for agriculture is the processors of agricultural raw materials such as cotton, oil seeds, fruits and vegetables, and sugarbeets. The processing companies generally provide advances to cultivators, in kind to the extent possible, to be accounted for when the farm produce is sold to the factories at the time of harvest. The advantage of this type of credit is its production orientation, being accompanied by some extension service, and guaranteeing the marketing of the farm production.

This type of credit is generally short-term with higher effective interest rates than from commercial banks. The specific use of this type of credit limits its effectiveness for general farming.

Supply and Demand for Agricultural Credit

The total volume of agricultural credit in Iran at present is estimated at about Rls. 60 to 65 billion, of which organized credit constitutes approximately Rls. 20 billion. Rural cooperatives provide about 6 billion, another 9 billion is provided by the Agricultural Cooperative Bank of Iran, and the remaining Rls. 5 billion is supplied by various government agencies, commercial banks, the Agricultural Development Fund of Iran, and processors of agricultural raw materials. More than 95 percent of the present supply of credit in agriculture is short-term. The supply of medium and long-term credit is far less than total requirements, estimated at about Rls. 2 to 3 billion.

Many factors such as future agricultural policies, farmers' willingness to borrow, and incentives for investment in agriculture, etc., affect the future demand for agricultural credit. The uncertainty regarding these factors makes the quantification of demand projections rather arbitrary. On the basis of available data, the broad magnitude of credit needs for agriculture may be estimated. For short-term credit, considering the unknown future cropping pattern, increase in the use of modern inputs, working capital requirements of new commercial farms, and credit requirements for the marketing of inputs and products, the annual demand should increase gradually, depending on changes in the above mentioned factors.

The demand for term credit for financing on-farm investment will depend directly on the rate of development of irrigation in Iran. Assuming development of 1,000,000 hectares of newly irrigated land during the next decade, and one-third of the required investment to be from the cultivators' own resources, Rls. 20 billion is estimated to be required for land improvement, purchase of farm machinery, and construction of wells, irrigation networks, and other installations. Development in dairy, beef, and sheep production is estimated to require an additional Rls. 10 billion of credit. Marketing facilities can use Rls. 5 to 10 billion long-term credit.

Considering the present supply and distribution of credit, the major future expansion will be for investment credit and for commercial farms. These farms show the most promise of modernization, profitability and growth, and will undoubtedly account for the major part of growth in agricultural output.

Conclusions

In general, the supply of institutional credit in agriculture is at present far less than total requirements. The agricultural credit must thus institutionalize and expand, if the planned development of agriculture is to be achieved. The credit should be available to the farmers with a minimum of bureaucratic formalities, and at relatively easy access. The size, time of sanction, repayment terms, and ratio of the loans from various agencies should be adjusted and oriented towards production aims. Supervision of the proper usage of credit should become universal and compulsory.

For short-term credit, the requirements of subsistence farmers should be met by the rural cooperatives after becoming financially strengthened, consolidated, and made to cover all the villages and small farmers in the country. For commercial

farming, commercial banks should be motivated and provoked to get involved in agricultural financing by providing the short-term credit requirements of the commercial farmers and agricultural companies. The Agricultural Cooperative Bank, in addition to providing the required finances of the rural cooperatives, should complement the activities of the commercial banks in providing short-term credit to individual commercial farmers.

For medium and long-term credit, the rural cooperatives should become the source for small farmers. This would entail the availability of long-term financing from the Agricultural Cooperative Bank of Iran to the rural cooperatives for term sub-lending. The commercial farmers and agricultural companies should be able to get medium and long-term credit from both the Agricultural Credit Bank and the Agricultural Development Fund, depending on the size of the required loan. The present size gap between the upper limit of ACBI loans and the lower limits of ADFI loans should be removed by each bank extending their loan size boundaries.

Finally, agricultural credit should be considered as only one of the many necessary physical and nonphysical inputs required for achievement of agricultural development. Even with the abundance of supply and proper channelling, the extent of contribution of credit to agricultural development is dependent on the absence of other limiting factors. In Iran, these include: lack of practical research information, improper marketing and pricing systems, shortage of trained personnel, confusion originating from unclear government policies, and finally shortage of water and limited supply of other natural resources.

LONG-TERM AGRICULTURAL POLICY IN IRAN

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We come together at the first CENTO Seminar on Agricultural Planning at a time in history which is truly decisive for all member countries, but especially for those of this region. It is a time when the prospects for the future of our societies have never been more promising. It is also a time when problems relating to our agricultural communities deserve greater attention than ever before.

According to the FAO statistics nearly seven out of every ten persons in developing countries depend directly upon agriculture for their living. Agriculture accounts for almost one-third of the developing countries, total domestic output of goods and services, or gross domestic product and for most developing countries, agriculture provides 80 to 90 percent of their export.

Since agriculture plays such an obviously prominent role in the developing world, it is surprising that its importance has been widely recognized only recently. Now, however, developing countries themselves, international development agencies like the United Nations Development Program, the World Bank and industrialized countries involved in helping the less developed countries all agree that agriculture must provide the foundation for a healthy economy in the developing regions.

Given the primitive state of agriculture in much of the Third World and a projected expansion of its population by 1,000 million persons by 1985 compared with 1965, how can a healthy economy be achieved ?

The FAO Indicative World Plan for Agriculture indicates that by 1985 the developing countries will require nearly two and a half times as much food as they did in 1962; about two-thirds of this will result simply from the multiplication of mouths to be fed, while only about one-third will be due to higher individual purchasing power.

So the problem is not only to meet the demands of a rapidly increasing population but also to adjust production to changing patterns in demand for food which come with rising income.

Another problem facing us is the question of employment in agriculture. The agricultural sector cannot economically absorb all the labor that is now available in rural areas and there are not enough jobs away from the farm to employ all who are looking for it.

In relation to the subject of production and employment in agriculture, the developing countries have to take into consideration yet another grave situation, and that is the condition of international trade. The Indicative World Plan predicts that developing countries generally will be able to produce enough agricultural commodities for export in coming years, but for most products the problem will be to find profitable markets.

According to the statistics given by FAO from 1955 to 1967 the value of crop and livestock exports from developing countries rose at a rate equivalent to only 1.2 percent per year while that in developed countries increased by 5.5 percent per year. Furthermore on commercial and concessional terms imports by developing countries of crop and livestock products increased over the same period by more than 5 percent per year.

Taking into consideration such problems of worldwide importance and with a view to raising the standard of living of the rural population, the Government of Iran has completed various agricultural development plans during the past 20 years.

Development planning, started in Iran in 1949, and the First and the Second Plans of the country dealt with acute problems that had confronted the community of Iran in the past and which called for prompt actions by the Government for their elimination.

The objective of the Third Development Plan was to create a transformation in the agricultural activities of the country, to provide the community with better amenities of life while ensuring a more equitable distribution of income, particularly for the farmers. Experience so far gained had demonstrated that unless major changes were made in the prevailing systems, these objectives could never be realized. The factors requiring change included the social structure of the agricultural community, land ownership and the system of land exploitation.

Based on the above objectives, the regime of landlord and tenant was abolished in 1963 under the leadership of His Imperial Majesty Shahenshah Aryamehr and the Land Reform Law was introduced and approved by the nation. The farmlands were distributed among the peasants, thus encouraging them to put greater efforts into increasing agricultural production. It was evident from the outset that no long-term agricultural planning, based on sound economic concepts, could be initiated, without first abolishing the old and introducing the new land tenure system. The First, Second and Third Development Plans, therefore, provided only for short-term agricultural programs and served as foundations for later plans. They could not be considered to be comprehensive long-term agricultural plans, conforming to and consistent with the economic development of the country.

In the Fourth Development Plan a sum of 1.5 billion dollars was allocated to agriculture and irrigation and a growth of 5 percent per annum was foreseen for agricultural and animal husbandry products.

Shortage of water is a limiting factor to agriculture in Iran and the country has also suffered drought for the last two years. Therefore, the average annual growth rate for agricultural products during the first four years of the Fourth Plan is estimated at about 4 percent, which is not in harmony with growth rates in other sectors under the existing conditions in Iran. Efforts to increase the rate of growth to more than 5 percent are being made for the coming years.

A long-term agricultural policy has been presented by the Ministry of Agriculture to serve as a guideline for future development programs. In this master plan for agriculture which will be effective after final review and approval, the following aims have been considered as principal objectives:

1) To make maximum use of our natural resources

2) To provide reasonable occupation for the farmers by establishing rural industries and by adopting measures to employ the farmers in other sectors of the economy

3) To increase the per capita income of the rural population so that it compares favorably with the income of the urban population

4) To obtain optimum yield per hectare

5) To increase production in order to attain self-sufficiency as far as possible.

The realization of the above objectives will require a considerable investment and, although in comparison with other sectors, the return from investment in agriculture is rather low, to obtain a reasonable growth rate adequate funds must be invested in agriculture and the Government must bear the greater part of these heavy expenses.

In realizing these objectives we are, however, confronted with four major problems. These are:

1) Population increase

2) Employment in rural areas

3) Limitation of water and land

4) Shortage of skilled labor in agriculture.

POPULATION

To provide the food requirements of an ever-increasing population will be a major problem in the future. The rapid increase in population and the gradual exhaustion of the natural resources have focused the attention of Government on the fact that the country's future food requirements must be foreseen now and suitable measures taken to provide adequate food in due time.

On present estimates, the population of Iran is expected to reach 55 million in 1995 which means that the country's population will be doubled in the next 24 years. To this serious problem should also be added the expected rise in the standard of living and thus a changing pattern of demand.

EMPLOYMENT IN RURAL AREAS

Out of the 28.5 million people now living in Iran, about 11 million reside in the urban districts while more than 17 million live in the rural areas and earn their livelihood by farming, animal husbandry and other rural occupations. Considering a rural family at five members each, it will be noticed that 3.5 million rural

families live, at present, on the income from 3.5 million hectares of irrigated and 4 million hectares of dry-farmed lands. These small holdings, apart from being uneconomic, also prevent reasonable mechanization in agriculture.

During the next 25 years the number of farmer families will reach 5 million and it will be necessary to keep them employed throughout the year either by establishing rural industries and introducing improved systems of cultivation or by having them absorbed by other industries and services.

LIMITATION OF WATER AND LAND

The natural resources available for agriculture in the Middle East are limited and Iran is no exception. Reclamation of new land for cultivation is an expensive process.

