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SUMMARY

I. PAKISTAN - AGRICULTURAL RESEARCH LOAN

A. Summary and Recommendations

1. Borrower

The Government of Pakistan. The program will be executed by the Agricultural Research Council which is charged with the responsibilities for stimulating, promoting and coordinating agricultural research in Pakistan.

2. Loan Amount

\$8,000,000 is needed to finance dollar costs.

3. Program Objectives

The primary objectives of this research program are:

- a. Develop the institutional capability, organizational structure, administrative procedures and financial base; and provide training of staff adequate to provide sustained growth in agriculture research capability and research output to achieve agricultural development needs.
- b. Identify and carry out a five year research program which will yield significant information useful to farmers in increasing agricultural productivity and rapidly expanding output of key commodities now in short supply.
- c. Establish capability and attitudes which would anticipate developing needs and allocate resources effectively in overcoming principal constraints to agricultural development.

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*Mechanism?*

4. Description

Proposed is a five year program of financial assistance, academic and practical training for both professionals and sub-professionals, and commodity and equipment support to ARC in development of a National Research Center to carry out key research projects not adequately handled by the Provinces, and through ARC to the various provincial institutes to expand and improve efficiency, quality, and relevance of their research programs. The ARC, through stimulation and cooperative research, will ensure that all of the key elements in solving critical problems are provided for, and that unfruitful duplication of efforts is minimized. Establishment of a National Governing Board for ARC composed of high level policy making officials, professional personnel from research and development institutions, outstanding farmers and agro-industrial leaders will help ensure that policies and active programs of ARC and those at the province level supported by ARC, do in fact, reflect accepted political economic and social priorities.

*GRANTS?*  
*UNDER*  
*CONDITIONS?*

Technical committees drawn from the ranks of top professional personnel in various commodity and other research problem areas, chaired by outstanding authorities, will focus on identification of critical problems and establishment of coordinated research programs to overcome constraints that can be dealt with through scientific research (e.g. new and better genetic materials and cultural practices.)

The dollar loan herein described will be used to augment otherwise available indigenous resources; and resources from bilateral and multilateral donors, including continuation of the current AID level dollar grant funding. The \$8,000,000 loan will be used as follows:

- a. Procurement of equipment and supplies from US and 941 category countries \$3,000,000
- b. Training of Pakistani personnel outside of Pakistan \$3,000,000

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c. Foreign professional personnel \$2,000,000

Distribution among these categories is based on current projection of needs. It is clear, however, that flexibility must be provided to respond to varying rates of progress in different developing activities. Provision, therefore, will be made in the loan agreement for transfer between these three categories of upto 20% of the total annual budget on the request of GOP and with the concurrence of US AID Mission Director.

To supplement the above resources, the GOP have requested a grant of Rs. 73-74 million US owned rupees, to be used over this five year period, to help finance research development. Current estimates of program needs indicate this grant needs to be about Rs. 88 million. Agreement on the amount will be reached during Local Currency Project Agreement development. These rupees will be used approximately as follows:

a. Development of the National Research Centers	Rs. 30,000,000
b. Support for Provincial Research Centers and other institutions, including training	Rs. 58,000,000

5. Background of the Program

The program is designed to implement the major substantive recommendations of the 1968 and 1973 Pakistan-American Research Advisory Team. A copy of 1973 Team Report which updates and expands on the 1968 report is attached herewith as Annex III. The recommendations of this report have been reviewed by Ministry of Agriculture and ARC officials and with Provincial Agricultural Research officials. As a result of this review and the Central/Provincial discussion, the Government of Pakistan has decided to implement the substantive recommendations. It has requested \$8,000,000 financing from AID to cover foreign exchange costs and a grant of U.S. owned Rs. 73-74 million to augment otherwise available domestic research and international donor assistance.

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## 6. Priority of Research

We believe that need for agricultural research to support agricultural and national development in the developing countries is a non-issue. Economic analyses have long ago demonstrated the high potential pay-off and critical need for soundly based agricultural research programs in each of the developing countries, with strong linkages with the International Research Community. In respect of key commodity areas, there is a persistent lag on output of several major commodity groups for which the major causal factor is inadequate generation of technology applicable to specific physical conditions. It is clear too that major inefficiencies in use of human and natural resources are attributable to inadequate generation of applicable technology. Slow and inadequate rates of progress on small farm units and on rainfed land appear particularly to be associated with the neglect of these in past research programs. For the country as a whole a 5 to 6% rate of growth in agricultural production will be required for the foreseeable future. This will require a substantial strengthening of the research base.

## 7. Basis for USAID Appraisal of the Project

The appraisal of the need and capability to execute the proposed program is based largely on the evaluation carried out by the 1968 and 1973 PAK-US Agricultural Research Team, evaluations made by the USAID Agriculture Office, through continuing contact with Pakistani program officials and farmers, and various evaluations and reports of US and other foreign technicians including those of Ford and Rockefeller Foundation. On the basis of these assessments and review of these by the Mission Loan Committee, a conclusion has been reached that the proposal is a realistic one with outstanding prospects for success.

## 8. Rationale For Five Year Program

Funding has been recommended for this program for a minimum of five year in order to assure continuity of the research efforts to be initiated and carried out under this program. Research programs by their nature are long term with projects requiring five, six or more crop cycles to achieve results. It is considered that at least five years of the assistance of foreign technicians and inputs provided for herein will be essential to assure continuity of research programs and to allow a significant transfer of technology and methodology to Pakistani researchers.

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9. Other Free World Financing

The program described herein has been discussed with other multilateral and bilateral donors including IBRD, FAO, UNDP, Ford and Rockefeller Foundation. It is clear from these discussions that while other multilateral donors will continue contributing in modest way as they have been in the past, they are not in a position to make the major input required and which has been requested of AID. The IBRD, on its part, has indicated that it is developing details of a major program of support to improved seed processing and distribution which would pick up where this research program leaves off. It will provide for expansion of improved varieties through private growers, processors, and distributors. IBRD officials have indicated that US assistance to research provided for under this loan will be a major factor in ensuring the success of the IBRD Seed Improvement Project.

10. Statutory Criteria

All statutory criteria has been met. (See Annex I).

11. Pakistani Assignment of Priority

The Ministry of Agriculture, Special Assistant to the President for Agriculture, and the Economic Affairs Division (EAD) have all indicated they place the highest priority on support of this program. Ministry of Agriculture has proposed and the EAD has formally requested from the US funding support in both Dollars and Rupees for a five year program with \$8,000,000 of financial assistance to be in Dollars and Rs. 73-74 million of grant assistance from US owned Rupees. (US \$7.3 million equivalent at the current exchange rate of Rs. 9.9 to US \$1.00).

