

AGENCY FOR INTERNATIONAL DEVELOPMENT  
WASHINGTON, D. C. 20523  
**BIBLIOGRAPHIC INPUT SHEET**

FOR AID USE ONLY  
**Batch 70**

1. SUBJECT CLASSIFICATION	A. PRIMARY Food production and nutrition	AE10-0000-G730
	B. SECONDARY Agricultural economics—Pakistan	

2. TITLE AND SUBTITLE  
Pakistan agriculture sector analysis

3. AUTHOR(S)  
(101) AID/ASIA/USAID/Pakistan

4. DOCUMENT DATE 1972	5. NUMBER OF PAGES 62p.	6. ARC NUMBER ARC
--------------------------	----------------------------	----------------------

7. REFERENCE ORGANIZATION NAME AND ADDRESS  
AID/ASIA/USAID/Pakistan

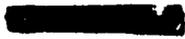
8. SUPPLEMENTARY NOTES (*Sponsoring Organization, Publishers, Availability*)

9. ABSTRACT

10. CONTROL NUMBER <b>PN-AAE-500</b>	11. PRICE OF DOCUMENT
12. DESCRIPTORS Pakistan Sector analysis	13. PROJECT NUMBER
	14. CONTRACT NUMBER AID/ASIA/USAID/Pakistan
	15. TYPE OF DOCUMENT

PN-AAE-500

AD/ASIA/PAKISTAN

  
June 23, 1972

PAKISTAN  
AGRICULTURE SECTOR ANALYSIS

OFFICE OF AGRICULTURAL POLICY  
UNITED STATES AGENCY FOR INTERNATIONAL DEVELOPMENT  
MISSION TO PAKISTAN

## FOREWORD

The majority of Pakistan's people are directly or indirectly involved in agriculture. The potential for increasing farm productivity is enormous. The need for more food and fiber is great; so are the constraints.

This agriculture sector analysis is an attempt at sorting out the major issues and constraints associated with efforts to increase agricultural production and to achieve a more equitable distribution of the fruits of development in the hope that by focusing on the constraints the goals may be achieved more readily. We recognize that it may be presumptuous to call this paper a sector analysis. It lacks the depth and detailed empiricism one would like in a complete analysis. It ignores some subsectors, such as forestry and fisheries, that sometimes are considered part of the agriculture milieu, and either ignores or treats lightly certain other aspects of the agriculture sector, such as marketing and pricing policy. While a more complete description and analysis would obviously be desirable, the main objective of the exercise is to identify a limited number of major problem areas that may lend themselves to concentrated, large scale assistance efforts with the potential of substantial impact. We believe we have accomplished that objective.

The primary thrusts and conclusions of what follows are based largely on the judgment and experience of a unique six-man Agriculture Division

staff whose collective time in Pakistan totals 22 years. The analysis also had the benefit of inputs from the Chief, Food and Nutrition Division; the Chief of Party, Colorado State University research team and the Pakistani professional staff of the Agriculture Division. The paper reflects a wide range of discussions with host government officials in the Center and in the provinces, many of whom offered valuable comment and criticism of earlier drafts.

Of course, the analysis should not end here. It must be a continuing process. Conclusions and hypotheses must be challenged and adjusted as new information and further analysis warrants. However, we are sufficiently confident that the major issues identified and the prescriptions for assistance are on the right track that we think it would be a mistake to delay implementation of the proposed assistance activities until a more thorough sector analysis were "completed". This feeling is buttressed by the fact that the host government gives every indication of wanting to move rapidly in the areas identified for U.S. assistance.

Major attention of the Agriculture Division staff now will turn to further analyses of the subsectors -- agricultural research, water management and barani agriculture -- with the expectation of submitting a series of specific subsector development proposals beginning within the next few months.

Leon F. Hesser  
Assistant Director, Agricultural Policy  
Islamabad - 23 June 1972

## CONTENTS

	<u>Page</u>
FOREWORD	i
SUMMARY	1
AGRICULTURE IN PAKISTAN'S ECONOMY	4
PERSPECTIVE ON AGRICULTURAL GROWTH	6
THE CURRENT SITUATION	10
G. O. P. CONCERN ABOUT SOCIAL PROBLEMS	12
MAJOR ISSUES AND CONSTRAINTS	17
Need for a Stream of New Technology	17
Need for Improved Efficiency of Water Use	20
Need for Parani Agricultural Development	20
Need for More Rural Jobs	23
Need for Improved Nutrition	27
Other Issues	30
LIKELY CONTRIBUTIONS BY OTHER DONORS	37
AREAS IN WHICH U. S. ASSISTANCE IS DESIRABLE	39
TABLES	
ANNEX I: SUMMARY OF WATER MANAGEMENT SUBSECTOR LOAN PROPOSAL	
ANNEX II: SUMMARY OF AGRICULTURAL RESEARCH SUBSECTOR LOAN PROPOSAL	

## SUMMARY

Agriculture is not only the largest sector of the Pakistan economy, it is currently the most viable sector in an otherwise sluggish and confused economy. Crop production, livestock production, use of inputs and other indices show continued growth. However, the aggregate growth statistics for recent years obscure several basic issues that are cause for concern.

The high rate of population growth has eroded otherwise impressive increases in total agricultural production, making per capita gains meager, except in foodgrains for which increases in production have been much larger. Barring additional significant breakthroughs in the near future, the limits of gains to be had from the new cereal/fertilizer technology will be approached later in this decade. Stepped-up research is needed to provide a continuing stream of new technology to assure sustained increases in productivity.

The practical limits of mobilizing the available water resources for irrigation will likely be approached early in the decade of the 1980s. Both research and large scale operational programs must be mounted to get substantially improved efficiency in the use of the scarce resource, water.

Because of the differential applicability and impact of the new seed/fertilizer technology, some regions are outpacing others in development. Major attention must be focused on getting increased productivity in the less advantaged areas -- namely, the rainfed (barani) regions.

2.

While most rural people are probably better off in an absolute sense, with the introduction of higher yielding varieties and other new farming techniques, it is alleged that the gap between the rich and poor farmer is widening. To the extent feasible, institutions, tax policies and development programs must be skewed to eliminate, or at least to mitigate, any forces that may tend toward growing inequalities.

With rapid population growth, it is inevitable that the farm labor force will continue growing between now and the end of this century, even if optimistic rates of increase in non-farm employment are assumed. Every possible avenue leading to potential new rural jobs must be explored.

Pulses are a basic staple and prime source of inexpensive protein for the poor. Acreage and production of pulses have been moving steadily downward while pulse prices have been moving upward. Vegetable oil production lags behind demand. Nutrition considerations dictate the need to explore possible ways to expand production of pulses and oilseeds.

Other issues to which the GOP should give attention are the need to develop a framework for agricultural policy analysis; the constraint on agricultural development posed by the seeming inability to create viable local governmental or other types of organizations to implement development activities; and the need to formulate an export strategy for agricultural commodities.

### 3.

This agriculture sector analysis is presented as the basic document supporting two subsector loan proposals that recommend assistance to Pakistan to cope with some of the issues noted above. Earlier drafts of the sector analysis were shared and discussed with officials of the Central and Provincial governments. Consensus exists on the major issues identified in the analysis. Much interest is evident in the two subsector loan proposals, which are being developed in collaboration with host government officials. The two proposals are:

-- A water management subsector proposal designed to improve the use of water on farms. One feature of this proposal is that technical assistance will be provided to mount a large scale program of leveling land in irrigated areas, using simple engineering techniques, farm tractors already in Pakistan, and locally manufactured soil scrapers and land planes. Another aspect of the proposal is aimed at watercourse improvement. The approach is to provide rupees through a dollar loan to finance a large scale, labor intensive effort to line, enlarge, straighten and otherwise improve the tertiary water distribution facilities for irrigation. A limited amount of technical assistance will serve as a catalyst in helping to develop the legal and organizational structures needed to mobilize the farmers effectively to solve the persistent problem of excessive losses of water in the tertiary watercourses.