Therefore, efforts must be made to utilize the available natural resources to obtain maximum output by increasing the yield per hectare and thus solving the problem of land limitation to a great extent. In adopting policies on matters pertaining to water and land, the Government has taken measures to prevent the land holdings from falling below the economic level. In the programs prepared for the cultivation of various crops, climatic conditions as well as the quality of land and water in the regions concerned have been taken into consideration and efforts have been made to encourage the cultivation of the most suitable crops in the regions of high potential for agricultural growth known in Iran as the "agricultural centers for development."

THE SHORTAGE OF SKILLED LABOR

In the production areas regional training centers of the Ministry of Agriculture will be established to train agricultural technicians and skilled labor to fill the gap between experts and the farmers.

With due consideration of the existing problems, the policies established for realizing our objectives are as follows :

1) Agricultural services and inputs needed for implementing the development plans, will be centralized and concentrated in the regions of high potential for agricultural growth.

2) In order to obtain the optimum yield per hectare, irrigation systems will be improved and, by harnessing the available water and regulating its flow through the construction of irrigation networks, it is hoped that the maximum use of available water for agricultural purposes will be achieved. Extensive land levelling will also be undertaken. Comprehensive plans for establishing multipurpose agricultural research centers in the agricultural development regions in order to coordinate all research activities are being prepared.

   - Agricultural service centers will be established near the farms in production areas so that they may be able to provide services in time.

   - In order to encourage the farmers, policies will be designed to stabilize prices and, thereby, support and protect agricultural products.

- To enable the farmers to make maximum use of agricultural inputs, cooperative societies will be developed. To prevent the breaking up of farms into small uneconomic holdings and to enable farmers to use farm machinery and consolidate their holdings, farm corporations will likewise be expanded.

- To provide animal feed, the cultivation of forage in the cropping patterns will be encouraged and steps will be taken to conserve the soil and reclaim the natural pastures.

- In order to utilize new techniques and accelerate the production of crops, part of the land below the dams will be allocated to agro-industrial business.

The long-term policy which I have briefly elaborated is a part of a master plan for the agricultural development of the country; detailed studies have now been started and preparations are being made to formulate the Fifth Agricultural Development Plan which will start in 1973.

AGRICULTURAL PLANNING FROM THE STANDPOINT OF MARKETING AND PRICE POLICIES

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Agricultural planning may be for the whole of a country's agriculture, or it may be for a particular area, project or crop.

Various goals may be stated for plans, for example, to achieve a balanced economy in the country, to improve farmers' incomes and standard of living, to reduce migration to towns, to earn foreign exchange by increasing exports, to save foreign exchange by substituting local production for imports, to become self-sufficient in a particular crop- - such are some of the aims frequently stated, when planning by a government organization covers all, or an important part, of the agricultural sector.

When, however, a farm project is undertaken by a business company or by an individual, the aim, whether stated or not, is understood by all to be to make profits, whatever other benefits may accrue to an area of the country, or to the country as a whole, as a result of setting up the project. It is also regarded as self-evident for such a project that unless the produce can be sold, either for processing into a form to be consumed ultimately, or else directly for consumption, and at prices that will more than cover the costs of production plus all the costs of getting the produce in an acceptable form to the consumer, no profit will be made. If such a private project makes no profit or sustains a loss it has to close down when it sees no prospect of improvement or when it runs out of funds.

It should be equally evident that in the broader fields of agricultural planning the same considerations apply. Production is for consumption. The desires and needs of consumers, either within the country, or in the case of exports, outside it, and the extent to which produce can be sold in the markets available at sufficient prices in relation to costs of production and distribution, determine whether agricultural planning for production results in success or failure. Of course a government normally has greater resources than any private organization and can, by subsidies or a variety of arrangements or controls, keep in existence a project which would have failed in private hands alone, because its produce could not yield sufficient return. Such action may postpone the day of reckoning or may seem to be successful, but in most cases is likely to result in more difficult problems. Such policies are frequently instituted for political more than for economic reasons and are often difficult to discontinue.

Marketing, the Basis for Agricultural Planning

To be successful, therefore, agricultural planning for production must first take into consideration actual and potential consumption of what may be produced; that is to say, the present and probable future state of markets, both inside and outside a country, and how produce might or might not be successfully distributed and sold in those markets for consumption. In other words, agricultural planning must begin with marketing.

Therefore it is necessary to appreciate exactly what the activity of marketing entails. The following are various definitions:

1) The process in a society by which the demand structure for economic goods and services is anticipated or enlarged and satisfied through the conception, promotion, exchange and physical distribution of such goods and services.
(This is a definition from the standpoint of philosophy of marketing of a marketing faculty in a university.)

2) All business activities involved in the flow of goods and services from production to consumption.

3) Marketing, in a free economy, is the skill of selecting and fulfilling consumer desires so as to maximize the profitability per unit of capital employed in the enterprise.
(This is the definition of a businessman).

We come also to a definition of product, which is the object marketed.

A product to be marketed is any consumable item which costs something to provide at a given time and place and in certain units, which is designed to fulfill certain desires, and for which people are prepared to pay a price that makes it worth the producer's efforts to provide it.

Marketing therefore, includes not only the actual physical distribution of goods and services, but also the determination of the amounts and kinds of products that consumers will purchase and the prices that they will pay, together with the research, development and introduction of new products and the various merchandising activities involved in satisfying the demands of consumers. In this connection by merchandising is meant planning the physical presentation of a product so that people will buy it at the most profitable price.

The phase of marketing which must provide the basis for resource use in agricultural planning is the estimation of future market demand for the various agricultural products, both for domestic consumption and for export. Such demand projections should provide information on the probable market requirements in the short run or immediate future, including periods up to a year, as well as intermediate and long-run projections for periods of up to say, 10 years.

Such projections should provide answers as to which crops it may be profitable to grow, and, among possible alternatives, that crop which will provide the best return for the inputs provided. For example, on an area of irrigated land it may be possible in one season to grow either wheat or cotton or sunflower. Study of available markets, and of the probable demand, supply and prices in relation to costs

of production and of marketing, provides a guide as to which crop to plant. For such seasonal crops, which can be varied yearly, or for agronomic reasons should be rotated from season to season on established agricultural land, marketing projections are short-term only. But if much capital would be needed to bring, for example, new land into cultivation or to install an irrigation system on previously rainfed land, then longer-term projections of the probable results of marketing the various crops made possible by such capital expenditure need to be made, before it is decided to put such capital works in hand, in order to establish whether the project can be self-supporting. Similarly, if expenditure is envisaged on long-term crops, such as fruit trees, a market study needs to be first carried out on a long-term basis, in order to establish whether the project is feasible, that is, whether the returns during the life of the trees, having regard to the possibilities of marketing the fruit, justify the capital expenditure involved in planting the trees, and maintaining them until they are bearing, as well as the annual costs of harvesting and marketing the fruit from them.

Market prospects should also influence agricultural planning as regards the import or export of produce. For example, a survey of internal and world markets may show that it is cheaper to import an agricultural product than to produce it in the country. In such a case, the land and inputs previously devoted to this crop could be used for another crop which could be exported to yield more foreign exchange than that required to import the first product. If the returns to the producer are also greater by producing the export crop, then there would be good reason to plan a change in the cropping pattern. That would be the economic approach. However, ideas about self-sufficiency or political fears about dependence on foreign supplies, justifiable or not, sometimes prevent an economic proposition from being accepted and followed.

Realization that production should be planned according to market requirements is evident in the cases in which farmers contract with a marketing organization to produce quantities and qualities of a crop according to the marketing organization's specifications, and often with the aid of credit and instruction from the organization. The marketing organization naturally bases its requirements on a previous market study on which it forms its decisions with respect to the quantity and qualities it requires to supply its market outlets and the prices it can afford to pay the producer in relation to marketing cost and probable market prices. Such an arrangement is apt to be beneficial to the farmer since it assures him of selling his produce at a certain price and gives him a basis for planning the use of his resources, which, without some knowledge of probable markets he cannot do to best advantage. To some extent guarantees by government organizations to buy produce at a guaranteed price serve this purpose, although sometimes such guarantees are not sufficiently related to qualities and a clear forward view of markets.

Planning Production for Export

Where production for export is concerned planning has to take account of the fact that world markets for many commodities are highly competitive, and that even when a sellers' market exists quality regulates the price received. Additionally, the existence of a sellers' market invites increases in production in future seasons, with the result that increased supplies create greater competition and reduced prices. Any supplier who has allowed the standards of produce to deteriorate because of good prices during a period of shortage of supplies will find himself in a poor position to compete in world markets when the market supply situation changes to one of plenty.

When it is thought possible to enter the world market by exporting a product which has not previously been exported to any great extent the following sequence of action is needed to determine whether such production can be planned successfully and to what extent:

1) A preliminary assessment of production potential

2) A preliminary assessment of market potential

3) If (1) and (2) seem satisfactory, a thorough market survey

4) Production trials based on market research if market and consumer research under (3) have good indicators, and facilities exist for proper harvesting, assembly, grading, packing, transport, etc.

5) Trial export shipments, closely supervised at all stages, including distribution, with the results fully investigated and reported on if production trials result in a satisfactory product.

6) Continued production and export trials with any changes required, based on the findings of previous shipments

7) Depending on the results of these trials a complete analysis of the feasibility of a full-scale programme of production and marketing for export with detailed planning as to how it is to be carried out.

It is clear that such action must start with consultation between production and marketing experts, in a preliminary assessment of production and market prospects and that such consultation must continue closely at all stages of such a project. Success cannot be achieved without full communication and collaboration.

Planning for New Agricultural Production

Much the same steps as outlined to determine the market possibility of a prospective export commodity need to be taken in connection with the introduction of a new project for agricultural production designed to supply internal markets.

Planning must include consideration of the following details :

1) The location of production in relation to the supply of inputs and to potential markets

2) Costs of production in comparison with those of others competing to supply the market

3) The quantity and quality of production- - the seasonality of production in relation to market requirements

4) Present and future demand for the product, related to variety and quality, volume and prices in alternative outlets

5) Costs of harvesting and assembling by possible alternatives

6) Costs for cleaning, sorting, grading and packing, including equipment

7) Costs for storage and the need for storage in relation to periods of production, of market supply and the perishability of the product-- the possibilities of using rented storage or the need to erect storage

8) Determination of marketing margins

9) Evaluation of the return on investment resulting from the proceeds of marketing and the production and marketing costs incurred.