12. Rationale For Dollar Loan And Dollar Grant Financing

Both the GOP and AID place very high priority on agriculture and as reflection of this, the USAID under an approved PROP has programmed a dollar grant funding level of approximately 500,000 dollars per year to support of agriculture research. The

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GOP has indicated strong conviction that the current and projected level of international assistance is not sufficient, combined with available domestic resources, to overcome the inadequacy of rates of output of agricultural research to meet national and agricultural development objectives. It has indicated its intent to seek loan financing to augment the otherwise available domestic resources and international donors' assistance.

The high level PAK-US Agricultural Research Team which submitted its report in 1973, strongly recommended substantial expansion in the research program and recommended that the GOP solicit additional outside support. The US Mission, which has reviewed this report and other relevant documents and independently studied in-depth research organizations and research development progress, also feels strongly that a quantum jump is urgently needed in production of suitable modernizing technology for Pakistani agriculture if the country is to achieve more adequate rates and balances in agriculture output, increased rural employment opportunities and improve its balance of payments. It would be self defeating if the US were to curtail its dollar grant financing for research when and because the GOP placed such a high priority on agriculture research that it was prepared to borrow hard currency to expand its efforts in this area -- an area which traditionally has been supported by international donor agencies through grants and loans.

In addition to the issue of total levels of inputs, excessive dependence on the loan for financing of Technical Assistance (T.A.) would cause timing and continuity problems. Technical assistance will be needed immediately to refine the overall program needs, prepare detailed plans, and resolve initial implementation procedures before it will be realistically possible to begin to draw on foreign technical assistance under the loan.

It is therefore, recommended that AID continue, to the extent funds are available, the current levels (approximately 500,000 dollars per year) of grant funding for technical assistance to the GOP for agriculture research. It is anticipated that these funds will be drawn upon more heavily in the early years before conditions, procedures, contracts and recruitment have been completed under the loan. The

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AID dollar grant funds will be utilized to provide approximately 36 man years of short-term and long-term professional inputs through a PASA with United States Department of Agriculture and through one or more contracts with US universities.

13. Review and Evaluation

The GOP and USAID agree that periodic review and evaluation is needed of research priorities, use of funds and progress in achievement of institutional development objectives and objectives of individual project activities. It is proposed to carry out such a review and evaluation in considerable depth as a basis for any modification in operational procedures, and as a basis for annual approval of resource allocations. This evaluation and budget approval procedure will apply to both dollar and rupee budgets and will be the basis for release of funds.

*eval of resources*  
*SEE PALS*  
*90*

It is anticipated that this annual in-depth review would involve senior research and other administrative officials of the Central Government and one or two Provinces, and possibly one non-government person in addition to a representative of ARC. It would include also two or more non-Pakistani personnel, including, if possible, at least one non-American agricultural scientist. Funds for non-Pakistani personnel on the review might be provided either from the loan or USAID dollar grant or from other bilateral or multi-lateral donor sources depending on situation at the time.

In addition to the annual review and evaluation, a quarterly review will be carried out by personnel of ARC and in USAID/Agriculture Office. Results of the review may, as appropriate, be incorporated in operating plans for the project by the ARC or submitted as recommendations to the appropriate officials of the GOP and USAID Mission Director for their consideration and action.

More specific terms for the review and evaluation will be agreed upon in writing prior to signature of the loan agreement.

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#### 14. Special Considerations

##### a. GOP Budgetary Commitment

A substantial increase in Rupee budget is required to meet research objectives and particular non-salary budgets need to be substantially augmented and made more flexible in application. The GOP has indicated its willingness to expand its own budgetary commitment over time and in particular to increase flexibility in budget applications. In the loan negotiations, specific commitments will be agreed upon with respect to levels of support to be provided to ARC and through ARC to the Provinces by the end of fifth year.

##### b. Professional Incentives

Traditionally, advancement of professional personnel has occurred as a result of tenure in particular positions, and salary has been tied to level of positions. One of the objectives of the program will be to bring about greater flexibility in personnel procedures which will permit reward to scientists on the basis of their scientific contributions and tend to continue top scientists in their specialized professional activities, rather than move them into administrative or other currently higher paying positions.

#### 15. Recommendations

It is recommended that the loan to the Government of Pakistan be authorized in the amount of US \$8.0 million to finance foreign exchange costs of:

- a. Technical assistance from US and 941 category countries including International Centers.
- b. Training of Pakistani researchers in the US, 941 category countries, and International Research Centers.
- c. Procurement, from the US or 941 category countries of equipment, machinery and supplies required for the development and operation of various Pakistani Research Centers.

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16. Terms

- a. Repayment will be made in US dollars within 40 years from the date of first disbursement with a 10 year grace period.
- b. Interest at the rate of 2% per annum during 10 year grace period and 3% per annum thereafter.
- c. The Government of Pakistan will covenant to study the means of establishing professional remuneration and incentives which will maintain continuing high level productivity of researchers in their chosen professional fields.
- d. This loan shall be subject to such other terms and conditions as AID may deem advisable.

17. Project Committee

Chairman	Richard R. Newberg, USAID/P, AD/AP
Agric. Research Advisor	Floyd J. Williams, USAID/P, ARA
Legal Officer	L. Michael Hager, USAID/P, RLA
CDE Office	Arthur J. Thivierge, USAID/P, AD/CDE
DEA Office	Edmund L. Auchter, USAID/P, DEA

Approved by:



Joseph C. Wheeler, USAID/P, Director

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## I. PAKISTAN'S CURRENT SITUATION

### A. General Economic Analysis

#### 1. Economic Background

The economy of Pakistan is now uniquely poised to move into a period of development culminating in self sustaining economic growth. Pakistan has survived the trauma of national dismemberment and a lost war, and turned to building a democratic constitutional government. This government, in the Spring of 1972, agreed with the International Monetary Fund (IMF), and the World Bank chaired Aid to Pakistan Consortium upon the most significant set of economic reforms in the history of Pakistan.

Not all of the reforms agreed upon have been fully implemented, but work on all of them has begun. The Government of Pakistan (GOP) has taken radical steps to rationalize its foreign exchange practices, liberalize imports, simplify tax administration and impose a more equitable distribution of land and income. Banking regulations have been tightened, and steps have been taken to make bank credit more available to small farmers and businessmen. The GOP clearly recognizes the need for further fiscal reforms to increase the low level of public savings.

#### 2. National Income Growth

During fiscal year 1972/73 Pakistan's economy continued its recovery from the wartime depression of 1970/71 and registered an increase in per capita income for the first time in three years. In 1971/72 Gross National Product at constant factor cost had declined both absolutely and per capita, and although the following year the total goods and services made available by the economy increased, the additions were not enough to keep up with the growth of population.