4.

-- A subsector loan for agricultural research aimed at getting improved organization of agricultural research and markedly increased investment of talent and financial resources in agricultural research. Emphasis will be on adaptive research that takes maximum advantage of the output of international research institutions. The focus of proposed U.S. assistance will be on a few high priority crops such as pulses and oilseeds (relevant particularly to barani agriculture) and improved management and conservation of water.

These subsector proposals are fairly fully developed and will be submitted for financing in FY 1973. Additional subsectors which the USAID is developing for FY 1974 or later are: (a) a research and action program to improve barani agricultural development (with initial emphasis in NWFP), and (b) rural electrification.

#### AGRICULTURE IN PAKISTAN'S ECONOMY

Pakistan has suffered economic stagnation for the past two years as a result of political uncertainty, civil strife, and finally a war that culminated in the loss of the eastern province.<sup>1/</sup> This general depression follows a period of fairly rapid growth. During the Third Plan Period (FY 1966 to FY 1970) the Gross National Product increased at about 6.5 percent per year.<sup>2/</sup> Per capita income grew 3.5 to 4.0 percent per year during that period. With the

1/ All further reference to Pakistan will include only that area which was formerly West Pakistan, unless otherwise stated.

2/ All growth estimates are stated in terms of constant prices.

5.

slackening of economic activity, particularly the more sophisticated industries and interwing trade, growth in GNP is estimated to have been only 1.0 to 2.0 percent in FY 1972; hence, per capita income probably declined.

While having a total land area of 199 million acres -- about the size of the States of Washington, Oregon, and California combined -- Pakistan is notably devoid of proven mineral resources. Heavy, large scale industry generally lacks the domestic markets or comparative advantage for export sales and is still in an early development stage. Hence, agriculture and agro based industry and trade dominate the Pakistan economy.

The agriculture sector contributes about 40 percent to the GDP (Table 1) and employs three-fourths of the labor force. Value added from agriculture grew at 5.0 percent per year during the Third Plan Period. Major grain crops, notably wheat and rice, increased much more than the average for all crops. Although the pace of growth has slackened in the post Green Revolution period, agricultural output is credited with having kept the economy from total collapse during the past two years.

Pakistan's agricultural production is characterized by small, privately operated farms. The average size of farm units is only slightly more than 10 acres (the median is about 5 acres) and they often consist of scattered fragments. Despite small, fragmented holdings, agriculture possesses

tremendous potential for increased productivity. The climatic conditions of Pakistan are predominantly sub-tropic and the majority of the agricultural land lies within a large fertile river basin. Of the 79 million arable acres in Pakistan, approximately 29 million acres are accessible to permanent, controlled irrigation facilities.

In addition to supplying the basic food requirements of the country, agriculture forms the base of the country's industrial production and foreign trade. Raw cotton, cotton yarn, and cotton textiles are Pakistan's most important exports. Cotton along with high quality (fine) rice, fish and fish products, wool, tobacco, leather and leather products account for about 60 percent of the country's export earnings.

With the recent separation of the eastern province into an independent country, Pakistan faces a reorientation in agricultural production to adjust to a different market situation. Unless new export markets are found, or unless trade is resumed with Bangladesh, surplus production of coarse rice, mustard oil seeds, tobacco and possibly raw cotton will likely occur.

#### PERSPECTIVE ON AGRICULTURAL GROWTH

From the time Pakistan became a country until the beginning of the decade of the 1960s, population growth outstripped the meager increases in agricultural production. From 1960 to 1965, population growth rates and increases in agricultural production were about equal. From 1965 to 1970

agricultural production grew at about twice the rate of population increase.

The foundation for the Green Revolution in the late 1960s had been under construction for several years. Beginning in the early 1960s, the GOP evolved a production-oriented strategy with several interrelated and reinforcing components that formed the basis for dramatic increases in foodgrain production during the late 1960s. Investment in water and irrigation facilities had been taking place over a long period; stepped-up public and private investment in tubewells for irrigation occurred in the 1960s and was a very important contributing factor in the over-all growth of agriculture.

Beginning in the early 1960s, the new strategy for agricultural growth included significant changes in price policy for agriculture. Until then price policy had acted essentially as a disincentive; notable was the export tax on cotton. The export tax was gradually reduced and eventually eliminated and an export bonus was applied to cotton, rice and sugar about two years ago.<sup>3/</sup> To induce farmers to increase foodgrain production, the GOP instituted a system of floor prices on wheat and rice. These were raised from time to time to give a stronger inducement to increase food production. In 1969 a floor price was instituted for maize. Subsidies on fertilizer and pesticides were introduced in the early 1960s. Water and farm machinery were also subsidized.

<sup>3/</sup> With the devaluation of the rupee on May 12, 1972, an export tax was again imposed on cotton. However, the net effect amounts to an increased incentive to cotton production.

The Third Five Year Plan, published in 1965, contained heavy emphasis on agriculture and expressed the determination to "move in the direction of foodgrain self-sufficiency" although it was not expected that self-sufficiency (meaning no foodgrain imports would be required) could be attained until some time after 1970. Early in 1966 the Third Plan was revised and the target date for foodgrain self-sufficiency was stepped up to 1970.

In 1966, the GOP appointed an Agricultural Policy Committee, chaired by the Governor of West Pakistan, to review progress and to take appropriate action to ensure that required agricultural inputs were made available. The stepped-up "Grow More Food" campaign became a national issue. All high-level government officials were keenly aware of the importance of increasing foodgrain production.

All the above-mentioned factors had been building up to create the environment for a breakthrough in foodgrain production.

While the stage had been appropriately set and the political and economic climate were favorable, it was the high-yielding varieties of wheat and rice that sparked the Green Revolution. Perhaps somewhat fortuitously, the new varieties came along at the appropriate time to set in motion the forces that had been generated over the previous several years.

Fertilizer consumption had begun to rise even before the high-yielding varieties, but because the HYV's could usefully and economically convert

larger doses of fertilizer to grains, the use of fertilizer began to rise very dramatically after the introduction of the new varieties.

Mexican type wheat was introduced in Pakistan in 1965. IRRI rice was introduced one year later. Acreage of both increased very rapidly (Table 2). Growth in wheat and rice production was unprecedented (Table 3). Foodgrain self-sufficiency was achieved even ahead of the stepped-up schedule. (Very favorable weather played an important part in FY 1968).

For several years -- approximately the decade ending in 1968 -- West Pakistan imported roughly a million tons of wheat per year (Table 4). For the three years 1969 to 1971, net exports of foodgrains (mainly basmati rice plus shipments of wheat and rice to East Pakistan from West Pakistan were:

<u>Fiscal Year</u>	<u>Net Foodgrain Exports</u> (thousand tons)
1969	503
1970	342
1971	94

The wheat and rice crops in FY 1971 were down from the previous year. Rainfall and irrigation water supplies were below normal. In addition, rice production was affected by severe insect infestation. As a consequence of the lower foodgrain production, about 500,000 tons of wheat were imported during FY 1972. Net imports of foodgrains during FY 1972 are estimated to have been about 150,000 tons. Preliminary estimates of FY 1972 wheat production (mostly for consumption in FY 1973) are about the same or perhaps slightly higher than for the year before.

## THE CURRENT SITUATION

Growth in the agriculture sector remains one of the more encouraging aspects of Pakistan's economy.<sup>4/</sup> Although wheat production was down in 1971 and 1972 from what it was in 1970, due to lower than usual water availability, the total gross value of major crops continues to increase. Production of livestock and livestock products (including poultry) is also increasing fairly rapidly, which has positive implications for nutrition as well as for the general agricultural situation.<sup>5/</sup> The use of inputs such as fertilizer, pesticides and improved seeds also continues to rise.