Both planning and market surveys require reasonably accurate information, both of the present and of the past, in order to evaluate the present situation and to make projections of future situations.

Without such information embodied in recorded and reliable statistics any planning or projections are based on no more than guesses and success is a matter of chance.

Given a basis of accurate statistics and making certain stated assumptions, econometricians can estimate mathematically the supply and demand elasticities on which to base projections of future situations.

Such projections, like any other attempts to foretell the future, are by no means infallible, but are to be used, along with any other indications that may be obtained by study of past and present situations, as guides to decision making based on probability. An element of risk remains always, but the degree to which it can be assessed may decide the success or failure of a project.

Prices Provide an Incentive for Increased Productivity

The main aim of agricultural planning is generally to increase the income of the agricultural sector of the economy. Such an increase in farm income helps not only farmers but the rest of the economy. This stimulus from increased farm income to the general economy comes in part from an expansion in the farm market for production and consumer goods manufactured locally, but also from the value added to primary farm products as a result of transportation, storage, processing and merchandising. The means of achieving increased farm income by means of agricultural planning is primarily through improved farm productivity or better use of resources. An essential incentive for improved farm productivity is a rational price policy and the assurance of an adequate level of minimum prices.

The general position on farm prices has been summed up by Professor Arthur Lewis: "While it is true that an increase in farm prices by itself will not necessarily raise farm productivity significantly, it is equally true that keeping farm prices low can be disastrous."

That prices are influenced by supply and demand is an over-simplified general statement which has to be qualified in various ways. In the actual market buyers and sellers have imperfect knowledge of supply and demand. Therefore although prices may tend towards the position of equilibrium at which buyers take all that producers offer; in fact, imperfect knowledge, as well as other factors, prevents this equilibrium being reached. One such factor is the pricing policies and strategies of all participants in marketing that tend to distort the price-making function of supply and demand. Another factor is the general level of prices, which means the movement of all prices and not those of a single product alone. This general

level of prices tends to influence the approximate level of prices for a particular product, in that the prices of each product tend to follow the movements of the general price level.

The demand and supply factors for each product in this situation come into play to determine how much above or below the general price level the prices of each product are likely to be. Even so and under the influence of supply and demand there is not inevitably a single price for each product, or for each quality of each product, but rather a band of prices, the bottom price tending towards cost, and the higher prices resulting from various influences.

Demand itself (by which, of course, is meant effective demand, that is, what consumers are able and willing to buy at a given price, not what they need or desire), is influenced by price, to a greater or lesser extent, according to the elasticity of each commodity. The effect of demand is more immediately related to market conditions, e.g. prices, than is supply.

Supply has to be considered in terms of time, that is, the very short run, the short run and the long run. The very short-run supply consists of products already in the course of marketing. As many agricultural products, especially food, are perishable, these have to be disposed of in whatever way possible. Their influence on the market is largely one of daily to weekly supply in relation to demand during the same period.

The short-run supply is that which can be produced in the time required for a production cycle with the land and equipment presently available.

The long run means the period required for the land area under cultivation of a product to be expanded or contracted.

The financial results experienced by a farmer in the very short run influences his decisions for short-run and long-run production. For short-run production he is chiefly concerned with being able to meet his direct costs. For long-run production he is concerned about being able to cover all costs including overheads. It is the long-run position which is likely to influence him most in changing the nature or extent of his production or even to go out of business altogether.

This pattern perhaps applies rather more to commercial farmers than to small subsistence farmers. The latter have been found often to extend or contract their production in a following season according to the financial results of the previous one. For example, if prices are low in one season because of a very good crop they deduce from this experience that they should plant less in the following season. Consequently, in the next season prices are higher but the farmers' returns may be no more because of their smaller crops. One of the factors determining such a decision is the income from the preceding crop which is available to finance production in the year following. In such circumstances a farmer who took into consideration the behaviour of his fellows and the results of their actions, would plant more, not less, in a season following a large crop and low prices, and, conversely less in a season following a smaller crop and high prices. This would, however, be an exceptional reaction.

The general objective of limiting price fluctuation to achieve a greater degree of price stability has resulted in the establishment of price policies by governments. Government intervention in some countries has had as its aim the protection of producers from unduly low prices, while in others the aim has been to protect consumers from increases in the prices of agricultural products.

Price policies, along with other aspects of planning, require adequate and reliable quantitative information. The formulation of a price policy must take into consideration the effects of such a policy on the supply of a product and on supplies of other products; its effects on the allocation of resources to the particular product and to other products; its effects on demand; its effects on the balance of demand and supplies; and its effects on the real income of producers and consumers.

One form of price policy designed to avoid fluctuations in supply due to uncertainty on the part of farmers with respect to adequate prices is a guarantee by a government organization to buy, at a price fixed before planting time, any quantity of produce of specified quality that is not otherwise absorbed by the market. Such a guarantee enables farmers to plan production in the certainty that they are assured at least a basic price, even though this may be lower than the maximum often obtainable. The result can be that fluctuations in supply would be limited to those caused by weather conditions or pests.

Any such price policy, however, has to be pursued with moderation if further problems which can be seen at present in some countries are to be avoided. Frequently, every year there is political pressure to raise the level of guaranteed prices. When this has been done the result has been ultimately a guaranteed farm price out of proportion to the general level of internal prices and of world prices, thus providing a massive inducement to farmers to increase production of that crop. This in turn can result in the accumulation of large surpluses for which disposal is difficult or impossible, with consequent heavy financial strain on the government organization which has to buy, store and attempt to dispose of stocks.

Government price policies which are designed to protect the consumer from higher prices of food products may have the opposite effect. If maximum prices are established without due regard for the economic position of producers faced with increasing costs of some production inputs and their reaction to what may be production disincentives, decreased production is inevitable. Such policies in the longer run will result in either higher consumer prices or the expenditure by the Government of foreign exchange to bring in supplies from abroad, while at the same time domestic production resources are not being effectively used. The best assurance of reasonable consumer prices is abundant supplies resulting from increased productivity.

There have been instances when some governments have pursued a dual price policy of an increasing guaranteed price to farmers, while at the same time holding down the consumer price at much lower levels. The inevitable result is a large financial deficit on the product's account which can be met only from government revenue derived from taxation. Once such a situation has been established it may be found that there is extreme political pressure from producers and consumers, blocking any attempt to approach a sounder economic and financial position by bringing producer and consumer prices into a closer relationship.

Such situations are a warning that while a price policy which attempts to regulate market forces may be successful if pursued in moderation, care needs to be taken that it does not run away and become unmanageable as a result of altering or superseding completely the free play of the relationship between supply and demand, which of itself tends to lead toward market equilibrium.

In a free unregulated market a rise or fall in the price of a product is a symptom of demand-supply conditions. Within the limits of normal production and supply, excepting, of course, gross shortages or surpluses, such price changes

tend to bring their own correction by attracting to or diverting from the market concerned either supplies or demand. Too close an intervention by a government in an attempt to keep prices within narrow limits is liable to upset the market mechanism and to create a chain of problems. In any case, attempts to fix prices by legal enactment cannot be fully enforced even by armies of inspectors. Such controls result in black market operations and corruption. Short-term stabilization of consumer prices can be more successfully achieved by having available supplies to introduce into a market when prices are rising unduly and an organization to take supplies from an oversupplied market when prices fall unduly.

When prices for a product consistently remain at a high level and it is established that this is not caused by costs of production alone then it is necessary to look to improvements in efficiency in processing and marketing. The prevention of waste, improvements in grading, handling, packing and transport, the rationalization of supplies to meet demand, the provision of storage to enable supplies to be regulated and the general dissemination of accurate up-to-date information of market conditions can all do much to keep prices within desirable bounds.

Competition in the market can also be potent in reducing wastage, improving quality and reducing costs and margins. Stimulation of competition by removing obstacles to competitive trading such as artificial monopolies and restrictive licencing of traders, and by the encouragement of cooperatives, not on a preferential basis, but in equal competition with the private trade, can do much to maintain equitable price levels.

Price policy, like the whole subject of this paper, is such a large, and disputable subject that it cannot be covered adequately here. It is hoped, however, that enough has been said in this limited space to indicate the importance of the relationship of marketing to agricultural planning and some of the considerations which should influence price policies and which are bound up with both planning and marketing.

To sum up, agricultural planning must start with an assessment of potential markets and of marketing facilities, equally with an assessment of potential production. Production should be planned in relation to consumption, and to the marketing techniques which enable consumer demand to be satisfied in the most efficient manner, while at the same time providing the best possible returns to producers.

Prices are both a symptom of the demand-supply relationship and a factor in the creation of demand and supply. Formulation of a price policy needs to be based on consideration of all the possible immediate and long-range effects of intervention in the free play of the price mechanism. Such intervention is more effective through indirect means than through direct legal controls.

Incentive or guaranteed prices to farmers need to be accompanied by other aids to increase productivity. Consumer prices can be influenced by the promotion of competition, efficiency in marketing, including the prevention of wastage, and the assurance of steady supplies to meet demand. Low prices to consumers may result in a decrease in supplies through removal of incentive from producers.

APPLICATION OF ECONOMETRIC MODELS IN AGRICULTURAL PLANNING

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I have been assigned the unfair task of discussing the application of Econometric Models in Agricultural Progress without using economics nor mathematics in eight minutes. It seems to me that first of all I have to explain what econometrics is. Classical economics was developed on a fairly abstract and general basis. The historical development of these theories has been in the treatment of patterns of human behavior in the economic phase of life, as though the implied relationships were exactly fulfilled. This was in line with the general thinking in the school of deterministic philosophy and Newtonian mechanics, which were dominant at the time. Along with the evolution in all branches of science, in economics too, a new branch, namely the econometrics, came into being. This branch of economics recognized that social behavior was exceedingly complex and that a limited number of variables related together in fairly simple and elegant equations cannot explain the whole of human behavior. Life in the social world includes many uncertainties and econometric analysis explicitly introduces a random element to include these disturbances. Therefore, econometric analysis leads only to probabilistic conclusions.

Econometrics, like classical economics, does believe that the future will confirm the past, and tries to make as strong a statement as possible about the future on the basis of past history. Therefore, one may conclude that econometrics is a way of studying history.