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In 1972/73 bumper foodgrain and continued good cotton harvests accompanied by large export shipments of rice and cotton, led the economy to a growth of about 6-1/2 per cent. Manufacturing contributed to the increase primarily through the heavily weighted textile industry (about 26 - 30% of the large scale manufacturing sector), which responded to the strong export demand for cotton yarns. Small scale industrial production also probably responded favorably to the stimulus of increased demand and began to improve significantly, although data on this sector is lacking.

### 3. Investment

Although hard data is not yet available, available indicators all suggest that sizeable long term industrial investment is limited. The GOP and the private sector are seriously studying new investment in cotton spindles and in fertilizer, but elsewhere excess capacity and uncertainty about future nationalization continue to discourage any sizeable private sector investments.

Small scale industry investment, by contrast, is claimed by GOP spokesmen to be increasing significantly. Despite the absence of hard data, many observers believe this likely, and private rural investment in tubewells, construction, and equipment is continuing. As a result, despite the still hesitant investment performance in large manufacturing industry it is likely that the low ratios of investment to GNP of 1970/71 and 1971/72 have improved, and will continue to do so. Even more importantly, the new investments (farm and small scale industry) will lead to a more equitable distribution of their resulting output than was true during the previous decade.

### 4. Domestic Resource Mobilization

The mobilization of domestic resources for development in Pakistan continues to be hobbled by the lack of public savings, and these are constrained by the GOP's commitment to a wide range of welfare measures and the inelasticity of existing taxes.

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Preliminary revised GOP estimates suggest that of the Rs. 4.05 billion (about \$410 million) of public investment 69% was financed by foreign aid. Other GOP estimates indicate that the net resource inflow equalled 41% of total 1972/73 investment. Total investment is probably understated in these estimates, so that the real ratio of external resources to investment is lower. But the fact of the economy's heavy dependence upon external resources remains.

Improved administration of the income and other taxes and the higher foreign trade tax base increased total revenues despite poor sales tax collections. But this improved revenue performance could not offset the increased expenditures for refugee rehabilitation, the losses of GOP financial institutions with East Pakistan assets, and the higher cost of commodity operations (particularly in agricultural products and inputs).

The Government is determined to improve public savings in 1973/74, primarily by a vigorous effort to hold down non-development, non social expenditures. The 1973/74 development budget will be about 129% of actual development expenditures in 1972/74.

Pakistan's Public Sector Development Program

Sources of Funds: Rupees Millions

	FY 1972/73 <u>Revised</u>	FY 1973/74 <u>Preliminary Budget</u>
Total	4050	5250
Foreign Aid	2820	3250
Public Savings	350	1000
Deficit	880	1000

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The low level of public savings in the last two years has probably not been without impact on private sector efforts to mobilize capital. The central bank's (State Bank of Pakistan) commitment to limit net credit creation (this commitment is an integral part of the IMF-GOP reform agreement) has undoubtedly led to some rationing of the credit needed for large scale investment. Certainly the spectre of inflation implicit in the GOP's poor public savings performance shortens the investment time horizon of the private sector and inhibits long term investment,

#### 5. Price Policy and Inflation

Price distortions remain a major problem. Many prices in Pakistan's economy (including interest rates) remain badly misaligned with the real economic costs, and sometimes are deliberately kept so by GOP actions. The exchange reform of May 1972 and the related actions cleared away many of the price distortions that existed before, but many still remain. There exists a basic conflict between the GOP's long run development need to improve the efficiency of resource use by correcting the remaining price distortions and the short run need to hold down prices.

Inflation has built up steadily since January 1972. At that time the uncertainty caused by the war and the change of government was relaxed which probably led to significant reductions in liquidity preference while large increases in money wages were negotiated with urban workers and public employees. Further increases in government wage and salary payments were announced in March 1972, March 1973, and more are being studied. Since April 1972 the GOP has also announced a number of significant compulsory fringe and cash benefits for industrial labor.

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This upward shift in the money incomes of employed urban workers has been matched and supported by increases in the money supply, which increased steadily throughout CY 1972. At the end of January 1973 the money supply was 18.4% greater than 12 months earlier.

The increases in the price level have now become notable and complaints about the rising prices from the public and the press have multiplied.

Pakistan Price Indices

	<u>Wholesale</u>		<u>Consumer (Karachi)</u>	
	<u>General</u>	<u>Food</u>	<u>General</u>	<u>Food</u>
December 1971	100.00	100.00	100.00	100.00
March 1972	106.56	110.14	102.50	103.92
February 1973	127.82	131.94	114.58	119.84

The government's commitment to a wide range of welfare and development measures coupled with the continued absence of firm signs of a revival of industrial output, employment and investment, make the GOP unwilling to apply the fiscal measure of reduced spending to the growing inflation. At the same time the tax structure is still very inelastic. The GOP has not yet developed a politically acceptable formula for taxing agricultural incomes, and is heavily dependent upon foreign trade taxes. (About 40% of central government revenues are foreign trade duties.) Other indirect taxes in the form of

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excises produce about 35% of central tax revenue, two fifths of it from petroleum products and natural gas, Government proposals to reduce income tax exemptions and increase income tax revenue were introduced early in the fiscal year but met with such strong public reaction that over 70% of them were withdrawn.

The reaction of the GOP to these problems has been to rely increasingly upon price control coupled with a system of subsidized distribution of rational consumer items, to blunt the impact of the inflation. Because it has also recognized the disincentive effects upon agriculture of a farm price too low to encourage farm investment, the GOP has recently increased the prices of which it purchases rice and wheat. This action makes explicit the costs of continuing the policy of supplying cheap foodgrains to urban consumers. The GOP hopes to recover much of the fiscal cost of this subsidy through newly imposed development surcharges on fertilizer and export duties on rice and cotton.

6. Balance of Payments Considerations

The economic integration of East and West Pakistan had never been complete, because of physical separation, high transport costs, and other impediments. There had however been considerable interwing trade, in which West Pakistan received tea, jute manufactures, paper, matches, textiles, and spices for rice, edible oils and oilseeds, tobacco, cotton and cotton yarn and industrial products. As a result, the delinking of the two wings had serious economic as well as political and social repercussions.

a. Assistance

The Consortium donors played a major role in West Pakistan's recovery by providing crucial foreign exchange support for the GOP as it implemented the May 12 package of economic reforms.