At this juncture, barring exceptional production conditions, the probability of a major wheat surplus problem in Pakistan within the next few years seems remote. Apparent per capita consumption of wheat has increased to unprecedented levels (Table 8). Increases in production of wheat will likely be much less in the future than they were during the late 1960s. Two-thirds or more of the irrigated wheat acreage is now planted to high yielding varieties. While some increase in the proportion planted to HYVs can be expected, and heavier rates of fertilization are likely in

<sup>4/</sup> For an elaboration and a substantiation of the thesis that agricultural growth continues, see: Carl Gotsch, Notes on the Current Status and Future Development of West Pakistan Agriculture, draft paper, November 11, 1971.

<sup>5/</sup> Gotsch (ibid) cites evidence that production of livestock and livestock products is increasing faster than official data indicate.

## 11.

the future, over-all increases in wheat production will come slower.

A problem of excess coarse rice production has arisen due to rapid increases in production in recent years and due to the loss of the East Pakistan market. Approximately 300,000 tons of coarse rice produced in the Sind that is processed by parboiling is in excess of the needs of Pakistan. Some of this may be bartered for tea and other commodities with Ceylon but the remainder may be difficult to export because most countries do not like rice that has been parboiled and because of the poor quality of Pakistan's rice milling.

Vegetable oil continues to be deficit with demand growing faster than supplies. Imports, to a large extent under PL 480, help fill the gap. Hence, increased emphasis on oilseed production and expanding the entire vegetable oil industrial complex offers a major opportunity for import substitution. Whether Pakistan has a comparative advantage in oilseed crops other than cottonseed remains open to question. To learn more about the potential, adaptive research is required to find appropriate types and varieties of oilseeds and improved cultivation patterns for Pakistan conditions. Analysis of some of the economic constraints is also needed.

Production of foods rich in protein, minerals and vitamins, particularly pulses (discussed more thoroughly in the section on nutrition), is lagging relative to production of cereals. Data on production of fruits, vegetables and livestock products are less reliable, but it seems clear that production

of these more nutritious foods is increasing at a slower rate than that for grains, and perhaps at a rate not much, if any, faster than that of population growth. More attention needs to be given to these more nutritious foods.

#### GOP CONCERN ABOUT SOCIAL PROBLEMS

The new political government has made clear its concern about rural social problems. Programs to redress the balances in rural society are in various stages of discussion and implementation. These include an integrated rural development program, a people's works program, a land reform and efforts to do more for the less advantaged Baluchistan and North West Frontier Provinces. It is unclear at this juncture the extent to which it will be possible to finance these programs in view of over-all GOP budget constraints. The programs also fall short in conceptualization and in implementation procedures, but in general they are moves in the right direction and deserve to be encouraged.

The objectives of the programs are interrelated. The programs are directed primarily at assisting the large majority of the rural population -- small farmers and landless laborers. Briefly, the implicit goals of the programs are to:

- (a) increase employment
- (b) support labor intensive small-holder agricultural production

13.

- (c) Provide social gains along with economic improvement for the small holder
- (d) increase total agricultural production.

The Integrated Rural Development program is a plan of the government to replicate throughout the country a pilot project that was initiated near Lahore in August 1971, known as the Shadab project. The project was conceived and implemented by the Agricultural Development Corporation. Shortly after the new government came into power it was decided that the concept would be replicated intensively in one pilot project area in each of the 46 districts of Pakistan and extensively in the remainder of the country, until resources and trained personnel are available for a more intensive replication. The Central Ministry of Agriculture has responsibility for policy guidance and for coordinating the program, while the provincial governments have responsibility for implementing activities.

At this point it seems that the program might more aptly be titled "Integrated Agricultural Development", as there are few specific plans for improvement of aspects of rural life other than agriculture. However, descriptions of the program say that it is hoped eventually to induce government departments to build all-weather roads, set up dispensaries and veterinary hospitals and improve education and cottage industries in project areas.

The main emphasis of the program now is to help small farmers obtain

14.

credit, supplies and equipment easily and to enable them to sell products at fair prices through an orderly system. Model farms would be set up in every tenth village to demonstrate effective agricultural techniques.

Various aspects of this plan bring to mind some of the problems of the Village AID program of the 1950s.<sup>6/</sup> Most important is the matter of coordination of the activities of various departments without stirring up bureaucratic jealousies. Program descriptions say that because all representatives of departments will be responsible to the project manager there will be "horizontal integration" of the program "devoid of departmental loyalties." A more carefully worked out mechanism may be necessary to help representatives of various departments to work together without treading on each other's toes.

The Peoples' Works Program will be similar to the Rural Works Program of the 1960's, except that it will cover a broader range of activities and will encompass urban as well as rural projects.<sup>7/</sup> The Government is currently working out details of the kinds of projects that will be included and is preparing manuals as guides for local level implementation of projects.

6/ For a summary description of the Village AID program, see: Carolyn Mathiasen, "Pakistan's Village AID Program," USAID/Islamabad 3 April 1972

7/ For a summary description of the former program, see: Carolyn Mathiasen "Rural Development in Pakistan: The Rural Works Program (1961-1969)" USAID/Islamabad, May 24, 1972.

A recent outline prepared by the GOP has a list "which is by no means exhaustive" of 25 types of activities that may qualify under the proposed program. These range from projects to develop rural and agricultural infrastructure, such as road building and construction of irrigation and drainage channels and watercourses, to consumer items such as housing, cultural activities and clothes making. The GOP budget for FY 1973 allocates Rs 25 crore to help finance the Peoples' Works Program.

A land reform was announced by the new government on March 11, 1972. While it is a move in the right direction, it will have only marginal impact.<sup>8/</sup> The reform places a ceiling on land ownership, set at 150 acres of irrigated land or 300 acres of semi-irrigated land. However, the acreage limitation does not apply unless the total of "produce index units" is more than ~~15,000~~<sup>13,000</sup> for a single holding. (A produce index unit is a measure of land productivity based on soil type and other factors and is used in determining the amount of land revenue to be collected by the provincial revenue departments. Furthermore, if a farmer has either a tractor or a tubewell, an additional 3,000 produce index units are allowable. In other words, an operator of an irrigated farm with a tractor or tubewell can retain a maximum of 150 acres of irrigated land or ~~15,000~~<sup>15,000</sup> produce index units, whichever gives him the

<sup>8/</sup> For a more comprehensive description of the land reform and its likely impact, see: Douglas M. Jones, "Some Comments on the Recent Land Reform Proposals for Pakistan," USAID/Pakistan, March 24, 1972

larger acreage. Similarly, a dry land farmer (with a tractor) can hold up to 300 acres or ~~18,000~~<sup>15,000</sup> produce index units, whichever gives him the larger acreage. It appears that produce index units will be the ruling constraint in many, if not in all cases.

A further provision of the reforms indicates that the single limitation will be based on the size of individual holdings rather than on family holdings. The provision of land reforms indicates that any excess lands over and above these ceilings will be revested by the government for distribution to landless tenants or to farmers with less than subsistence holdings.

In spite of apparent good intentions, it appears that not very much land will be available for redistribution under the land reform. The 1960 census, which admittedly is out of date but nevertheless is the best data available, indicates that in 1960 there were fewer than 14,000 farms larger than 150 acres, encompassing about 4.9 million acres. However, only about 1.6 million acres of this is listed by the census as "cultivated area".

Of the 14,000 farms in the largest size group, almost one-half are listed as "joint farms" for which there are more than one owner. Many of these farms are non-irrigated, or at least have a relatively small proportion of irrigated land.

All these things taken together, the number of land owners who will be affected by the ceiling on holdings will probably be quite small. Many landlords had already alienated title in anticipation of the reforms.

## MAJOR ISSUES AND CONSTRAINTS

The high rate of population growth in Pakistan, even if it is soon reduced, assures that between now and the end of this century the productivity of land and water -- of agriculture -- must be markedly increased and that more jobs must be created. The Green Revolution that Pakistan is experiencing benefits some areas more than others. These issues emerge from the agricultural sector analysis as the main ones needing concentrated attention.