Econometric models, like any other models, are sets of simultaneous equations used to describe the economic system of a country as a whole or just a sector of it. The reason for simultaneity of these equations is to obtain consistency in the model. Quantities produced have to be sold; in order that they may be sold their prices have to satisfy certain conditions; and these prices are dependent on the prices of land, capital and labor. Also many agricultural activities are interrelated, since some use the products of others, for example, the use of feed grains in cattle production; or the products of two activities can substitute for each other, such as red meat and poultry meat.

In agriculture the econometric models are applied in the study of the spacial equilibrium and simulation models of development planning.

In spacial equilibrium models, the supply and demand functions for each commodity in each region are estimated. If some regions have a surplus while others have a deficit in supply of that product then it is profitable to ship from

the surplus areas to deficit areas, provided the transportation costs are not prohibitive. Therefore, the solution of these models would indicate how much of a given commodity should be transported from each region to other regions in order to maximize the total welfare of the economy.

The econometric simulation models are sets of simultaneous equations, each equation indicating one economic activity. Each equation, similar to the real world activity, contains two parts: one exogenous part, including the effects of factors with uncontrollable quantities such as weather, and one part which includes the endogenous variables, meaning factors the size of which we can control, such as investment. The endogenous factors can be combined together in an infinite variety of competing activities. The purpose of simulation models is to obtain the best way of combining our resources in agriculture to reach the goals set by the policy makers.

For any given values of the policy instruments, we can generate the time paths of the endogenous variables. We can show the policy maker the consequences of the proposed policies. The policy maker then can select the policies that are most compatible with his preferences.

Problems with econometric models--these models like any other models are only tools and they cannot give accurate results out of wrong data. So the availability of correct data is the first condition to obtain correct results out of econometric models.

Also, in some cases the solutions of these models are technically more difficult than other models, because of inclusion of stochastic terms.

THE ROLE OF LIVESTOCK IN CENTO

by Mr. Clyde S. Adams,
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It is with real pleasure that I am here today to address this CENTO Conference on Agricultural Plannning. My pleasure derives from three sources. First, having spent four very enjoyable years living in Ankara and Karachi, I have been quite eager to experience what this beautiful city has to offer. Secondly, having had a livestock bias for most of my life, it is gratifying to see the continuing emphasis CENTO is devoting to this most important subject. Thirdly, for four years I had the responsibility in Washington for CENTO agricultural affairs and this is my first opportunity of participating in one of your seminars. Because of the detailed attention devoted to livestock in past conferences--I might cite the December 1969 Conference on Livestock in Islamabad and the Veterinary Conference held in Ankara one year ago as examples--my presentation today will be brief. Some points, because of their importance, will bear repeating. I hope you will forgive me if I subject you to a certain amount of repetition.

Also, because of limited time, I am not going to say much about poultry. This does not mean I do not understand the important contribution made to Iran, Pakistan and Turkey by approximately 150,000,000 poultry. However, I believe that tremendous progress has already been made by this sector and numerous examples exist of outstanding commercial poultry enterprises in the region. I also won't be saying much about the role of livestock as draft power, mainly because of data limitations. Draft power is, however, a very important livestock contribution. For example, I remember the deep concern during the African horse sickness outbreak in the Middle East in 1960 and what a tremendous task the Turkish authorities accomplished in first containing it and then wiping out the disease. Because of its importance I would like to see some comprehensive studies made of draft power needs and the socio-economic implications of mechanization. For example, in East Pakistan it might be useful to study the other relations of animal draft power, land pressures and the use of small tractors.

General Importance of Livestock

Now having placed a few limitations on our discussions, let us review some of the basic reasons for livestock enterprises throughout the world, after which we will narrow our sights to CENTO only. We might say that livestock has been traditional, since ancient man was a hunter before he became an agriculturalist. It was an easy step from hunting to herding. Man enjoyed meat and milk and found many uses for animal skins. By domesticating livestock he saved time in meeting those needs.

Herding allowed specialization which, in turn, permitted more labor efficiency. Thus livestock contributed to man's demand for food and fiber and allowed him to be more efficient through specialization.

Early livestock operations were, no doubt, based on the ability of animals to forage for themselves and even today this is an important component of livestock enterprises. Livestock will utilize land that is inadequate for crop agriculture or even forestry. In Arizona, I am amazed to see rangeland that appears to be quite useless, but with a carrying capacity of eight cows per section (one section equals 267 hectares). The secret is in adjusting grazing intensity (numbers of cattle) to grazing capacity. These cattle will later receive supplementary feeding to produce a carcass the United States consumers demand, but it should be pointed out that much of the world (including Australia), produces grass-fed cattle with limited or no grain fattening. Thus we see that under proper management conditions, livestock can utilize land that may have little or no value otherwise by converting roughage into products in human demand.

A very serious problem in much of the world, even in the United States in some areas today, is protein deficiency. While we can, to a large extent, use plant proteins, a certain level of animal proteins (for essential amino acids) is considered essential. Livestock produces these proteins in forms which are enjoyed by all men of all ages. (While we talk about the potential of artificial steaks and artificial milk, so far my taste buds prefer natural products.)

Some countries, especially those with available land, such as Australia, New Zealand, Argentina, or even Denmark, have specialized livestock to the extent that these products produce major export earnings. These countries have taken advantage of natural resource endowments and developed highly successful enterprises.

Along with conversion of waste products, livestock will consume large quantities of otherwise unutilized byproducts. Brewers' byproducts, beet pulp and cottonseed cake are typical examples. In Florida, the development of citrus pulp helped both the livestock and citrus industry to expand their development.

In addition to foreign exchange, livestock products produce other economic benefits. Land otherwise not suited for agriculture is utilized by providing employment for labor. Even where land can be utilized for crops, under certain conditions it may be more profitable to produce livestock. Such conditions as demand for crops, demand for livestock, and demand for labor would have to be evaluated. Also, by the "value-added" process, livestock increases the gross national product. Finally, conservationists can present a good argument for livestock programs (assuming grazing intensity is matched to grazing capacity). Livestock adds to soil fertility, assists diversification of crop agriculture, and utilizes soil building crops such as legumes and grasses. While each of you can probably add to my list, I am sure we all have a better overall idea of the general contributions of livestock.

Contribution to CENTO

Livestock makes a major contribution to CENTO countries. While up-to-date data have not been easy to obtain, it appears that the gross national product from livestock is about 10 to 11 percent for Turkey and Iran and, perhaps, slightly less for Pakistan. However, it is difficult to measure such contributions as draft power, animal manure and employment. I personally believe that if the total contributions could be accurately measured, the figure would be considerably higher.

Total numbers of livestock are significant in all three countries as the following figures from the FAO Production Yearbook for 1969 indicate :

LIVESTOCK POPULATION -CENTO COUNTRIES
1967-68 Estimates

Livestock	Number of Head (000)		
	Iran	Pakistan	Turkey
Horses	420	497	1,183
Mules	135	26	259
Asses	2,000	925	1,965
Camels	240	601	43
Buffalo	220	8,750	1,248
Pigs	6 (7,500)[2]	NA	14
Cattle[1]	5,500	36,000 (32,819)	14,165 (13,220)
Sheep[1]	33,000 (28,000)	11,050 (13,234)	35,878 (32,654)
Goats[1]	13,000 (14,000)	11,500 (17,039)	20,659 (13,139) (5,563)
Poultry[1]	29,202 (43,000)	NA (70,000)	33,975 (33,000)

1. Major differences from FAO estimates of livestock numbers in parentheses. These figures were reported at the CENTO Conference on National and Regional Livestock Development Policy held in Islamabad, December 1969. Turkey reported 13,139,000 regular goats and 5,563.000 angora goats.

2. Reported by the Iranian Delegates, Sept. 1, 1971.

Source: FAO Production Yearbook, 1969.

Income from the livestock sector amounted to about $ 653 million in Iran in 1965, of which $ 37 million were exports. Meat contributed nearly 39 percent of the livestock income and milk about 30 percent. While I did not obtain comparable figures for Pakistan and Turkey, the percentage contributions to the GNP are about the same. With growing incomes, especially in Turkey and Iran, local demand for livestock products will be stimulated. This point is illustrated by the fact that in Iran, according to Central Bank figures, the overall prices of meat, fish and poultry have risen 60 percent since 1959, whereas the overall cost of living went up only 17.9 percent. In Turkey, it has been stated that no other major commodity has a greater price advantage and that the rapid increase in prices results from demand created by the combined increases in population and disposable income.

While Iran exports a considerable value of livestock products (wool, hides, skins, etc.), it also imports meat, especially in the winter months, to meet local demands. Thus from a food standpoint, Iran is probably a net importer of meat. Turkey, on the other hand, is a net exporter of livestock. Today this market consists of sales to other Near East countries, including Iran. However, if Turkey eliminates some of its chronic disease problems, the lucrative European market is close by. With increasing local demands, Turkey will either have to increase production or limit its exports. Turkey does not import much in the way of livestock

products and these are confined to non-foodstuffs. From a review of existing source material, it does not appear that Pakistan currently engages in much livestock trade other than nonedible products.

Livestock plays a major role in CENTO by utilizing land not otherwise suitable for cultivation and in utilizing crop residues. For example, in West Pakistan alone there are over 130 million uncultivatable acres from which livestock obtain some forage. In addition, 35 million acres of fallow and wasteland are grazed, plus livestock are permitted to "clean up" fields after harvest on some 27 million acres of irrigated land. Similar situations exist in both Turkey and Iran.

From the foregoing, it can be seen that livestock plays a major role in the economy of this region. In addition to contributing about 10 percent of the GNP, livestock contributes to export earnings, furnishes a livelihood for millions of families, and utilizes otherwise wasted land and crop residues.

Some Roadblocks Ahead

For the past several years we have been hearing about the tremendous successes of the Green Revolution and I am personally acquainted with the outstanding results in Turkey and Pakistan. At the same time, people raise the question as to why livestock has failed to keep pace. It would be simple to offer the excuse of the long-term nature of livestock husbandry versus the short-term characteristics of crop agriculture; however, there are other fundamental problems in addition to the time dimension.