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This support included (a) debt relief, (b) new commodity assistance and (c) technical and project assistance. Several debt relief agreements were concluded in the last quarter of 1972, in which the donors agreed to reschedule \$234 million in debt service payments due over the twentysix month period ending June 30, 1973. The U. S. provided \$52 million of this short term debt relief. About \$350 million of non project assistance was pledged by the consortium through November 1973.

The delinking of Pakistan's two wings left West Pakistan with a relatively small pipeline of foreign assistance, and the GOP made a particular plea for more project assistance at the March 1972 meeting of the Consortium. But project assistance is aimed at specific developmental problems rather than the general problem of resource scarcity, and therefore takes longer to prepare. The loan proposed here is part of the U. S. reply to the GOP's general request, as well as a reply to a specific request.

b. Exports

In 1971, world demand for rice and cotton shifted sharply upward. For Pakistan, this was extraordinary luck which helped the economy quickly redirect its sales of these commodities from East Pakistan to world markets.

The exchange reform also contributed to the upsurge of exports, which is still continuing, and is a major feature of Pakistan's Balance of Payments. (See Annex Table 1.) (IBRD analysts have estimated the weighted effective merchandize export rate before devaluation was Rs. 7.43: \$1.00, compared to Rs. 11. :\$1 immediately after devaluation. February 16, 1973 the dollar rate changed to Rs. 0.90=\$1, but the SDR rate has been unchanged at Rs. 11.94: ISDR since May 1972.) Since 1969/70 Pakistan's exports have grown at an impressive compound rate of

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27%, (through 1972/73) but the growth has been highly concentrated and supported by sharp increases in world prices of the two major commodities. 1972 data clearly show the concentration:

	<u>Total percentage value</u>	<u>% of total value by commodities</u>		
		<u>Cotton raw</u>	<u>Cotton yarn</u>	<u>Cotton Textile</u>
<u>Cotton</u>	54.8	26.4	17.2	11.2
<u>Rice</u>	9.7			

To maintain the pace of export growth that Pakistan needs, it must diversify its exports. The high physical and human capital requirements of most manufacturing exports, the country's comparative advantage in agriculture, and the need to ensure that the gains from greater national product are distributed more equitably among the predominantly rural population, all combine to suggest that such diversification must be based upon agriculture.

c. External Debt

The current heavy reliance of export earnings upon two volatile commodities is particularly dangerous in view of Pakistan's high debt service ratio. In the view of the consortium countries, at this time the government of Pakistan retains legal responsibility for the entire external debt of the former undivided Pakistan. The consortium is continuing to discuss this issue with both Pakistan and Bangla Desh, and the May 1972 rescheduling of Pakistan's debt was based in part on a recognition that the two countries needed time to arrange a satisfactory division of assets and liabilities. Since then the non-consortium creditors (with the minor exception of Kuwait) have relieved Pakistan of responsibility for any remaining liabilities incurred on account of aid

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utilized in what is now Bangladesh. (The Peoples Republic of China has reportedly forgiven Pakistan all liabilities incurred before 1971). The COM has told the Consortium that it cannot continue to pay debt service on East Pakistan liabilities after June 1973 and the question is currently still under discussion.

The technical basis of a division of the debt is not now in dispute between Pakistan and the consortium creditors. Project liability would be assigned on the basis of the projects physical location, while the more difficult allocation of liability for repaying food or commodity assistance would be based largely upon the estimates of the location of end users.

The question of legal responsibility aside, it is clear that the need to continue payments on the undivided debt will place a severe strain on Pakistan's foreign availabilities, and inhibit the country's development potential.

d. Pakistan's Debt Service Capability

Pakistan receives substantial invisible earnings in the form of immigrant remittances and these must be added to the economy's merchandise exports when measuring the economy's debt service capability.- The following table illustrates the position on the basis of current projects of future earnings. It however omits debt service liabilities incurred after March 1972:

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## Debt Outstanding May 1972; Pakistan FY; U. S. \$ million

	<u>1972/73</u>	<u>1973/74</u>	<u>1974/75</u>	<u>1975/76</u>
Exports (U. S. \$ million)	720	820	902	1110
Invisible Earnings	120	100	100	100
Debt Service Liabilities	<u>840</u>	<u>920</u>	<u>1002</u>	<u>1210</u>
Debt Service Liabilities after debt division on locational basis:	156	204	268	268
Debt Service Ratio				
Without Division	.21	.29	.36	.30
With Division	.18	.22	.26	.22

Liabilities assumed after 1971 have already and will continue to increase the GOP's debt service liabilities by successive cumulative increments (e. g. an aid level of \$400 million increases debt service payments by 12 million in each a successive year: 12, 24, 36, 48.) In 1972/73 this is not serious (the increase is to 22% or 20%) but in the succeeding years the short term of the 1971 rescheduling increases the service burden so that by 1974/75 the service of an undivided debt will take almost 40% of current exchange receipts. Whatever the outcome of current discussions of debt division and long term debt relief for Pakistan, it is clear that a more diversified and stronger agricultural base is needed for Pakistan's economy.

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e. Imports

Pakistan's import requirements will grow, pushed by the twin factors of development investment and income growth. The growing domestic inflation will also begin to push up the demand for imports. It is crucially important that this demand be met and inflationary pressures be contained within the range that will not retard export growth or destroy the increasing rationalization of the domestic economy.

To date, however, imports have grown much more slowly than exports. When measured in units that are free of the distortions introduced by exchange rates, (SDRs) imports increased by only slightly over 2% in 1972/73. As the tempo of industrial activity picks up, so will the import demand for industrial raw materials and intermediates. Current estimates continue to project imports at \$1 billion in 1973/74, but in SDR units the increase is only 11%.

f. Repayment Prospects

Pakistan has recently completed a rescheduling of debt service payments due between May 1971 and June 1973. In March 1973, the GOP asked its creditors for consideration of a longer term rescheduling exercise and particularly for relief from payments related to assets or activities benefitting its former territories in what is now the Peoples Republic of Bangladesh. Its non-consortium creditors (with the minor exception of Kuwait) are reported to relieve it from the East Pakistan portion of its debt. The Consortium creditors are studying the GOP request and it is expected that the Consortium under the chairmanship of the IBRD will undertake a thorough assessment of Pakistan's debt servicing capacity in the near future. This loan is proposed with the understanding that funds herein obligated will be taken into account in that assessment, and that the activity to be financed will further add to Pakistan's strong export base, which will enable the country to service its debts.

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7. Economic Rationale

The economic rationale for this loan is built upon the triple foundations of: (one) the continued importance of agriculture as the basis of continuing but more equitably distributed, growth of real income and employment in Pakistan; (two) the need for new departures in Pakistan's agricultural structure to make this possible; and (three) the proven capability of applied agricultural research to make these departures possible through the adoption of known innovations to local cultural and environmental conditions.