Between now and 1975, Pakistan will approach the upper limits of the new cereal technologies. As the new high yielding varieties are more fully exploited, the rate of increase in agricultural production will slow down unless new technological break-throughs occur.

By 1980 to 1985, Pakistan will likely approach the practical upper limits of its irrigation potential; that is, most of the water sources available for irrigation that can be economically exploited will have been tapped.<sup>9/</sup> What this should mean is expanded research on various aspects of water use and exploitation, plus massive operational programs to improve the efficiency of water use.

Need for a Stream of New Technology

Agricultural output must increase by at least four percent and hopefully more than five percent per year for many years to allow improvement in

<sup>9/</sup> For a summary description of Pakistan's water resources, see: James G. Unti, "Availability of Water for Irrigation in the Indus Plain," USAID Islamabad, May 1972 (mimeo)

Pakistan's ability to feed and clothe its growing population and to earn foreign exchange. Because the cultivated land area is limited, these rates of increase in output can only be sustained with a constant stream of new technology and investment which makes possible more output per acre. Economic incentives alone -- to induce farmers to use more variable inputs such as fertilizer and pesticides with existing technology -- are insufficient. Cost-reducing new technology -- the fruit of research -- is essential. Price policy and economic incentives should be secondary, and used for shorter run objectives. Of course, it will remain important for the GOP to make available adequate supplies of such inputs as fertilizer and pesticides.

Agricultural research is the single most important element for long-run, sustained agricultural growth in Pakistan. For the most part, the research on which the breakthrough in foodgrain production has taken place in Pakistan was performed outside the country. Pakistan will undoubtedly continue to be the beneficiary of the product of research efforts at the major international research centers. In fact, the kingpin of Pakistan's research strategy should be to take maximum advantage of international research institutions. However, to take full advantage of the output of the international centers, an increased amount of adaptive research must be performed within Pakistan.

Research to develop higher yielding varieties of crops other than wheat

and rice is essential as a means of assuring continued advances in total agricultural productivity and improved nutrition. For Pakistan, this means primarily cotton, oil seeds, pulses, sugar and fodder crops, corn, and fruits and vegetables. Wheat research, the most liberally funded agricultural research program, could still use considerably more funding. This was true even before the budgetary cutbacks during the past year.

Qualified scientists and research assistants are the most scarce resource for carrying out agricultural research in Pakistan. Even so, a large number of potential scientists and other research workers are unemployed, at least in research, because the amount of funds allocated for research is too small. Because of the fundamental importance of research as a means of improving technology, budgetary allocations for research should be increased at least until available scientific talent is being effectively used. For the longer run, a continued availability of new scientists to man the research stations must be assured. West Pakistan Agricultural University, particularly the advanced degree program and the associated research element of the university, and the Agricultural Colleges at Peshawar and Tandojam, must play a growing role in training scientists. The alternative -- to continue to rely heavily on foreign advanced training -- is too costly for the longer run, although a considerable amount of exchange of personnel and ideas with the international research community is desirable.

### Need for Improved Efficiency of Water Use

Water is the most scarce natural resource for agriculture in Pakistan. The efficiency of water use on farms is low. Whereas considerable research and engineering have gone into development of irrigation systems and moving water to farms, only negligible attention has been devoted so far to improving the efficiency of on-farm use of water. The potential of increasing agricultural productivity due to improved efficiency of management of water rivals the gains from the recent breakthroughs in high yielding varieties of wheat and rice. Another way of expressing the potential is that if the efficiency of the use of water could be increased by 20 to 30 percent, which seems to be a reasonable possibility, this would have an impact on agricultural production equivalent to that of two or three Tarbela dams. (The investment in Tarbela Dam will approach \$1 billion).

To realize that potential depends, on the one hand, on research to find better ways of saving and using water and, on the other hand, on getting adopted on a massive scale some practices such as land leveling, improved construction of watercourses and other techniques that have been proved in other countries with similar conditions to be highly productive.

### Need for Barani Agricultural Development

The rainfed (barani) areas of Pakistan have benefitted much less than the irrigated areas from the new seed/fertilizer technology for cereal grains

that has been the basis for the substantial agricultural growth in the Punjab and Sind during the last five years or so. Neither have these areas benefitted from the substantial investments -- both public and private -- in water resource development that occurred elsewhere in Pakistan in the decade of the 1960's.

In geographic terms the barani area includes larger tracts of land in Rawalpindi Division of the Punjab and in the North West Frontier Province. Additionally, barani lands are found in the Sind and Baluchistan and in other areas of the Punjab especially in Mianwali and Sargodha districts. Annual rainfall varies from over 40 inches in some of the hill areas of NWFP to less than 10 inches in the Sind and Southern Punjab.

The new government sees the problem of barani agriculture as a major one from two points of view: (a) barani farmers, because they must rely on rainfall for crop production, face greater uncertainties in terms of income each year, their resource base is small, they have been left behind in the processes of agricultural development, and hence, are generally poor; and (b) many are located in the NWFP which, as one of Pakistan's more backward regions (and perhaps for political reasons) is marked for special efforts at both agricultural and industrial development.

There is some evidence that the new seed varieties are adaptable in those barani areas where annual rainfall exceeds about 25 inches.

It has been argued by Rochin<sup>10/</sup> that the rate of return on investment in agricultural capital (but not crop yields) in these disadvantaged areas compares favorably with returns achieved in irrigated areas. Nevertheless, the agricultural infrastructure in those regions is weak; farms are small and fragmented; capital is short; and living conditions are primitive even by Pakistani standards. Consequently yields continue to be low and farmers here as in other barani areas live close to the margin of subsistence. More specifically, policies need to be designed and programs need to be implemented which will:

- (a) result in increased crop yields
- (b) make better use of available soil moisture and result in water conservation measures
- (c) improve the utilization of forage resources to provide better income potential for livestock producers
- (d) provide farmers with better marketing facilities and more stable prices to reduce risks associated with crops such as pulses, oil-seeds, and other dry land crops
- (e) broaden the crop alternatives from which farmers in dry land areas may choose
- (f) provide opportunities to change rural organizational structures, social services and institutions to meet the needs of people in disadvantaged areas.

<sup>10/</sup> Refugio I. Rochin, "A Micro-Economics Analysis of Smallholder Response to High Yielding Varieties of Wheat in West Pakistan," Unpublished PhD Dissertation, Michigan State University, 1971.

Need for More Rural Jobs

In addition to (or perhaps in certain cases, instead of) simply increasing agricultural production, a need exists for total rural development, including in particular more rural jobs, but also improved rural incomes, better income distribution and better standards of living.

Using fairly optimistic assumptions about the rate of growth of non-farm employment, Kaneda <sup>11/</sup> projects the agricultural labor force in (West)

Pakistan as follows:

1961	7.48 million
1975	10.12 million
1985	11.85 million
2000	13.65 million

Growth in the farm labor force is projected at least until the end of this century because the rate of population growth is high, the agricultural labor force is a large percentage of the total labor force initially, and the capacity of non-farm sectors to expand employment is limited. This growth in the farm labor force comes at a time when the compulsion, especially among larger farmers, is to use new labor saving technology. Implications are apparent. Raising rural living standards depends on providing more and better jobs in the countryside and, above all, on farms.

<sup>11/</sup> H. Kaneda, Economic Implications of the Green Revolution and the Strategy of Agricultural Development in West Pakistan, PIDE, Research Report #78, Karachi, January 1969, p. 7.