Perhaps the most outstanding problem and, at the same time, the one with the most obvious solution is balancing livestock numbers with available feed resources. Ever since my arrival in Turkey in 1959, I have listened to livestock and range management officials state the simple answer to greatly increasing livestock production in the Near East and South Asia is to cut livestock numbers in half so there will be adequate feed for those remaining. Excellent feeding and range management demonstrations have conclusively proven that properly fed cattle and properly managed ranges yield vastly increased production. Then why haven't we culled out all the low producers, especially just prior to the advent of winter or during periods of drought when we also know many animals will succumb to diseases brought on by malnutrition or simply starve ?

Of course, we all know the problem is one of changing culture and institutions and these changes move slowly. Basically, livestock farmers in CENTO must be induced to cull their poorer producing animals. The best time to do this is in the fall of the year so as to reduce the demand upon limited feedstuffs during the winter. Price incentives, new marketing arrangements and storage facilities would have to be made available. A tremendous farmer education program will be necessary. (Our Turkish friends suggested a successful method yesterday whereby other forms of livestock have been substituted for goats.)

Related to the above problem is overgrazing. This problem is severely aggravated by common grazing lands which have no restrictions. Because of depleted winter feed and excess cattle, the first evidence of spring growth is grazed without giving the new plants an opportunity to replenish critical root reserves. As a result, desirable forage species die out and are replaced by brush. Proper management of grazing can be assisted in two ways: 1) by culling, mentioned earlier and 2) by grazing associations with authority to regulate grazing intensity. Governments

should encourage such associations. However, grazing associations require a careful study of existing local conditions. The southwestern part of the United States offers several excellent examples of the necessity of understanding local customs. In the 1930's Navaho Indian rangeland was being severely overgrazed with loss of topsoil from erosion. While the Government was technically successful in its program of reducing livestock numbers by one-half with no loss in total production, it incurred tremendous resentment from the Indians. Similar work with the Papago tribe indicates that this resentment might have been avoided if the Indians had been made an integral part of the planning and implementing process.

Disease problems and parasites are another major problem. However, adequate feeding will help animals to become less susceptible to disease. Other veterinary methods have been spelled out clearly in the CENTO Veterinary Conference last year and do not need repeating here. Compounding the disease problem is a shortage of well trained professional staff with necessary equipment, transportation and other necessities. Marketing systems and credit requirements also need to be improved prior to overall improvement of the livestock sector. Farmers wishing to use improved methods should receive supervised credit plus adequate marketing facilities. Along with programs of culling, livestock needs an intensive breeding program that will identify and expand genetic stock with high production potential under CENTO conditions. Private breeders need to be encouraged with financial resources, marketing facilities, and technical assistance.

I think that the foregoing statements indicate that what successful livestock programs need is no different from successful crop programs. This magic ingredient can be summed up as an integrated approach. Too often in the past our livestock programs have floundered because we only paid attention to disease control or, perhaps, we thought credit was enough. What we really need is to put all the pieces of the puzzle together under sound management and then have the patience to see it through to completion.

In closing, I would like to sum up what I consider to be the major points of this brief discussion. Turkey, Iran and Pakistan have a tremendous underutilized resource in their livestock industries. While the contribution to the GNP, employment, nutrition, etc., is significiant, it can be greatly increased. A program to improve livestock must include all elements of the puzzle with a high degree of emphasis on balancing feed supplies to livestock numbers. New institutional changes involving the changing of culture must be worked out before livestock can reach its potential. We must recognize the necessity for patience and perseverance.

Let me wish you success in planning and implementing sound livestock development programs.

DEVELOPMENT PLANNING: THE COMPREHENSIVE REGIONAL DEVELOPMENT APPROACH *

by Mr. M. Vakilzadeh,
General Manager,
Ghazvin Development Authority

Introduction

THE MAIN PLANNING APPROACHES AND COMPARISONS

When dealing with development planning the following main approaches may be indentified :

- The classical approach
- The strategic approach
- The regional approach

THE CLASSICAL APPROACH

The classical approach considers private initiative as the main factor in the development process. Assuming that in a given area both the natural resources and the necessary infrastructure are available, and that general conditions in the area will allow a profitable process, development will automatically occur, through the initiative of local manpower and private capital.

THE STRATEGIC APPROACH

The strategic approach to development suggests the application of concentrated efforts over a relatively short period to serve large-scale operations, spread over wide areas, for the achievement of limited and well defined physical targets.

THE REGIONAL APPROACH

The regional approach to the development process suggests the application of concentrated efforts and resources to selected, limited areas, in order to achieve maximum impact on the area in question by transforming its economy from a subsistence level to a well organized, market-oriented, modern production economy

* This is a summary of the original paper.

unit. In addition to the direct results expected in the project area itself, some secondary benefits are expected :

- Effect on surrounding areas as an influence core
- Direct assistance to neighbouring areas by putting at their disposal production and marketing services
- Serving as a pilot project for other similar projects
- Creation of trained and experienced cadres, capable of handling similar operations in other areas.

Having discussed the principal planning approaches let us get to our case study, the Ghazvin Development Project.

Background

LOCATION AND CLIMATE

The Ghazvin Plain, lying between the Elborz and Zagros Mountains, is situated between 100 and 180 km. west of Tehran. It is an intermontane basin which slopes gently from elevation 1,500 m. (MSL) near the foothills in the north to 1,150 m. at the centre, where the groundwater which saturates the valley fill reaches the surface and forms a salt marsh covering its entire southeastern portion.

The Plain has a continental semi-arid type of climate-- hot summers and cold winters, with precipitation ranging from 300 mm. in the northwest to 100 mm. in the southeast, and a wide daily range of temperature and relative humidities.

POPULATION

The total population of the project area at the end of 1965 was 250,000 of which 80,000 resided in the town of Ghazvin, 10,000 in Takestan and 160,000 in villages spread throughout the area.

History of the Project

INITIAL STAGE

In September 1962, a disastrous earthquake shook the Ghazvin Area and adjacent regions. Entire villages were destroyed and water facilities essential for the livelihood of the population were put out of commission.

While initial relief measures were being taken, the Government decided to replan completely the severely damaged Ghazvin Area, with the object of raising its level of production and the standard of living of its inhabitants. The first aid and rebuilding work already underway was to serve as a start for the further development of the area, and the planning and development of the Ghazvin Area was to become a pilot project for the development of similar areas in Iran, following the introduction of the Land Reform Act.

The Reconnaissance and Feasibility Report

Following the reconnaissance survey, which indicated a development could take place, a feasibility report was completed and submitted to the Plan Organization in December 1966. The proposed Development Project, which provided for the integrated utilization of all local water resources in combination with the run-of-the-river diversion of Taleghan water into the area, has been found both technically sound and economically feasible.

The cost of the entire irrigation and agricultural development, including the cost of setting up service organizations with the necessary equipment, was estimated at 7,709.4 million rials. The return on the capital invested, as measured by the "internal rate of return" calculated over a 50-year project lifetime, worked out at 12.87 percent and the more conventional benefit-cost ratio, based on discounted benefit and cost streams, worked out at 1.47.

The proposed plans were based on implementation in two stages. The first stage was to develop and utilize fully the local resources, while at the same time introducing modern agricultural techniques. The second stage was to enlarge the irrigated area by imported waters from the Taleghan River.

THE WATER DEVELOPMENT PLAN

GENERAL

In view of the low precipitation and high values of potential evapotranspiration, dry farming cannot be considered as a feasible solution on the one hand, and the project has more irrigable soils than water to irrigate them on the other hand. Thus water was found to be the main limiting factor of the project.

The Water Development Plan had foreseen an imlementation program according to which Stage One of Development, which is based on local resources, was to include only a part of the area while the remaining part was to be postponed to Stage Two of development when Taleghan River water was to be imported into the area and additional local water resources (not otherwise effectively utilizable) are developed.

PLANNING OBJECTIVES

The objective of the Water Development Plan was to provide an adequate and dependable supply of irrigation water to those villages of the project area which were included in the Land Reform Program.

WATER ALLOCATIONS

After much consideration, it was decided to assume as a basic criterion in the farm planning that all farming families will receive equal annual allocations of water.

WATER ZONES

For the purpose of the Water Development Plan, the Ghazvin Area has been divided into five water zones, largely on the basis of their hydrogeological characteristics.

PROPOSED CHANGES IN WATER RESOURCES UTILIZATION

The local water resources--which consist of groundwater, springs and some perennial and intermittent surface flows--have unavoidably been used in the past in a most inefficient way because they are mainly available in the season when they are least needed, and are scarce during the main growing season.

In order to raise agricultural production to the planned level, the Water Development Plan proposed the following basic changes in the utilization of water resources :

- To alter the mode of exploitation of the local resources--ghanats and streamflows--so as to make the water available for irrigation in accordance with the demand curve based on the agricultural plan
- To increase the overall exploitation of groundwater and reduce its outflow to the salt marsh
- To augment local resources by the importation of Taleghan River water into the area so as to complete the quota of water required for the agricultural development.

THE AGRICULTURAL PLAN

SCOPE AND CRITERIA

The Development Plan related to those families provided with land and entitled to an allocation of water under the Land Reform Law.

PLANNING CONSTRAINTS

A number of constraints were considered in drawing up the Agricultural Development Plan for the Ghazvin Area, the most important of them was water (quantity and quality), soil and market demand.

ECOLOGICAL CONSIDERATIONS

The Plan has been based only on those perennial crops which are capable of withstanding extreme winters (with frosts occurring from November to early April). Both the perennial and annual crops must be capable of producing high yields in a relatively short growing season of about 200 days in conditions of high summer temperatures and low relative humidities.

LAND RESOURCES

The soils of the Ghazvin Area have been classified as belonging to six soil classes, and their land use capability determined accordingly. This classification is summarized in Table 1.

TABLE 1

SUMMARIZED CLASSIFICATION OF GHAZVIN AREA SOILS

Class	Description of soil and land use capability	Area (ha)	Percentage of total area
I	Lands well suited for irrigation all crops and orchards	68,000	15
II	Lands moderately well suited for irrigation almost all crops with the exception of slightly saline areas where apples and pears cannot be grown. In gravelly areas, it is suitable only for grapes and peaches.	123,400	28
III and III A	Lands fairly well suited for irrigation but of limited use for orchards	118,600	27
IV	Lands less suited for irrigation suitable for shallow - rooted vegetable or forage crops	52,400	12
V	Lands requiring special irrigation management suitable for barley or sugarbeet drainage and lowering of groundwater table : requires excess water for leaching	69,400	15
VI	Non-irrigable lands suitable for sparse grazing only	11,400	3
	TOTAL	443,200	100

* This table has been drawn up on the basis of the land classification system recently applied in Iran by the Soil Institute, Amirabad, Tehran.