AID has long accepted the fact that research has a definite payoff to developmental objectives with sufficient regularity to be an essential developmental activity. The crucial question is whether in Pakistan today, the establishment of an institutional capability to effectively carry out such research has a higher developmental priority than other possible uses of AID funds.

Elsewhere in this paper, we have noted that a diversification of Pakistan's cropping pattern is essential if the increased real income and output brought by the Green Revolution of HYVs is to be equitably distributed among the smaller farmers, and particularly the dry land (barani) farmers. Fractional technologies, conforming more exactly to the peculiarities of Pakistan's situation must be developed.

Macro-economically, the current heavy dependence of Pakistan's agriculture based export regime upon two major crops (rice and cotton) must be diluted. If and when the currently high world relative prices of these commodities return to secular levels, Pakistan must be much more nearly ready to market alternative products than it is today. If it is not, foreign exchange scarcity will severely constrain the speed of the country's development and endanger its ability to meet its international obligations. Fortunately, a number of such alternatives exist (e.g. livestock products, fruits and vegetables). To implement these alternatives applied research in the adoption of agricultural technology is required, and this loan is intended to finance it.

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In a dynamic world, such research must be a continuing activity. It is not a one time thing, that will provide answers valid for all time. Therefore this loan is intended to meet the higher set up costs of establishing an institutional research capability, while the continuation will be the responsibility of Pakistan. This continuation is well within the capabilities of Pakistan's economy. The loan agreement will ensure that the machinery to provide for the institutions continued existence will be established with the activity itself.

Consideration of the employment impact of various alternatives have played an important part in the selection of this loan activity. Pakistan has serious problems of unemployment and underemployment, which in turn aggravate inequalities of income. The bulk of the population and the labor force are rural and accustomed to agricultural rather than industrial employment. At the same time, the additional capital required to provide productive employment in industry for sufficient numbers to make a significant dent in the country's employment problem is beyond the economy's ability to mobilize. Like other developing nations, Pakistan has severe problems mobilizing the increases in real rural income that have accrued from the Green Revolution in foodgrains, for investment in other sectors. But these resources can be mobilized for investment in agriculture if the appropriate technology is available and the proper structure of incentives exists. This loan is part of a concerted effort to meet these conditions. While it properly addresses only the first directly, it is also an essential component of the effort to properly structure incentives.

#### 8. The Agricultural Sector

Agriculture is the most important productive economic activity in Pakistan. The major share of Pakistan's gross domestic product arises in the agricultural sector (44% or 33 billion rupees, in 1971) and almost 56 percent of the nation's labor force is employed in the sector.

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Foodgrain production has been the spearhead of Pakistan's economic growth of over the last seven years. The Grow More Food Campaign was sharply stepped up in 1966, and combined with the introduction of new high yielding varieties of rice and wheat to spark the Green Revolution in Pakistan. Fertilizer use rose at an astounding compound rate of 23% through 1973 from a low 1964 base as farmers learnt how effectively the new grain varieties could convert fertilizer to food, and was followed by a dramatic increase in foodgrain output. After growing a record 6.9 million tons of rice and wheat in 1965, Pakistan's farmers took several years of bad weather in their stride and will grow almost 9 millions tons rice and wheat in 1973 although industrial production has also grown at a compound rate of about 7-1/2% since 1965 decade of the 1960's. Pakistan's relatively poor mineral endowment, the low industrial skill level of the population, and its rural and pastoral cultural patterns make it clear that long run growth must be firmly based in agriculture.

Underemployment and unemployment are serious problems in Pakistan, and the population continues to grow at a rate beyond the current ability of the economy to employ productively the new additions. The Government of Pakistan, with the help of USAID and other donors, has started a bold new population program that will increase its people's population awareness, create a new program of continuous motivation for family limitation, and radically enlarge the family planning options of Pakistani families. This innovative program must be matched by a widening range of employment opportunities in agriculture and agro-business if employment is to be contained and Pakistan's population is to participate equitably in the universal growth of real income.

The opportunities for Pakistan to share, by a process of export led growth, in the universal growth of real income are excellent. The economy of Pakistan has shown an amazing degree of resilience in recovering from the traumatic dismemberment of the nation and the loss of a short but decisive war. Fortuitously, the

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high world price of rice has enabled Pakistan to market the coarse rice it formerly supplied to the East Wing without any cut in the supply price. (It is likely much of this rice continues to be sold to Bangladesh through entrepot markets, such as Singapore) As world market foodgrain prices return to lower secular levels, Pakistan will be able to retain its share of this market only at the cost of lower prices.

Pakistan has similarly benefitted from increased world cotton prices, which have come just as domestic production increased to new highs. These circumstances have given Pakistan's economy the period of adjustment it badly needed.

During this period of adjustment Pakistan must align its agriculture with the secular structure of opportunities in world markets. Today, Pakistan is still a grain deficit country, which in the fiscal years 1972 and 1973 imported .7 and 1.4 million tons of foodgrains respectively. Yet it has a clear opportunity to become self-sufficient, and even become an exporter of grain production in the form of meat products.

While adjusting to world marketing opportunities, Pakistan's agriculture must also meet growing domestic shortages of high protein pulses (beans) and vegetable oils. Pulse production and acreage have been moving steadily downward in recent years, even while pulse prices have been moving upward. Pulses are a basic staple and a prime source of inexpensive protein for the poor. A simple cereal and pulse diet interacts to produce a result in terms of protein that is greater than the sum of the parts and adequate to meet basic requirements for protein and calories if consumed in adequate quantity. Not only can agricultural resources and policy be manipulated to improve nutrition, but nutrition and related income distribution considerations should be among the prime considerations in agricultural policy decision making.

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Edible oil provides more than double the calories of cereal and the processed meal could be used effectively for protein rich human food. Yet oilseed production in Pakistan is primarily a by product of cotton production--nutritional considerations are largely neglected.

These crops are only two particularly notable examples of how adaptive research, that will reshape discoveries and innovations developed elsewhere so that they are readily usable by Pakistan's lower income farmers, is badly needed.

#### 9. Prospects for Agricultural Growth

Over two thirds of Pakistan's irrigated wheat acreage is now planted to high yielding varieties. While further increases in the proportion of land planted to HYVs will accrue, future growth in foodgrain output will be largely based upon increased rates of fertilization and more efficient water use on both irrigated and unirrigated lands. In recognition of this we are proposing increased funding of fertilizer imports, while reducing PL-480 funding for imports of wheat. The GOP is studying several proposals for additional domestic fertilizer plants, and if (as we expect) feasibility studies demonstrate that it is to Pakistan's comparative economic advantage to build such plants, we would consider giving assistance to their development. As they come on stream, the need for U. S. assistance in the form of fertilizer imports would be reduced.