Actions within the field of agriculture which offer potential toward providing more jobs include: (a) taking advantage of the increased labor requirements associated with the new high yielding varieties (HYV's), (b) crop diversification, and (c) more intensive farming. However, it is almost certain that these actions alone will not provide enough new jobs to accommodate the projected rise in the labor force. Strict attention must be given to developing new job opportunities outside of agriculture if catastrophic levels of unemployment are to be avoided. <sup>12/</sup>

What are the possibilities within agriculture for increased employment? The new cereal varieties respond favorably to more careful cultivation -- better water control, more fertilizer and pesticides, better seedbeds, and more weeding. These varieties require more labor per acre, but less labor per ton of grain produced. The profit incentive for using the new varieties has been so strong that the varieties have spread rapidly in areas for which they are readily adaptable. To exploit the job-creating potential, emphasis now must be to extend their use to more farmers where conditions permit and to develop HYV's adaptable to new areas. Development of additional controlled water irrigation systems will also help to increase the acreage

<sup>12/</sup> Under USAID contract AID/nesa 527, Dr. Carl Gotsch of Harvard University is currently conducting a study designed to shed more light on the rural employment problem and possible solutions. At this juncture he is not optimistic. He makes a tentative conclusion that "in the absence of deliberate social reform, the trends of the 1960s will continue, leading to increased migration and serious unemployment."

of HYV's.

Diversification of crop production offers a considerable opportunity of increasing agricultural employment to the extent that the new crops involved would be more labor intensive. Among the possible crops, oilseeds may be the most significant. Increasing production of oilseed crops has the advantage that vegetable oil is deficit in Pakistan. Oilseeds also require processing, which would utilize additional labor. Most oilseeds are more labor-intensive than foodgrains. Winter oilseeds offer some possibility for increasing edible oil production, but summer oilseed crops, especially peanuts and perhaps soybeans and eventually sunflower, are believed to offer the largest potential for increased production of oilseeds other than cottonseed. Adaptive research is required to assess the true potential.

More intensive types of agricultural production would appear to have considerable potential for using labor in Pakistan. Multiple cropping is one obvious form of intensification. In general, more water (or improved efficiency of water used) is an important key to multiple cropping. Mechanization, to allow more timely land preparation, may also be important. The new HYV's of cereal grains may facilitate multiple cropping since they usually have shorter growing periods than traditional varieties and generally are less sensitive to day length so that they frequently can be grown during more than one season. Higher value crops, which normally require more

labor, offer another possibility. Most fruits and vegetables fall within this category. Looking toward the future, exports of fresh and processed fruits and vegetables to higher income countries may be a growing possibility.

Increased livestock production is another means of intensification. As incomes rise, the local demand for livestock and livestock products will increase. The world demand for livestock products is also increasing rapidly and range land throughout the world is becoming more limited. Pakistan has large areas that potentially could support more livestock, although improved grazing and range management practices will be required and experience to date indicates that improved practices will not come easily. However, the potential for improved nutrition and foreign exchange earnings as well as increased employment from increased livestock production appears to be great enough that the potential and the bottlenecks to achieving that potential should be thoroughly studied.

Farm machinery which tends to increase the demand for labor, such as pumps, tubewells and irrigation equipment, should be encouraged. Also, there is need for research and local manufacture of farm implements that can raise agricultural productivity and yet be used by the majority of farmers without displacing unjustified numbers of laborers.

The direct effect of the new cereal varieties is not spread evenly among areas of Pakistan. This is partly because the new varieties are only suited

(or are best suited) to certain environments; the new varieties simply perform better where the water supply is adequate and controlled, namely, in much of the Punjab and the Sind. To some extent, the new varieties are adaptable in the rainfed areas of northern Pakistan where rainfall exceeds 25 inches per year. Research into new cereal varieties suitable for the barani areas with lower amounts of rainfall will partially offset the regional disparities and will help create employment. Developing new areas for irrigation will also help. Research to find improved methods and demonstration of methods proved useful in other countries of conserving moisture and using water more efficiently should be carried out in the barani areas. These methods may include sub-soiling, fallowing, land formation, carefully engineered slopes, etc.

#### Need for Improved Nutrition

While nutrition is an area of concern that cuts across many sectors, whether perceived in terms of problem or solution, USAID shares the GOP view that agriculture must figure importantly in any nutrition improvement strategy. The best data available for Pakistan suggest that two-thirds of the population is deficient in both calories and protein. Over half are deficient in Vitamin A and riboflavin, and nearly 90 percent of pregnant/lactating women have iron deficiency anemia.

The negative implications of malnutrition for national development have

often been catalogued: high infant mortality; retarded physical growth; impaired learning ability; physical deformities; high incidence of illness; lowered productivity as adults; increased load on health services; less efficient use of education; and possibly less acceptance of family planning. All of these implications, to some degree or other, are believed to be operative in Pakistan. If past trends continue, to cite one example, it is likely that 25 percent of Pakistan's nine million children under five years of age will not live to see their fifth birthday.

By way of identifying possible agricultural options, we make three simple assumptions: (1) that agricultural policy and resources can be manipulated to improve nutrition; (2) that greatest attention must go to the low income group where nutrition problems are greatest; and (3) that nutrition should be among the prime determinants in agricultural policy decision making. Assuming this backdrop, the following options stand out:

-- The GOP currently estimates an average daily per capita deficit of 250 calories, or roughly 10 percent of the required minimum the GOP has set. Since cereals typically provide 80 percent of all caloric intake, this would imply the need for continued high priority attention to cereal grains research and production.

-- Pulses are a basic staple and prime source of inexpensive protein for the poor. A simple cereal/pulse diet (e.g., chappati and dal) interacts to

produce a nutritious result in terms of protein that is greater than the sum of the parts and adequate to meet the basic requirements for protein and calories if consumed in adequate quantity. Yet pulse acreage and production have been moving steadily downward while pulse prices have been moving upward at an even faster rate.<sup>13/</sup> There is growing concern over these trends within the GOP, though no systematic national strategy has yet been formulated to increase pulse production and stabilize or lower prices. Nutrition considerations dictate the need for a concerted high priority effort in research and extension to strengthen the base for expanding pulse production as rapidly as possible.

-- Edible oil provides more than double the calories of cereal and the processed meal could be used effectively for protein for human food. Yet nutrition seems to be a neglected consideration in oilseed policy decisions at the present time. Two examples: (1) little attention has been given to processing oilseed meal to the point where it could be introduced into human diets through such mediums as weaning food, biscuits, or fortificants for basic staples. (2) Peanuts yield well in Pakistan and have the special nutritional bonus of being protein-rich snack foods. Yet peanut acreage remains far below potential. The oilseed situation would seem to call for a systematic examination of policy and potentials, with nutrition factored

<sup>13/</sup> Douglas M. Jones, "Pulses in Pakistan: Production, Prices, Protein," USAID/Islamabad, February 1972.

into the assessment.

In considering where to invest its resources in agricultural research and production, the GOP of course will have to weigh the trade-offs between a great many important factors besides nutrition. But from USAID's point of view, the key point is that nutrition should be an important parameter for agriculture policy making. Accordingly, this view will be encouraged as appropriate and necessary in dialogue with the GOP as well as with provincial and agricultural research authorities. A special effort will be made to see that the nutrition factor is considered in the implementation of programs in which USAID resources may be involved, e. g. , agricultural research programs and a possible special effort in the rainfed (barani) areas.

#### Other Issues

Besides the major issues already discussed, Pakistan should give attention to: (a) developing an institutional framework for agricultural policy analysis, (b) the fact that development is constrained because of the difficulty of organizing farmers to implement development activities, (c) the need for an export strategy for agricultural commodities, (d) the advantages of more rapid rural electrification.

Framework for Policy Analysis: Following is a representative list of major policy questions that agricultural policy analysts in Pakistan should be concerned with:

1. Production: What is an appropriate agricultural production strategy?
  - a. For domestic consumption
  - b. For export
  - c. For import substitution
2. Prices: What role should the Government play regarding:
  - a. Support prices for foodgrains, including whether to maintain strategic reserves of foodgrains or to use PL 480 as a reserve instrument
  - b. Subsidies on inputs such as fertilizer, pesticides, water and farm machinery
  - c. Agricultural taxes
  - d. Export taxes or subsidies on agricultural commodities.
3. Rural Development: What are appropriate policies regarding:
  - a. Rural employment
  - b. Small farmers
  - c. Less advantaged areas
  - d. Rural electrification

A question arises as to what would be the most appropriate way of organizing to make best use of the available talent for carrying out appropriate policy analyses. Some of the problems in the existing system of analysis are:

1. Only a few well-trained and experienced agricultural economists exist in Pakistan.
2. For the most part, the Agriculture Section of the Planning Commission as it is now constituted performs a bureaucratic function; that is, the analyses are mostly routine rather than policy oriented

and consequently personnel who would probably be best suited to identifying and analyzing major policy issues are not attracted to the agency. The Agriculture Section performs a useful function of routine analysis, but falls short of what is needed.