Since the water resources of the area are insufficient to irrigate all the lands suitable for irrigation, there was considerable latitude in the selection of the areas to be included in the development plan according to the crop rotation and the area of orchards to be planted.

SUMMARY OF PROJECT AREA

CROP AREA AND LIVESTOCK

The total irrigated farmland in the final stage (1978) is to be about 79,500 hectares, and consist of about 6,700 hectares of decidious orchards, 3,800 hectares of existing vineyards and a field crop area of about 69,000 hectares. Livestock will consist of about 225,000 head of sheep for the production of milk, meat and wool, and about 750,000 hens for egg and meat production.

The distribution of irrigated land according to the various crops is given in Table 2.

TABLE 2

DISTRIBUTION OR IRRIGATED LAND ACCORDING TO CROPS

Crops	Hectares
Apples	4,460
Pears	1,230
Peaches	1,030
Vineyards[1]	3,860
Sugarbeets	13,790
Wheat	12,730
Barley	2,110
Chick peas	12,730
Fodder	13,780
Fallow	13,780
TOTAL	79,500

1. Existing vineyards included in the project.

Revision and Modification of the Development Plan

In September 1968 the High Council of Ghazvin Development decided to accept an alternative which limits irrigated agricultural development of the northern part of the Ghazvin Area where large continuous areas of high grade soils are situated. The water diverted from the Taleghan River will be used to irrigate villages and the land of private landlords in the area as well as to meet the anticipated domestic and industrial needs of the town of Ghazvin and the Elborz Industrial Estate. This area is referred to as the Taleghan Project Area (TPA). In the rest of the original project area which is referred to as Outside Taleghan Project Areas (OTPA), the rate of land development will be controlled by the availability of groundwater. Soils of classes I and II and selected soil groups of soil class III only, will be irrigated.

Following the High Council's decision, a Preliminary Reappraisal Report was prepared. In that report development programs were separately outlined for TPA and OTPA, an estimate of investments required for completing the project was made, and the economic feasibility of the project was reevaluated.

In addition to the change of policy, the revised plan took into consideration the lower quantities of groundwater than those considered for the Feasibility Report as well as the reduced use of local streams because of economical reasons.

As from April 1969, the development of the project has been carried out in accordance with the above mentioned revised program.

As the First Stage development is based on local water resources, the impact of the change of policy will take place mainly while implementing Stage II.

Table 3 shows the adopted agricultural development plan. (Note the differences between the original plan and revised one.)

TABLE 3

DISTRIBUTION OF FARMS AND LAND DEVELOPMENT ACCORDING TO PLANNING REGIONS

Description	Number of F. U.[1]	Number of villages	Landlord farms	Irrigated lands (ha)[2]			Pasture and atriplex
				Total	Field crops	Orchards and rehabilitated vineyards	
Water Zone I	820	16	-	4,330	4,095	235	1,000
Water Zones II-III[3]	4,725	64	32	47,885	45,255	2,630	5,500
Subtotal TPA	5,545	80	32	52, 215	49,350	2,865	6,500
Water Strip 5 B	425	5	-	1,060	880	180	850
Water Strip 6	3,685	32	-	6,120	4,060	2,060	4,200
Water Strip 7	2,078	9	-	4,575	3,760	815	4,200
Water Zone V	1,527	8	-	1,155	990	165	1,550
Subtotal OTPA	7,715	54	-	12,910	9,690	3,220	10,800
Grand Total	13,260	134	32	65,125	59,040	6,085	17,300

1. F. U. = Farming unit
2. Including 25.600 hectares private landlord lands
3. Except Strip 5B

State of the Project at the End of 1349

ACHIEVEMENTS

The physical development achieved up to the end of the Iranian year 1349 (21 March 1970) is presented in Table 4 and the gross income farmers achieved in 1349 is presented in Table 5.

TABLE 4

PROJECT GROWTH IN VILLAGES DURING 1349

Item	State at the end of 1348 (For current operation in 1349)	Net increment during 1349	State at the end of 1349 (for current operation in 1350)
All villages under development	124	(-) 5	119
All farming families under development	10,100	(-) 168	9,932
The total figures comprise :			
1. Irrigated agriculture			
Villages	112	-	112
Farming families	9,306	200	9,606
Field crop area (ha)	13,371	3,446	16,817
Orchard area (ha)	1,549	52	1,601
Vineyard area (ha)	650	339	989
Total irrigated area in villages (ha)	15,570	3,837	19,407
2. Sheep Improvement			
Villages (Total)	33	(-) 11	22
Farming families	1,400	(-) 210	1,190
Villages with sheep development only	12	(-) 5	7
Villages with sheep and irrigated farming	21	(-) 6	15
Total ewes milked	6,950	1,550	8,500
3. Poultry			
Villages	1	1	2
Wells in operation	187	16	203
Water supplied during the year (MCM)	69.7	66.3	136

TABLE 5

INCOME OF FARMERS 1345 - 1349[1]

Item	Index 1345 = 100				1349 in thousand rials
	1346	1347	1348	1349	
Gross income from field crops	257	454	278	495	123,607
Income from labour in orchards	111	176	222	325	17,128
Gross income from sheep farming	100	116	122	125	5,000[2]
Gross income from poultry	-	-	100	328	7,811
Compensation payments	93	8	16	-	-
TOTAL	231	385	268	462	153,546
Number of farming families	128	138	166	175	8,734
Average income per family (rials)	100	278	162	264	17,580
Average normative work days per farming family	129	176	121	163	62

1. Excluding income from vineyards and dairy cattle.
2. Estimate.

Conclusions

SPECIAL ASPECTS

INSTITUTIONAL CONSTRAINTS

Land Consolidation

In the Ghazvin Development Project Area the Land Reform Law granted freehold title deeds to the farmers. The plots were transferred in total to a certain village and the individual farmers reserved their right to utilize a fraction of the land according to their relative share of the whole unit.

The Land Reform did not attempt the redistribution of land. Freedom of planning was further restricted by the voluntary nature of farmer participation in the development program. On the other hand, land consolidation in its classic form was not required, as plots were transferred from absentee landlords to the farmers as whole units (musha).

Water Rights

The water rights system has been functioning for generations. The water rights represented proportional shares of the water from ghanats or from surface flows. This system did not pose any real planning constraint as most of the water required for the irrigation of the newly developed plots came from newly sunk wells; an additional source will become available by the diversion of the Taleghan River.

Water Law

About 52,000 hectares of the project area are planned to be irrigated by an integrated groundwater-surface water system. Such a system, especially when it is combined with the recharge of groundwater (as in this case), requires full control over the operation of the entire network and especially on the pumpage of underground water. Only by legislative means can such control be exercised, and the required law, called the "Water Nationalization Law," was approved by Parliament.

FARMER'S ATTITUDE TOWARD TECHNOLOGICAL CHANGES IN THE PRODUCTION PROCESS

In our project, farmers were rather quick to learn modern agrotechnical practices. The results attained confirm the assumption that farmers became convinced of the benefits derived from modern agrotechniques.

However, it is evident that extension work will be kept up for much longer, if the technical know-how disseminated by the project staff is to be followed up and adopted as a regular practice.

SECONDARY OBJECTIVES

Most of the four secondary benefits expected to be derived from a regional development project have been achieved. The project has exerted its influence on the surrounding area--most of the agrotechnical practices introduced in the development area are being copied by the farmers in their own undeveloped plots, with a degree of success. Trained and experienced cadres have come into being, capable of taking over similar operations in other projects. The Ghazvin Development Authority with its accumulated know-how and experience could use this project as a pilot project.

FLEXIBILITY

Flexibility in this context will be considered as the option or possibility to change plans or decisions at relatively low cost. Flexibility was attained by the following three means:

1) By staging
2) By planning
3) By incorporating detailed planning or design in the implementation.

As stated before, in the Ghazvin Project all three ways of getting flexibility were adopted. The first two were due to open possibility of water conveyance from the Taleghan River basin and the third one was due to lack of sufficient data for agricultural planning at the beginning.

CONCLUSIONS

Theory vs. realization in the Ghazvin Development Project

As already described the G.D.P. is identified as a comprehensive regional project due to:

- Geographical boundaries
- Scope of activities and subjects dealt with
- Long-range development program
- Staging

The project may be referred to as a good example for the regional planning approach in all aspects--its external characteristics, its objectives as well as the typical set of objectives of a regional project. Moreover it can serve as a pilot project for similar development enterprises in the Iranian plateau.

The general planning was adhered to with one major deviation--reevaluation of the plan was made before the completion of the first stage of the project.

That deviation took place because of a change in policy. The main goal of the reevaluation was to identify immediate implications of the policy changes on the project plans under implementation. In planning much attention was paid to preserve the flexibility. This flexibility was actually required from both points of view:

It allowed the introduction of:

- Changes dictated by new information which became available during implementation
- Changes dictated by considerable variation in policy guidelines.

The Influence of Policy Changes on the Development Plan

At the beginning, priority was given to social objectives:

The direct beneficiaries of the project to be those farmers who were entitled to benefit from the Land Reform Act, the policy adopted at that stage was equal chance-equal income for each farming family.

Consequently, the planning criteria for allocation of equal water quantities to each farming unit became a dominant factor in both:

- The Water Development Plan
- The Agricultural Development Plan

As a result, the original Development Plan called for the conveyance and the supply of the Taleghan River water to the entire project area, and for the development of a considerable area of low quality soils. The new policy directive gave a decisive priority to economical efficiency.

Consequently, the Taleghan waters were allocated only to areas concentrating large parts of the best soils, regardless of the previous egalitarian equal chance-equal income concept.

As a result the Taleghan conveyance system was considerably reduced in size--spread only on about 20 percent of its orginally planned area--but no cut to speak of regarding the hectares to be irrigated was envisaged, by which the cost per unit was considerably lowered.