In addition to foodgrains, major opportunities for agricultural growth exist in other crops. Particular attention needs to be given the dry land (barani) areas, and especially to small holdings. Increased crop diversification and more intensive use of available land and water by the smaller, poorer farmers are a major opportunity to both increase production and to ensure the more equitable distribution of the resulting increased real income.

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Adoption of known technological innovations to make them useable by Pakistan's small farmers is a priority need that this Agricultural Research Loan is intended to address.

The loan and its companion assistance will establish a continuing system of adaptive, that will become self supporting in a few years.

10. Expected Economic Impacts of Project

The proposed project will increase the amount of local currency resources available to the national research system from Rs. 15.5 million in 1972 to Rs. 35-40 in the last year of operation. In addition, by the end of the period, institutions will be benefitting from substantially improved facilities provided by dollar financed imports, and from Mondale rupee financed goods and services obtained locally. Most important, the system will benefit from better trained and more experienced staff, working under streamlined administrative procedures with continuing coordination and linkage among institutes and between researchers, extension workers and farmers. Further, through improved internal training programs and facilities, and linkages with foreign research and educational centers, the research system should have achieved a capability for self-sustaining growth. These improvements will continue to yield benefits in removing technological constraints to adequate rates of agricultural growth as well as improvement in the balance of future growth among socio-economic groups in the population, among commodities, and among areas of the country.

?  
WHAT IS MEANT.

Analyses of returns to investment in agricultural research in the U. S. reveal very high returns to some projects and a high overall benefits to cost ratio, but some projects provide no returns. Returns to resources to be invested under this project should be higher than typically true in the U. S. , since most of the basic

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investment already exists and the need is for relatively small amounts of incremental inputs, strategically applied, to make the entire system function effectively. Further, many relatively simple problems heretofore neglected should have unusually large and predictable results.

The benefits already obtained from modest investments in introduction, testing, adaptation and related research on higher yielding varieties of wheat and rice are indicative of the potential. Wheat yields have increased by almost 50% or 4 maunds per acre over the total area and more on the irrigated lands, with the dissemination of higher yielding varieties and fertilizer. Admitting that increased fertilizer and water account for part of the gain, still the introduction, testing and adaptation of improved seed, and some related research, should be credited with at least one maund of increase in yield per acre. Similarly rice yields have increased by over 50% (over 6 maunds per acre). Thus, conservatively, on the 18 million acres in wheat and rice, the returns to investment in research would be about Rs. 450 million per year. This is 30 times the total current annual Pakistan budget for agricultural research. Of course the possibilities for such simple adoptions are limited and their yields can be sustained only by continuing research on new problems, e. g. new strains of rust.

Maize and sorghum have shown increases of about 1.5 maunds per acre over the past decade, but still have yields of only 10-20% of U.S. levels. Using the U.S. level as a possible goal in yields, there is scope for improvement of 5 to 10 fold in these and in many other crops as well as in livestock production.

It is reasonable to expect the identification and testing of forages grasses and legumes, and simple improvements in management would make possible a several fold increase in yields under

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rainfed conditions. A rate of adoption sufficient to increase forage yields by 5% - 10% by 1978-80 seems possible. Since little input other than labor is required, and labor has little alternative employment, the returns could be attributed largely to research and extension efforts. An increase of 5% in milk production alone would mean an increase of about 350,000 M. T. worth Rs. 200 million per year. Programs which are in the formative stage to improve forage and to export beef to Iran and other nearby countries, could conservatively result in the export of 50,000 beef carcasses a year by the end of this period. This should have a foreign exchange value of at least \$5 million per year.

Significant increases in yields of maize, sorghum and pulses should be forthcoming. A yield increase of only 0.1 maund per acre on coarse grains and pulses would have a value of Rs. 15-20 million per year. Ten times this is still a conservative goal as adoption begins to accelerate. Vegetable oil for which the country would otherwise be spending over U.S. \$50 million per year (on 100,000 tons) by mid 1970's, could be produced locally with adequate research. Given the relatively modest fertilizer needs of oilseeds and pulses, a fairly large share of returns for these should properly be attributed to research.

In summary, the returns as measured in increased output over the period of the project after adjusting for other inputs, should be several times the total resources to be invested and the improvement in balance of trade position will amply justify the foreign exchange commitment.

#### 11. Expected Social Impacts

Social impacts of the proposed program are less easily estimated than economic impact. However, the program, aimed at restoring balance in research allocation among different problem areas, will help relatively more those socio-economic groups

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which to now have least benefited from improved technology. For the most part these include smaller farm units and areas with poorer quality unirrigated land, where personal incomes are lowest. Improved practices on crops, feed and forage and livestock production, which also have been neglected, will require substantially increased labor inputs. Shift of even small tracts from migratory, uncontrolled grazing to improved, well managed, forage with proper harvesting and good livestock care would involve a manifold increase in labor per unit of area. (In the AMUL Dairy Cooperative in India, where considerable progress has been made on improved feeding and productivity of milking buffalo, the average number of milking buffalo per family is between one and two. There are over 100,000 producers in the cooperatives. Most of the cattle are tended by women with, in most cases, income and a suitable alternative to field work provided for one woman in the family.)

Employment also will be generated off the farm as agricultural output is increased as has occurred with HYV of wheat and rice. Many very low income farm operator families, especially in barani areas, will benefit directly from technology suitable to the crops they raise and from the introduction of new crops and rotations which will substantially increase yields and farm income. Considering the current output per worker in the barani areas achievement of self-sufficiency in cereals and oilseeds through expanded barani production should provide well over a million additional jobs on the farm and provide an increase in income about Rs. one billion after adjustment for costs of fertilizer. This assumes an increase of 1.2 million M. T. of wheat and 300,000 tons of oilseeds.

A plausible rate of increase in pulses, in dairy and other livestock production which is labor intensive, could easily add another million jobs on the farm, indicating two million jobs as a reasonable goal for increase in on-farm employment. This would generate a significant amount of off-farm employment in industry,

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trade and services. Jerry Eckert, et al in An Employment Strategy for Rural Areas of Pakistan<sup>1/</sup> estimated a current level of 750,000 rural unemployed and 2,250,000 rural under-employed. Thus developments as suggested above could go far in providing much more adequate rural employment opportunities. Investment in research would be needed, of course, but research must provide the technical basis for these developments.

1/ Islamabad, May 1973 pp 1-2.