3. By and large, economists (including agricultural economists) in major institutions in Pakistan are not geared into the process of analyzing policy issues of national importance. This includes those in the Faculty of Agricultural Economics at WPAU, which constitutes the largest single group of analytical agricultural economists, and those in the Pakistan Institute of Development Economics as well as other universities and institutions.

What is needed is an institution that can more effectively stimulate and involve the relatively small number of better-qualified Pakistani economists in analysis of important agricultural policy issues. Ideally, this institution should be organized so as to get an infusion of new ideas and enthusiasm from outside the country.

An approach which has been suggested to the GOP would be to have a three-member Council of Economic Advisors for Agricultural Policy. The Council would be divorced from the bureaucratic routine. The function of the Council would be to articulate alternative strategies for agricultural development, to identify, think about, and analyze the major constraints to

agricultural development and to make recommendations for alternative ways of solving the problems, together with an enumeration of the consequences of each alternative. The Council itself would not make decisions; it would only make recommendations based on careful analysis. The Council would be provided with staff support, including clerks, typists, and junior economists. Members would serve on the Council for a maximum of two years, which would tend to insure an atmosphere of academic freedom and would guard against the possibility of domination by any one institution.

Salaries would be high enough to attract the best talent and help to make it a prestigious position. After completing a tour with the Council, members presumably would return to their parent institutions with a more vital and continuing interest in analysis of important national policy issues and hopefully their work would make a contribution on a continuing basis.

Ample provision should be made to assure that the Council can draw on the most able agricultural economists from any of a number of countries, for periodic short-term consultation. Such consultants would be selected with the objective of getting new approaches to analysis as well as new ideas on solutions to policy questions and to help with analysis of specific issues.

A training program should be initiated to increase substantially the pool of qualified agricultural economists in Pakistan.

Ideally, a multilateral donor institution would finance the foreign exchange

costs of the Council and its training program. If the GOP adopts the Council concept and a multilateral donor is not forthcoming, the U.S. should consider grant financing.

Farmer Organization Constraint: A surprising number of development activities fail, are hampered or are never initiated due to lack of a viable organizational structure at the local level for carrying out the program. Probably the most serious deficiency of the new Integrated Rural Development program is that up to now there has been an absence of a local governmental or other organizational structure through which the community can effectively participate in the planning and implementation process. How to develop such an organizational structure remains a challenge to the Government of Pakistan. Unfortunately, USAID has pitifully little to offer by way of constructive suggestions.

One additional example of the organizational constraint: It is well recognized that a substantial amount of irrigation water is wasted in the tertiary canals because the water courses are of improper size or location or are poorly maintained. To improve the system requires that a community of water users be organized so that decisions can be made and the physical improvements carried out. Despite the importance and the long history of the problem, an effective organizational structure has not yet been developed. With the help of Professor Radosevich of Colorado State University (under

the centrally funded CUSUSWASH project), USAID hopes within the next few months to make suggestions leading to a viable system for implementing water course improvement activities.

Export Strategy for Agriculture: Particularly with the recent devaluation, Pakistan has the potential for substantially increasing exports of agricultural commodities. A strategy based on careful analysis would help more effectively to exploit that potential. The analysis should encompass:

- a. An appraisal of (largely existing projections of) world supply, demand and prices for principal commodities that Pakistan might produce competitively;
- b. A review of costs of production, know-how, potential quality, and marketing capacity for potentially exportable commodities;
- (c) An appraisal of the capacity to expand production to export those commodities which show promise based on (a) and (b).

The study by Dr. Roger Lawrence represents a start, but only a start, in such an analysis.<sup>14/</sup>

In addition to crops, a growing interest exists in exploring the feasibility of exporting meat products. Possibilities might include: (a) the (relatively thin) market for fresh meats in the nearby Persian Gulf states, or (b) processed meats, such as pepperoni and dry sausage, for such markets as

<sup>14/</sup> Roger Lawrence, "The Comparative Costs of Pakistan's Major Crops," USAID/Islamabad, June 1969

Italy and the United States. Both possibilities lend themselves to small-scale beginnings and could be started with existing breeds of livestock. At the least, the potential and the major limiting factors for meat exports should be examined.

Rural Electrification: Of Pakistan's 33,000 villages, only about 1,000 had electrical service in the early 1960s. By 1970 about 2,500 villages had power. The Fourth Five Year Plan called for an increase of only 1,000 with electrical power. Progress in rural electrification has been slow and, as a result, by 1975 Pakistan will still have only about 10 percent of its villages electrified.

The development thrust of rural electrification is double-edged. In the first instance, electric power is an agricultural input, much like fertilizer or labor. It aids in intensification of crop production and improves the efficiency of farm management. The most important use of electrical power for agriculture at this stage of Pakistan's development is for electric pumps for irrigation. In the future, electrical power will become increasingly more important on the farm and for rural industry: for electric powered farm implements such as stationary threshers; village-based agro industries such as grain drying, cleaning, and milling; and for cottage crafts.

The second benefit of electrical power distribution for rural areas is that it allows greater participation by the rural population in the fruits of

development. Increased use of electrical power in homes and public service institutions such as schools, health centers, etc., is almost synonymous with a growing economy, but too often only the urban population has access to these modern services. Rural electrification allows for a more equitable distribution of the benefits resulting from a country's technical progress. The coupling of this increased agricultural, or rural, productivity and the expanded social benefits from rural electrification will provide a better way of life for the rural population and hopefully will help stem the tide of migration to already over-crowded urban centers.

A detailed study of the benefits of an accelerated program of rural electrification for Pakistan would seem to be desirable. The Tarbela Dam apparently will have a large unused power generation capacity which could be put into operation at a relatively low cost by installing extra turbines earlier than now scheduled.

#### LIKELY CONTRIBUTIONS BY OTHER DONORS

Other donors that are contributing and that will likely continue to make contributions to agricultural development in Pakistan include the Ford Foundation, the United Nations Food and Agriculture Organization (FAO), and the International Bank for Reconstruction and Development (IBRD). Bilateral assistance is also being provided by several countries.

Ford Foundation has current grants totaling \$1,790,000 relating to agriculture in Pakistan. They include:

1. Overseas training for agricultural planners.
2. Advisors and consultants for planning and evaluation.
3. Training institutes for extension service.
4. Strengthening the rice, wheat and maize research programs.
5. Support to academies for rural development.

Of these current grants, continuing funds are expected for strengthening wheat and maize research. Several of the other grants are near completion. During 1973-74 the support for rice, wheat and maize research will probably continue, with Ford Foundation supplying advisors, equipment and training. One advisor for the maize program is in country and a second is expected soon.

Tentative support for training includes:

- a. Forest conservation (3 persons, Baluchistan)
- b. Animal husbandry (2 persons, Baluchistan)
- c. Sugar cane research (1 person, Punjab)
- d. Fruit and vegetable preservation (1 person, Baluchistan)

Ford Foundation is considering providing a consultant on vegetable seed production and a longer term advisor for potato seed production.

With financing through UNDP, totaling about \$1.5 million per year, FAO has several current programs supporting Pakistan's agriculture: (a) assistance to the Veterinary Research Institute in Lahore, (b) assistance to the Poultry Production and Training Institute in Karachi, (c) assistance in

soil survey, and (d) one advisor on rodent control to the Plant Protection Department in Karachi. FAO advises that they expect to launch no major new initiatives in agriculture in the immediate future.