PLANNING AND DECISION MAKING: ADVANTAGES AND DISADVANTAGES OF A "FLOATING PLAN" *

by Dr, Charles K. Mann,
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In thinking about how to handle the suggested topic of the "floating plan," it seemed to me that the most useful approach would be to discuss in general some of the advantages and disadvantages of this sort of plan in relation to those of a fixed plan, then to discuss briefly some of the criteria one might consider in judging which approach is most desirable for any given country. Since the purpose of this talk is to stimulate discussion of the relative merits of the two planning approaches, it seemed to me more appropriate to address the general principles rather than any specific country's planning experience. In this way each of you, being far more familiar than I with your own country's planning systems, can relate individual country situations to these generalities.

In general, I would assume that there is widespread agreement that there is a need in planning economic development to have a long-term planning horizon. Moreover, there is generally a need to have some sort of shorter-term implementation framework. In my experience this generally takes the form of an annual budget which actually channels funds to specific projects. In general there are two approaches to satisfy the necessity for the long-term planning horizon. The most widely used seems to be the multi-year plan with fixed beginning and terminal dates spanning usually a five-year period. This may be set in some longer period generalized framework such as a 15 or 20-year perspective plan.

The other general approach is to maintain a fixed planning horizon of, say, five years, moving the target date forward one year with each passing year. The most notable example of this approach to my knowledge is the planning system Mr. MacNamara instituted in the Pentagon and which was later incorporated in other major U.S. Government agencies. It is this system of maintaining a constant five-year time framework out beyond the current year that I take to be what is meant by the term "floating plan."

In moving to a discussion of some of its advantages and disadvantages, it is useful as a point of departure to start with a discussion of what might be called a fixed long-range plan with fixed beginning and ending dates. Since it is developed over a relatively long period of time, there is considerable scope for public debate of its various aspects and time to develop public support for its targets. Moreover,

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* This paper represents the personal opinions and thoughts of the author and not necessarily the position of any U. S. Government agency.

since its preparation is of necessity a very time consuming operation, its development can be stretched over several years prior to its commencement date. Thus there is ample time and scope for mathematical modelling of alternative courses of action and careful examination of the mutual consistency of various targets and objectives.

It seems to me one great advantage of this kind of plan is the fact that the targets and objectives have been widely debated and presumably attracted widespread support. This means that if it becomes apparent the targets are not being met, there is considerable possibility of channelling more resources and administrative effort into breaking these bottlenecks.

The major drawbacks of this kind of fixed plan to some extent are the converse of the advantages, namely if actual performance deviates significantly from target performance, the plan very easily gets completely out of touch with reality. Moreover, if the plan is not revised, significant shortfalls in one sector may make attainment of other sector objectives impossible. If this sort of thing happens enough, the plan may become a hollow document completely divorced from on-going decision making.

Another disadvantage of the fixed plan occurs in the area of long gestation types of projects. If these are commenced at the beginning of the plan, then the plan's horizon is sufficient to see them through to completion. If, however, it is sensible to start one of these projects in the fourth year of a five-year plan, its completion does not fall within the plan's time horizon. This may lead to a tendency to bunch the starts of long gestation projects early in successive five-year plans. Also on long gestation projects there is considerable possibility of their getting off schedule. If they are delayed significantly they may make other related objectives in the plan unattainable, which again tends to make the plan lose touch with reality.

To offset the sorts of disadvantages of a fixed plan mentioned above, some have advocated the concept of the floating plan. The principal advantage of such an approach in my view is to permit frequent revisions in order to keep the plan consistent with reality. The more that various projects and sectors are interrelated, the more important it becomes to make sure that ramifications of a shortfall or breakthrough in one area are reflected in other areas to which the first is related. It may be, for example, that a shortage of investment funds blocks the progress of a major irrigation project. With a floating plan, the ramifications of this on agricultural production will be readily apparent when the plan undergoes the annual revision cycle. On the other hand, an unusually large harvest or a new mineral discovery may permit unexpected foreign exchange savings or earnings and permit a speedup in investment (assuming foreign exchange is the relevant bottleneck). Moreover, for long-gestation projects the plan horizon will always be long enough to encompass the project's completion so that bunching in the early years of the plan is not necessary.

Because the floating plan permits a continual review of assumptions and progress and permits revision of targets to take account of reality, it may be a more effective guide to action than a fixed plan. If, for example, large-scale irrigation projects are being implemented ahead of schedule and secondary distribution systems for these projects behind schedule, it is possible to revise the investment program in favor of the secondary systems in order to maintain a balanced pace of water development. With the fixed plan there may be a tendency to try to hit

the target for large-scale systems even if delivery systems are far behind whereas it might be more sensible to revise the target for the primary systems downward and for the secondary systems upward. The floating plan would facilitate such revision.

Despite these advantages of the floating plan, there are also some major disadvantages. One of the advantages of the fixed plan is that the extent of debate and commitment preceding its adoption tends to give sanction to the plan's major targets. This visibility of the targets may result in considerable pressure being brought to bear to break bottlenecks when they occur if they threaten to impede the achievement of major targets. If the system makes it easy to change the targets themselves, there may develop a tendency simply to change the targets to reflect reality rather than trying to change the reality to make possible achievement of the target.

Another disadvantage is that there may simply not be time or administrative resources to go through annually a thorough rethinking of the entire plan and all its interrelationships. Therefore there may be a tendency to change targets in one sector without working through all the ramifications of those changes on plans for other sectors. In general, planning with a floating plan--if done thoroughly--is probably administratively much more complex than with a fixed one. Moreover, it is probably more difficult to focus both public and official attention on an annual reformulation of the plan than it is to concentrate the country's attention, say once every five years, on long-range objectives and goals. Thus there may be a danger with the fixed plan that reality may so differ from it that the plan becomes irrelevant; yet on the other hand there is a danger with the floating plan that its being so frequently modified may cause people to lose interest in it as an action-forcing document.

Given the advantages and disadvantages of the two approaches, what criteria should one use to decide between the two? I suggest that the most important factor in any plan's success is the degree to which it is integrated with the decision-making process. No matter how the plan is formulated, the key to its realization is ensuring that the decisions it implies are actually carried out. If, for example, a certain amount of funds is required for investment, then the tax system must be structured in such a way to generate those resources. If the decision on the level of taxation is made independently of the requirements of the plan, the plan is in danger of becoming irrelevant whether it is a fixed plan or a floating plan.

If I may be granted the speaker's license to refer to my own experience in the U.S. Bureau of the Budget, my impression of the main reason for the success of Mr. MacNamara's five-year "rolling plan," as it was called in the Department of Defense, was that it was completely integrated into the decision-making process. It had Mr. MacNamara's full support, and he took its implications seriously. By this I mean to say that in each subsequent year the "closest" year of the plan was sliced off and translated into the annual budget document. Therefore the funding implications of the plan were translated into reality through their integration with the budget-making process.

After several years of successful operation of this system in the Defense Department it was applied more or less government-wide within the U.S. In my opinion, the transplant in many cases was not very successful. The key difference was that although the decision makers were presented with a five-year plan by their planning staffs, their focus continued to be on the annual budget decision with many people not taking the five-year plan very seriously. In effect, the budget did

not flow from the implications of the five-year plan. Since the long-term plan was not the focus of decision making--as it seems to have been to a great extent in the Defense Department--it could not be considered an action-forcing document.

In conclusion, the key point in my judgment is the relationship of the plan to the decision-making process and the method by which plan targets are translated into implemented action programs. In some countries a fixed plan with the force of a wide consensus behind it may provide the impetus to assure that sufficient resources are committed to achieve targets and to bring forth extraordinary efforts to break bottlenecks which may threaten target achievement. In other countries a floating plan may be best with frequent revisions to keep the plan consistent with reality but also with enough force to stimulate action programs to remedy shortfalls. In theory the floating plan has many advantages to recommend it. In practice, however, while it may be continually modified to reflect reality, if it is not integrated with the decision-making process, if it is not action forcing, if it makes no impact on modifying reality, instead of a floating plan it will become simply a drifting plan. It may give the intellectual satisfaction of being realistic but make little impact on accelerating the development of the country beyond what would be attained without a plan.

Actually the system of a fixed plan with a realistic annual program could offer some of the advantages of both systems. It can serve to move plan implementation toward the established targets, yet if the targets become clearly unrealistic the annual program can somewhat disregard them and deal with reality. Thus the targets would still stand as desirable objectives to be striven toward, but they would not be so rigid as to force completely unrealistic objectives into the annual programs thus distorting project and program implementation. Thus even within the general framework of a fixed plan some of the advantages of the floating plan may be realized by not requiring the annual program to conform rigidly to the long-term plan in cases where events have made targets clearly unrealistic.

OBTAINING THE DATA NEEDED AT REASONABLE COST

by Dr. Leon F. Hesser
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General agreement seems to exist among members of the seminar group that planning in one form or another is both useful and necessary for sound agricultural development. Agreement also exists that planning and analysis are facilitated a great deal if ample accurate data are available to shed light on the issue in question. The problem is how to get the relevant information needed for planning, at a reasonable cost. Parenthetically, I think the hardest part is deciding what is the relevant information that is needed. In other words, what are the relevant issues in agricultural planning and what types of information and analyses are needed in order to make intelligent policy decisions? I shall assume that it has been decided what kind of information is needed and will concentrate on a few ideas that may be useful in obtaining the data. My approach will be to list a few principles as a way of introducing the topic to open it up for discussion.

Following is a classification of some methods of obtaining information:

I. Census

II. Survey Techniques

- A. Personal Interview
- B. Mail Surveys
- C. Crop Cutting Estimates
- D. Aerial Photography
- E. Remote Sensing

III. Institutionalized Reporting Systems

- A. Extension Service
- B. Revenue Records
- C. Private Companies

Obviously, having full and complete information would be nice for each analysis, but just as obviously, it usually is too costly to do a complete enumeration except periodically to get data to serve as bench marks. In general, a good survey is better than a poor census. The 1960 Census of Agriculture in Pakistan was not a true census, but was based on a 10 percent sample. Likewise, the 1972 Census of Agriculture will be based on a 10 percent sample. This reduces the cost considerably

and, in cases where there are shortages of trained enumerators, probably improves the quality of the information.

The personal interview technique is a common way of getting information that is not easily obtainable otherwise. The cost per unit of data obtained by this method is fairly high, particularly when trained enumerators must be used, but for many types of problems the interview technique is a particularly useful way of getting a feel for the issues. Sometimes, reasonably conclusive information can be obtained from a small sample so that the relative cost of a study may not be prohibitive.