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## I. PAKISTAN'S CURRENT SITUATION (CONT'D)

## B. Major Problem Areas

1. Performance Variability

Performance within the agricultural sector varies greatly from commodity to commodity, from geographical area to area and in effectiveness with which different resources are utilized and different rural groups benefitted.

Illustratively, a great deal of effort (including research) has gone into development of agriculture in irrigated areas, but little has gone into rainfed areas. Of the commodities, cotton and wheat, rice and maize have received emphasis, while pulses, livestock and oilseeds received little attention. Changes in yields, and in total production and domestic supply situation, reflect these imbalances in emphasis. Cotton yields have been increasing steadily and total output growing at an annual rate of about 10 percent. Yields of rice have been increasing at about 5 percent rate and total production at a 10 percent rate. Both cotton and rice are now heavily dependent on outside markets. Wheat production has increased by 90 percent in 10 years, but demand (stimulated by artificially low prices), has also grown very rapidly, and Pakistan continues to import wheat to the tune of about a million tons per year. Maize production has grown at about 3-4 percent per year but still is insufficient for domestic food, feed and processing requirements. (See Table 1.)

In contrast with these commodities production of pulses has been declining over the last several years (at about 5 percent per year) and recently, prices of pulses have been going up rapidly. Total production of edible oils has varied widely from year to year. Despite significant increases in prices, the country has had to import increasing amounts each year. The bill for the current year's vegetable oil imports of 100,000 M. T. will be \$40 to \$50 million. A further concern is the increasing percentage of total oils coming as a by-product of cotton lint production. Most of Pakistan's lint is exported in raw or processed form. Cotton production consequently is thus vulnerable to world

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fluctuations in cotton production and prices, which affect demand for the major product of the crop. Thus the vegetable oil supply will decline if exports of lint decline, causing a double problem of increased oil import requirements while foreign exchange earnings are falling. Cotton currently accounts for 50-60 percent of total exports.

Sugar production has been almost stagnant with supplies inadequate to satisfy needs.

Livestock development probably has been the most neglected of the major commodity groups. Yield of meat and milk per head are almost unbelievably low, particularly for cattle and buffalo (see Table 2). As a result, despite a large ruminant population relative to human population, meat and milk are in very short supply. These shortages and poor quality of meat and milk are of increasing concern both because of the consumption habits favoring meat and milk and the recognized importance of animal protein in the diet. Also possibilities are seen for some exports of meat both to nearby Arabian countries and to Europe, Japan and the U. S.

Sorghum, which currently accounts for about 3 percent of total cereals, has been making some progress in yield and total output, but millet has been declining. It is quite probable that a major improvement could be made with both these crops under barani conditions, where they now are grown.

Problems other than inadequate and imbalanced commodity growth rates are evident. Major emphasis has been placed on development of water resources and crops for irrigated areas. Unfortunately, no comparable emphasis has been placed on efficient use of irrigation water after it leaves the major canals. Combined losses from delivery systems and inefficient end use of water may allow only 25-50% total efficiency in water use. Waterlogging and salinization are common resulting problems.

Areas dependent solely on rainfall (which make up 85% of the total), receive very little attention. Similarly, the smaller farmers and tenants appear to be less well served by research, credit, inputs, markets and government service, and encounter the greatest difficulties in modernizing.

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Causes of slow rates of progress and large imbalances are many and varied. Two of the most important causes undoubtedly are: (a) Government policies on prices, investment, control and regulations which discourage improvements by farmers, livestock owners, marketers of agricultural products and suppliers of inputs and, (b) Inadequate research and extension on new and improved genetic material and crop and livestock management systems. A few of the apparently more seriously adverse policies might be cited before discussing research problems and priorities development and extension of technology, which is the main subject of the project.

## 2. Some Policy Issues

Poor systems for delivery of water to farm and the policy on assessment of water charges result in grossly inefficient use of water, and leads to extensive waterlogging and salinization of good crop land.

Price control and regulations on livestock products (aimed to benefit mainly urban consumers), discourage investment in increased production of livestock products and encourage adulteration of products. Tradition, furthered by lack of regulations and control, stimulates most extreme rates of overstocking and over-grazing of all forage (including grasses, legumes, shrubs), and the cutting of forests. Major results are extremely low forage and wood yields, and extremely heavy rates of water and soil loss.

Import, price and subsidy policies on wheat, to benefit mainly urban consumers, discourage more rapid expansion in production and costs tax payers heavily.

Fertilizer and pesticide import, price, and subsidy policies (which cost tax payers heavily), discourage domestic production which would reduce imports, and at the same time are probably ineffective in expanding use of modern agricultural inputs.

Inadequacy in credit funds and credit distribution programs and policies operate particularly to the disadvantage of small farmers and tenants.

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Vegetable oil price and import policies inadequately encourage domestic oilseed production on the part of farmers and its procurement by processors.

### 3. Research and Extension Priorities

Commodity priorities in research naturally will change over time in response to progress in increasing supplies, changes in demand for different commodities over time, and the specific nature of problems inhibiting (or likely to inhibit) adequate growth rates.

Current priorities would include:

- a. Wheat - Development of varieties more suitable to barani areas and increased resistance to rust and other pests for both barani and irrigated types. / AGRICULTURE ?  
P.H.  
OUTREACH ?
- b. Maize, Sorghum and Millets - Emphasis on introduction and testing of new varieties and improved cultural practices in barani rotations.
- c. Pulses and Oilseeds - Emphasis on introduction and testing of improved varieties under a wide range of conditions and rotations, (barani areas would be emphasized), and the development of pest resistant varieties.
- d. Livestock - Given the past neglect of this important area, a major effort is required on a broad range of problems. Development of more adequate supplies of feed and forage would have highest priority. This would include: (a) collection, testing and analysis of indigenous varieties of grasses and legumes; (b) systematic introduction and testing of foreign varieties of grasses and legumes; (c) development of improved management systems for indigenous and foreign grasses and legumes for different conditions, including rotation with irrigated and rainfed crops, in range areas, with and without fertilizer, grazed or cut, etc.; (d) research on suitable inoculants for introduced forage legumes. / ANIMAL  
GENETICS,  
BARANI ?
- e. Grasses and legumes production benefits livestock production and also has a major role to play in other priorities, such as barani areas, poppy growing areas, soil

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and water conservation measures, natural improvement in soil characteristics, and fertility. Improved livestock management practices also should receive attention.

f. Pest Management Research cuts across nearly all commodity research programs. In many instances biological control, in the form of resistant varieties or modified cultural practices, is the only control method feasible. In other instances chemical control procedures have been developed or borrowed intact but are unsatisfactory because of costs, inadequate supply of materials or implements, applicator skill, contamination, etc. The pest management research program will attempt to develop integrated control methods using resistance, tolerance, cultural practices, and where applicable, chemical control, for the control of important diseases and pests threatening production of major commodities.

g. Barani Area - In addition to the efforts made to solve problems of traditional crops in the barani area, new crops specially suitable to lower rainfall or heavily eroded areas, such as castor bean, cassava, tree crops, sweet palm, etc., should be tried in rotations.

h. Soil Fertility - Research on soil fertility and fertilizer and the micro nutrient requirements of different crops and forages, and economics of fertilizer use under different conditions and locations to increase efficiency of fertilizer use is needed.