The IBRD expects to sponsor comprehensive reviews during the next year of the cotton industry, the livestock sector and possibly the irrigation system in NWFP. Project identification for IBRD or bilateral assistance will follow these reviews.

For fiscal year 1973, the United Kingdom is considering providing:

- An expert in cotton production
- An expert in range management
- Twelve grain storage silos

West Germany expects to continue the program of training tractor operators and mechanics as well as an agricultural extension project at Multan. West Germany is considering providing:

- An expert in cotton marketing

Australia expects to continue assistance to a dairy farm near Islamabad.

#### AREAS IN WHICH U. S. ASSISTANCE IS DESIRABLE

Major areas in which the U. S. seems to have a comparative advantage in assistance, in which other donors are not providing overlapping assistance, and in which U. S. assistance is desirable, are agricultural research, improved management of water on farms and improved agricultural production in rainfed areas. Two subsector loan proposals are planned for the near

future: one on Water Management and one on Agricultural Research. Brief summaries of these proposals are provided in the Annex.

For barani agriculture, USAID proposes to respond to the GOP's request for assistance in developing specific research needs and action programs with the help of a four-man team of short-term consultants. This may lead to a proposal for a major program of assistance to agriculture in rainfed (barani) areas.

At this juncture, USAID is unaware of the degree to which the GOP may seek donor assistance for the Integrated Rural Development and the Peoples' Works programs. While supporting the concepts, USAID will be hesitant to consider tangible direct support to these programs until reasonable assurance exists that pitfalls of past (Village AID and Rural Works) programs will be avoided. Meanwhile, every opportunity will be exploited in which existing or planned new activities (such as land leveling and watercourse improvement) can be organized to complement the Integrated Rural Development and Peoples' Works programs and a positive attitude will be taken with respect to more direct support, if such is requested.

USAID will wish to continue to be responsive to special requests from the GOP for short term assistance on more specialized problems. In many cases these requests may be only peripherally related to our main development assistance objectives. However, in those cases where the required expertise

41.

is readily available in the U.S. (and often under TAB contract) the Mission will continue to rely on short term consultants to provide this type of assistance.

TABLE 1

AGRICULTURE'S SHARE OF GROSS DOMESTIC PRODUCT  
At Constant FY 1960 Factor Cost

	Fiscal Year						
	<u>1965</u>	<u>1966</u>	<u>1967</u>	<u>1968</u>	<u>1969</u>	<u>1970</u>	<u>1971</u>
	----- Million Rupees -----						
Agriculture	<u>9276</u>	<u>9318</u>	<u>9829</u>	<u>10982</u>	<u>11478</u>	<u>12215</u>	<u>11952</u>
Major crops	4888	4821	5137	6078	6408	7038	6584
Minor crops	1130	1172	1284	1406	1516	1536	1637
Livestock	3121	3178	3242	3307	3373	3440	3508
Fishing and Forestry	137	147	166	191	181	201	223
Non Agriculture	<u>12731</u>	<u>13774</u>	<u>14239</u>	<u>14929</u>	<u>16098</u>	<u>17259</u>	<u>17756</u>
Total GDP	22007	23092	24068	25911	27576	29474	29708
Agric. Percentage of Total	42.2	40.4	40.8	42.4	41.6	41.4	40.2

SOURCE: CSO Bulletin April 1972

NOTE: Gross Domestic Product  $\pm$  Net Factor Income from abroad = GNP  
Estimates of Net Factor Income for West Pakistan are not available; therefore  
GDP estimates are the best available indicators of National Income.

TABLE 2

ACREAGE OF HIGH YIELDING VARIETIES OF  
WHEAT AND RICE WEST PAKISTAN

	Fiscal Year					
	<u>1966</u>	<u>1967</u>	<u>1968</u>	<u>1969</u>	<u>1970</u>	<u>1971</u>
	-----Thousand acres-----					
HYV Wheat	12	250	2,365	5,850	6,626	7,445
Total Wheat	12,738	13,205	14,785	15,221	15,393	14,771
Percentage HYV	0.1	1.9	16.0	38.0	43.0	50.4
Irrigated Wheat	8,751	9,151	10,260	11,174	NA	NA
Percentage HYV of Irrigated Wheat	1.4	2.7	23.0	59.2		
HYV Rice	-	0.2	10	761	1,239	1,360
Total Rice	3,443	3,483	3,508	3,842	4,008	3,715
Percentage HYV			0.3	20.0	31.0	37.0

TABLE 3  
WHEAT AND RICE PRODUCTION, 1961-1971

<u>Crop</u>	<u>Fiscal Year</u>											
	<u>1961</u>	<u>1962</u>	<u>1963</u>	<u>1964</u>	<u>1965</u>	<u>1966</u>	<u>1967</u>	<u>1968</u>	<u>1969</u>	<u>1970</u>	<u>1971</u>	<u>1972</u>
	----- Million Long Tons -----											
Wheat	3.77	3.91	4.12	4.12	5.55	3.85	4.25	6.32	6.49	7.18	6.37	6.40*
Rice	1.01	1.11	1.17	1.22	1.36	1.27	1.32	1.48	2.00	2.36	2.17	NA

\*Estimate

TABLE 4  
IMPORTS AND EXPORTS OF FOODGRAINS  
1965-1972

<u>Fiscal Year</u>	<u>Wheat 1/ Imports</u>	<u>Wheat 2/ Exports</u>	<u>Rice 3/ Exports</u>	<u>Net Exports (Imports)</u>
	-----Thousand Tons-----			
1965	1,492	--	180	(1,312)
1966	744	--	146	( 598)
1967	1,146	--	418	( 728 )
1968	1,419	--	278	(1,141)
1969	16	145	374	503
1970	226	108	460	342
1971	215	--	309	94
1972	500 <sup>*</sup>	--	346 <sup>*</sup>	( 154) <sup>*</sup>

1/ Excludes trans-shipments to East Pakistan

2/ Consists only of shipments to East Pakistan

3/ Basmati exports plus coarse rice shipments to East Pakistan

\* Estimated

TABLE 5  
CONSUMPTION OF FERTILIZER, 1961-1971

<u>Fertilizer</u>	<u>Fiscal Year</u>											
	<u>1961</u>	<u>1962</u>	<u>1963</u>	<u>1964</u>	<u>1965</u>	<u>1966</u>	<u>1967</u>	<u>1968</u>	<u>1969</u>	<u>1970</u>	<u>1971</u>	<u>1972</u> <sup>1/</sup>
	-----Thousand Tons-----											
Nitrogen	31.0	37.0	40.0	68.0	85.0	69.8	112.3	177.7	206.0	272.6	251.5	342
Phosphorus	0.4	0.5	0.2	0.7	2.2	1.2	3.9	11.3	40.0	33.8	30.4	35
Potassium	-	-	-	-	-	-	-	0.2	2.0	1.3	1.2	1
<b>Total</b>	<u>314</u>	<u>37.5</u>	<u>40.2</u>	<u>68.7</u>	<u>87.2</u>	<u>71.0</u>	<u>116.2</u>	<u>189.2</u>	<u>248.0</u>	<u>307.7</u>	<u>283.1</u>	<u>378</u>

<sup>1/</sup> Estimate based on assumption that sales for May and June were the same as for previous year.