Reasonably satisfactory and relatively cheap data can be obtained by mail survey, if respondents are literate and well informed.

The crop cutting technique is one of the most accurate methods of estimating production of many crops. It is reasonably objective. It is also fairly expensive, since considerable labor is involved per unit of data obtained. Particularly for the major crops, this technique may be justified at least as a supplement to other less costly but less reliable techniques.

In the longer run, aerial photography and remote sensing offer considerable potential for obtaining reasonably accurate information on both crops and livestock. The U.S. Department of Agriculture is carring on research on these techniques, which promise to be revolutionary as means of obtaining data. When they are closer to perfection, the cost may be relatively cheap. While these methods are not likely to be a solution for developing countries in the near future, it would be well for the three regional countries to become knowledgeable about the status and potential of these techniques so they can be considered in longer-range data planning.

Institutionalized reporting systems are among the cheaper methods of getting certain kinds of information, usually routine data. A few examples will illustrate some of the characteristics of this method. The Extension Services in Pakistan are asked to submit periodic reports on such things as estimated crop yields, area planted, and growing conditions. Besides being relatively cheap, this is also a fairly quick way of getting data. Yield estimates are based on judgement and hence are not reliable in a statistical sense, but they appear to be fairly good indicators of the direction of changes and therefore are useful for planning purposes. Ideally, they should be supplemented with objective estimates.

A large percentage of the agricultural statistics in Pakistan is a byproduct of the land revenue system. Since much of the information was already being collected for another purpose, the cost of the data for analytical purposes is small. However, it is not always in the form desired for analytical studies and some of the series are subjective.

Much useful and relatively cheap information may be obtained from private companies by having them submit reports that, in general, are based on information they already have in their records. Examples are fertilizer sales data, purchases, sales and shipments of agricultural commodities, etc.

In conclusion, let me mention that a CENTO Symposium on Agricultural Statistics was held in October 1967. The publication containing the proceedings of this symposium has much information that is relevant to the question at hand.*

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* Copies of this publication are available upon request. See list of U. S.-sponsored Economic Publications for the address.

LIST OF DELEGATES

Iran

Mr. Hossein Sepehry	Undersecretary, Ministry of Agriculture, (Head of Delegation)
Mr. M. Ayazi	Adviser to the Ministry of Agriculture, CENTO and RCD Affairs
M. F. Mahdavi	Chief, Soil Institute
Mr. M. Vakilzadeh	General Manager, Ghazvin Development Authority
Mr. Edraki	Head of the Bureau of Agricultural Planning
Mr. Manii	Expert, Bureau of Agricultural Planning
Mr. Amir A. Behnam	(Tech.) Deputy, Director General, National Livestock Organization, Ministry of Agriculture
Mr. Mortazavi	Department of Agricultural Engineering
Mr. Parvaneh	Expert, Ministry of Agriculture
Mr. S. Mosaddeqi	Director General of Research and Planning, Ministry of Natural Resources
Mr. G. Nakhai	Expert in Planning, Ministry of Natural Resources
Mr. Emam Verdi	Expert, Ministry of Water and Power
Mr. R. Alaii	Expert, Ministry of Agricultural Products and Consumers' Goods
Mr. Khatibi	Director, Rural Research Center, Ministry of Rural Affairs
Mr. Komaly	Deputy Director, Agriculture Division, Plan Organization
Mr. Bahmaniar	Agricultural Economist, Division of Agriculture, Plan Organization
Mr. Amir-Shahi	Head of the Agronomy and Horticulture Department, College of Agriculture, University of Tehran

Mr. Mehriari Sadrolacurafi	Assistant Professor, Department of Agricultural Economics, College of Agriculture, Karadj
Mr. M. M. Rahmani	Associate Professor, Department of Agricultural Economics College of Agriculture, Karadj
Mr. E. Mehrad	Director, Economic Affairs, Agricultural Development Fund
Mr. Yazdan-Panah	Head of Agricultural Marketing, Ministry of Agricultural Products and Consumer Goods
Mr. M. Koopahi	Department of Economics, Agricultural Fund of Iran
Mr. A. Razeghi	General Director of Impact Projects, Ministry of Agriculture

Pakistan

Mr. C. A. Ahmad	Chief, Planning, East Pakistan Agricultural Development Corporation, Dacca
Mr. B. Abdul Hamid Khan	Director of Agriculture, Quetta, Baluchistan, West Pakistan
Mr. Mohammad Azhar	Chief of Agriculture, Planning and Development Department, Government of the Punjab, Lahore, West Pakistan

Turkey

Mr. Arif Uğur	Economic Planning Division, State Planning Organization, Ankara
Dr. Nazmi Demir	Economic Planning Division, State Planning Organization, Ankara
Mr. Mete Başci	Planning Division, Ministry of Agriculture, Ankara
Mr. Şerafettin Özgül	General Directorate of State Water Works, Ankara

Mr. Samim Öztek	General Directorate of State Water Works, Ankara
Mr. Mustafa Epikman	Ministry of Rural Affairs, General Directorate of Soil and Cultivation Management, Ankara

United Kingdom

Dr. E. S. Clayton	Wye College, University of London

United States

Mr. Robert E. Wieczorowski	Executive Director of World Bank, Keynoter
Dr. John L. Fischer	Professor of Agricultural Economics, University of Arizona, U.S. Coordinator and Head of Delegation
Dr. A. T. Mosher	President of the Agricultural Development Council, New York City
Dr. Leon Hesser	Assistant Director for Agricultural Policy, USAID/Pakistan
Mr. Clyde Adams	Agriculturist, USAID/Washington, D.C.
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LIST OF U.S.-SPONSORED

CENTO ECONOMIC PUBLICATIONS

* 1. Seminar on Cattle and Sheep Breeding, 1959
* 2. Seminar on Land Classification and Soil Survey, 1959
3. Seminar on Forestry, 1959
* 4. Conference on Minerals, 1959
* 5. Progress Report. Coordinating U.S. Action for CENTO, 1959-60
* 6. Conference on Development Programming, 1960
* 7. Symposium on Chrome Ore, 1960
* 8. Conference on Teaching of Preventive Medicine, 1961
* 9. Conference on Industrial Development Banking (1), 1961
* 10. Symposium on Coal, 1961
* 11. Progress Report, Coordinating U.S. Action for CENTO. 1961-62
12. Traveling Seminar for Increased Agricultural Production, 1962
* 13. Conference on Agricultural Development Banking, 1962
* 14. Conference on National Income Accounting, 1962
* 15. Conference on Development Planning, 1962
* 16. Conference on Teaching Health Centers, 1962
* 17. Conference on Industrial Development Banking (2), 1962
* 18. Conference on Establishment of National Scientific Organizations, 1962
* 19. Symposium on Industrial Rocks and Minerals, 1962
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21. Conference on Teaching of Science, 1963
* 22. Symposium on Rural Development, 1963
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27. Conference on Nursing Education, 1964
28. Conference on Hospital Administration, 1964
29. Traveling Seminar on Range Management, 1964
* 30. Conference on Manpower Needs and Training of Environmental Sanitation Personnel, 1964
* 31. Symposium on Mining Geology and the Base Metals, 1964
32. Traveling Seminar on Agricultural Credit and Cooperatives, 1964
33. Symposium on Industrial Statistics, 1964
34. Symposium on Scientific and Industrial Research, 1964
* 35. Second CENTO Veterinary Pathology Seminar, 1964
36. Symposium on the Role of Local Government in National Development, 1965
* 37. Symposium on Tax Administration, 1965
38. Symposium on the Development of Capital Markets, 1965
39. Traveling Seminar on Veterinary Education and Animal Health, 1965
* 40. Traveling Seminar on Fresh Fruit and Vegetable Marketing, 1965
* 41. Seminar on Field Techniques for Mineral Investigation, 1965
* 42. Progress Report, Coordinating U.S. Action for CENTO, 1962-65
43. Symposium on Hydrology and Water Resources Development, 1966
44. Conference on Land Classification for Non-Irrigated Lands, 1966
45. Symposium on Household Surveys, 1966
46. Summer Training Program in Geological Mapping, 1966
47. Traveling Seminar on Farm Tools and Implements, 1966
48. Symposium on Mine Health and Safety, 1966
49. Conference on Engineering Education, 1966
50. Conference on Agricultural Extension, 1967

51. Traveling Seminar on Processing and Marketing of Fruit and Vegetable Products, 1967
52. Summer Training Program in Geological Mapping, 1967
53. Conference on National and Regional Agricultural Development Policy, 1967
54. Symposium on Agricultural Statistics, 1967
55. Traveling Seminar on Marketing of Livestock and Livestock Products, 1967
56. Conference on Combating Malnutrition in Preschcol Children, 1968
57. Symposium on Development and Utilization of Mineral Resources, 1968
58. Conference on Industrial Vocational Education, 1968
59. Conference on Earthquake Hazard Minimization, 1968
60. Report of the Ad Hoc Working Party on Fertilizers, 1968
61. Decade of Development, a Ten-Year Compendium, 1959-69
62. Symposium on Demographic Statistics, 1968
63. Progress Report, Coordinating U.S. Action for CENTO, 1965-69
64. Geology and Ore Deposits of the Lakan Lead-zinc District, Iran, 1968
65. Symposium on Manpower Planning and Statistics, 1969
66. Conference on National and Regional Livestock Development Policy, 1969
67. Geology and Ore Deposits of the Zizma-Ladik Mercury District, Turkey, 1969
68. Conference Series on the Teaching of Public Health and Public Health Practice, 1970
69. Conference on Broadening Public Participation in Equity Investment, 1970
70. Traveling Seminar on Management and Financing of Marketing Cooperatives, 1970
71. Conference on Forestry Development Policy, 1970
72. Seminar on Veterinary Investigational and Diagnostic Methods, 1970
73. Traveling Workshop on Range Management, 1970
74. Symposium on Price Statistics, 1970
75. Workshop Series on Clinical and Applied Research on Family Planning, 1971
76. Workshops on Marketing of Livestock and Their Products, 1971
77. Symposium on Central Banking, Monetary Policy and Economic Development, 1971
78. Report of Second Meeting of Ad Hoc Working Group on Fertilizers, 1971

* Out of print

The above list includes all publications issued by the Office of the U.S. Economic Coordinator for CENTO Affairs. Most of the older books are now out of print and are no longer available. However, copies of those still in stock may be obtained by writing to:

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