TABLE 6

NUMBER OF TRACTORS AND TUBEWELLS  
BY PROVINCE  
1968

	<u>Tractors</u>		<u>Tubewells-Installed</u>	
	<u>Private</u>	<u>Government</u>	<u>Private</u>	<u>Government</u>
Baluchistan	179	129	1510	29
NWFP	727	292	2560	178
Punjab	13764	1259	69030	7357
Sind	1913	646	2620	418
Total	<u>16583</u>	<u>2326</u>	<u>75720</u>	<u>7982</u>

TABLE 7  
AREA UNDER WHEAT

<u>Year</u>	<u>Irrigated</u>	<u>Unirrigated</u>	<u>Total</u>
-----Thousand Acres-----			
1960-61	7306	4254	11560
1961-62	7719	4472	12191
1962-63	7923	4589	12512
1963-64	7774	4543	12317
1964-65	8537	4661	13198
1965-66	8751	3987	12738
1966-67	9151	4054	13285
1967-68	10260	4608	14868
1968-69	11174	4047	15221
1969-70	NA	NA	15393
1970-71	NA	NA	14771

TABLE 8

APPARENT PER CAPITA AVAILABILITY OF FOODGRAIN  
FOR CONSUMPTION WEST PAKISTAN

	Fiscal Year						
	<u>1967</u>	<u>1968</u>	<u>1969</u>	<u>1970</u>	<u>1971</u>	<u>1972</u>	<u>1973</u> <sup>4/</sup>
	----- Million Tons -----						
Net production for consumption:							
Wheat <u>1/</u>	3.47	3.83	5.69	5.85	6.47	5.74	5.76
Rice <u>2/</u>	1.20	1.34	1.80	2.13	1.96	2.07*	2.16
Total	<u>4.67</u>	<u>5.17</u>	<u>7.49</u>	<u>7.98</u>	<u>8.43</u>	<u>7.81</u>	<u>7.92</u>
Net Imports <u>3/</u>	.73	1.14	(.50)	(.34)	(.09)	.15	1.00
Total available	<u>5.40</u>	<u>6.31</u>	<u>6.99</u>	<u>7.64</u>	<u>8.34</u>	<u>7.96</u>	<u>8.92</u>
Population (million)	55.25	56.78	58.30	59.83	61.36	63.20	65.10
Lbs. foodgrain/capita/ year	218	249	268	286	304	282	306

1/ Total production less 10% for seed and waste. Also production of a given crop year is assumed to be consumed 100% in succeeding year; hence, production data lagged one year.

2/ Total production less 10% for seed and waste.

3/ From Table 4

4/ Projected

\* Estimated

## ANNEX I

### SUMMARY OF WATER MANAGEMENT SUBSECTOR LOAN PROPOSAL

The proposed sector loan for Water Management will focus on two major activities: land leveling (or more properly -- land formation), and water-course rehabilitation. It is anticipated that these activities will be concentrated largely in irrigated areas, although some land formation work might also be done in rainfed areas as well.

Responsibility for organization and implementation will rest with various agencies at the provincial level and each province will probably proceed somewhat differently in terms of time phasing and organization. This will require considerable flexibility in meeting the requirements for several specific project proposals of modest size.

It is proposed that a sector loan for \$5 million be negotiated with the Central Government. The purpose of the loan is to meet foreign exchange requirements of the several provinces for projects directly concerned with land leveling, watercourse rehabilitation, and other closely related activities.

Utilization of the loan is expected to be completed over a three year period.

The Mission is in the process of discussing with the various provinces, specific project elements which would draw against the proposed loan funds.

The details of these are not sufficiently developed at this time to be able to present a clear picture of the magnitude nor specific loan requirements for the various project elements.

2.

It is anticipated that the proceeds of the loan will be utilized (a) to obtain technical assistance, (b) for import commodities directly related to specific projects or programs being implemented by the provinces, (c) to finance the cost of short term training and observational tours in the U. S. or in third countries, and (d) where appropriate to generate local currency for support of selected elements of the various programs. Some complementary grant financing for certain technical assistance elements is also contemplated.

## ANNEX II

### SUMMARY OF AGRICULTURAL RESEARCH SUBSECTOR LOAN PROPOSAL

The main threads of USAID's strategy to assist in the development of agricultural research in Pakistan will include steps to maximize use of relevant new imported technology, after minimal adaptation, and to concentrate available research resources on a few of the major crop production problems. The intimate involvement of the Agricultural Research Council (ARC), the provincial Institutes, the major relevant educational institutions (West Pakistan Agricultural University and Colleges of Agriculture at Peshawar and Tandojam), and the international research community (including advisors) in a few priority programs, is expected to encourage the development of a cooperative, problem-solving approach to agricultural research. The enhanced capability of ARC to assist in research planning and coordination, and the continued development of decision capability by the Provincial Research Coordination Boards, is expected to lead to increasing efficiency in research expenditure utilization, which in turn should encourage public support for research.

To focus attention on a few priority areas, USAID (considering deficiencies in the research establishment and inputs of other donors) expects to concentrate technical support, commodity assistance and training in a relatively few programs. The proposed mechanism for support is an Agricultural Research Subsector Loan, which will include grant elements.

USAID expects to assist in the development of major research efforts for water management, rain-fed (~~barani~~) agriculture, pulse crops and oilseed crops. Modest training and commodity assistance are planned for the wheat program (in collaboration with and in support of Ford Foundation), improvement of professional communication, and increasing faculty competence at the 3 relevant educational institutions. In addition, some flexibility is needed to allow USAID to respond to requests for training, commodities and technical assistance from the provinces, whose priorities are not identical to those of the entire country.

The water management research will concentrate on the farm level distribution and utilization of water, including research on factors affecting infiltration rates; consumptive use of crops; the relationships among water quality, crop

tolerance and management techniques; economics and social aspects of water utilization; final distribution system design, efficiency and maintenance; and overall balance of surface and groundwater use.

The pulse crop research program will concentrate on chickpea, mung and mash (black gram), and include some work on pigeon pea. A breeding program for the three major crops will be essential. Other major aspects will include cultivar selection, fertilizer use, cropping patterns, tillage practices, disease control and insect management. The technical consultants will help establish linkage with the international pulse research community.

The oilseeds research program will concentrate on developing production technology for groundnuts, rape and mustard, including cultivar selection, insect and pest control, production agronomy, harvesting and farm processing procedures. The potential of new oilseed crops, including soybeans and sunflower, will be investigated.

The research program for rain-fed (barani) agriculture will probably emphasize soil and water management techniques and cropping patterns to maximize returns in the area receiving 10 to 36 inches annual rainfall. At present

there is no major research capability to serve this area. GOP considers the area as high priority and is interested in developing a research station. If a new station develops, the pulse crop and oilseed crop research programs could be incorporated but research for these crops should not be restricted to the rain-fed areas, and the soil and water management research should not become secondary objectives.

The approach in each commodity area (wheat, rice, maize, pulses and oilseeds), will be multidisciplinary or problem-solving. The ARC will supply a staff coordinator for each of the major crop programs, and additional budget for needed functions. The national coordinator will assist the provincial scientists in program development and act as liaison with the international scientific community. The foreign advisors are expected to assist in establishing these relationships as well as supply technical capability.

SUMMARY OF FIRST ESTIMATE OF DOLLAR COSTS OF  
PROPOSED USAID INPUT

Program	Man Years Tech. Asst.		Commodities \$000		Man Years Training			
	FY 73	FY 74	FY 73	FY 74	Degree		Practical	
					FY 73	FY 74	FY 73	FY 74
Pulse Crops	4	4	30		4	4		
Oilseed Crops	3	3	30	5	3	2		
Rainfed Agr.	5	5		200	5	5	3	3
Water Mgt.	4	4			4	4	2	2
Rice					1			
Wheat			80		3		8	7
Seed Storage			10				2	
Speciality Crops			10	10	5	5	4	4
Communications Development			10	10				
Faculty Develop- ment			150	150				
<b>Total</b>	<b>16</b>	<b>16</b>	<b>320</b>	<b>375</b>	<b>25</b>	<b>45</b>	<b>19</b>	<b>16</b>
Costs (\$000)	800	800	320	375	188	338	152	128

Total FY 73 = 1,460

Total FY 74 = 1,603

ESTIMATED RUPEE EXPENDITURES BY GOP

<u>Program</u>	<u>FY 73</u>	<u>FY 74</u>
	----- ( 000 Rupees) -----	
Pulse Crops	200	300
Oilseed Crops	200	300
Barani Agriculture		5,000*
Water Management	300	500
Rice	750	750
Wheat	150	150
Seed storage	100	100
Communications Development	200	200
Total	Rs. 1,900	7,300

\*Excluding value of land