#### 4. Increasing rural employment

Emphasis should be placed on: Techniques and cultural practices which would require increased labor as the principal input in the expansion of production; Planting of improved grasses and legumes and careful management, (should bring several-fold increases in output with little other than more labor required); Use of legumes as a nitrogen source in crop rotation instead of commercial fertilizers; Drouth resistant crops for areas and seasons where rainfall is low; Crops tolerant to water-logged and saline land now unused or under-used, and forage and field crops for conservation of land and water.

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5. Probable Effects of Agricultural Development  
Progress on Employment

It is difficult to estimate accurately effects of improved technology on employment, directly on farms and even more difficult to estimate indirect effects. However, one macro study done in Guatemala several years ago indicated a GNP multiplier of 4.0 on agricultural import substitution or export development when expansion in output was based largely on labor and other indigenous inputs. This would imply a GNP effect of \$400 million to \$600 million by achievement of self sufficiency in wheat and oilseeds. Considering existing wage levels, this would imply at least a couple of million jobs. Viewed alternatively, an average family under barani condition probably produces no more than a ton of cereals and oilseed per year, possibly less. Even assuming that less labor is required marginally to expand output on the same land, the domestic production to make up the existing deficit of wheat and oils should provide in excess of a million jobs directly on the farm, plus many more off the farm.

Large areas of both barani land and water-logged and/or saline areas are very much under-used. Intensive forage grass and legume cultivation for meat and milk production would greatly increase labor requirement in these areas. Except for irrigated berseem and lucerne, inputs and outputs are so low now it is difficult to imagine increases in labor requirements and output of less than 3 or 4 fold or more for areas where a full range of improvement practices are developed and adopted for forage and livestock on un-irrigated areas. Export of the equivalent of half a million fresh cattle carcasses to neighboring Arabian countries, where a large market is reported to be seeking supplies from here, should generate over \$50 million foreign exchange, \$150-200 million growth in GNP and provide several hundred thousand jobs.

Other export diversification possibilities which are fairly clear at this point are castor bean seed or oil and poultry and eggs. From time to time Pakistan has exported poultry products to nearby Arabian countries. It produces and exports a small amount of castor beans but the potential for the crop especially on barani areas has not been scratched.

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AVERAGE, YIELD AND PRODUCTION OF MAJOR CROPS - PAKISTAN

AVERAGE 1960-64 AND 1965-73

	1960-64	1964-65	1965-56	1966-67	1967-68	1968-69	1969-70	1970-71	1971-72	1972-73
<b>Wheat</b>										
Production in 000 tons	3,979	4,518	3,854	4,266	6,317	6,513	7,179	6,374	6,759	7,600
Acreage in 000 acres	12,110	13,140	12,738	13,205	14,785	15,221	15,393	14,771	14,478	14,710
Yield/Acre in maunds	8.9	9.4	8.2	8.8	11.6	11.6	12.1	11.7	12.7	
<b>Rice</b>										
Production	1,093	1,329	1,296	1,343	1,475	2,000	2,363	2,165	2,168	2,224 1/
Acreage	3,006	3,350	3,443	3,483	3,508	3,842	4,008	3,715	3,642	3,738 1/
Yield/Acre	9.9	10.8	10.2	11.4	11.7	14.2	16.1	15.8	16.2	16.2 1/
<b>Maize</b>										
Production	477	520	531	578	779	616	657	706	694	658
Acreage	1,180	1,202	1,339	1,368	1,502	1,523	1,600	1,581	1,563	1,494 1/
Yield/Acre	10.9	11.8	10.8	11.5	14.1	11.0	11.1	12.2	12.0	
<b>Jowar (sorghum)</b>										
Production	235	288	270	273	286	258	279	324	307	306 1/
Acreage	1,199	1,446	1,467	1,380	1,444	1,170	1,212	1,378	1,253	1,244 1/
Yield	5.3	5.4	5.0	5.4	5.4	6.0	6.3	6.4	6.7	6.7 1/
<b>Bajra</b>										
Production	359	439	364	365	407	325	297	355	354	277 1/
Acreage	1,958	2,250	2,075	2,069	2,258	1,819	1,560	1,881	1,876	1,607 1/
Yield/Acre	4.9	5.3	4.8	4.8	4.9	4.9	5.1	5.1	4.7	
<b>Barley</b>										
Production	115	116	82	87	106	95	107	90	101	103 1/
Acreage	461	458	382	400	429	385	399	348	387	395
Yield/Acre	6.8	6.9	5.8	5.9	6.7	6.9	7.3	7.0	7.1	-
Total cereal production	6,258	7,210	6,397	6,912	9,370	9,807	10,882	10,014	10,383	11,168
Total acreage under cereals	19,914	21,846	21,444	21,905	23,926	23,960	24,172	23,674	23,199	23,188
Total Pulses production	698.4	736.8	595.2	701.1	556.0	585.5	560.5	569.5	597.7	-
Acreage	3,365.0	3,423	3,044.5	3,534.1	3,282.8	2,803	2,683.4	2,688.7	2,924.7	-
Cotton (000 bales)	1,981.9	2,123.8	2,330.8	2,604.8	2,910.8	2,966.7	3,012.3	3,050.5	3,979.0	3,947.4
000 Acres	3,418.2	3,644.4	3,858.2	4,003.3	4,411.3	4,313.0	4,338.3	4,283.5	4,837.4	4,968.5
Yield mds., per acre	2.7	2.8	2.9	3.1	3.1	3.3	3.3	3.4		
Sugarcane production	14,980	18,373	21,957	21,635	18,365	21,624	25,953	22,801	19,647.7	21,069.7
Acres 000 acres	1,137.5	1,243	1,476	1,605	1,245	1,336	1,523.2	1,571.5	1,364.7	1,422.8
Yield/acre	372.1	402.3	366.9	366.9	401.5	440.6	461.1	394.9		
* Production of vegetable oils (000 tons)										
Cottonseed oil		75.68	83.23	93.02	104.85	108.70	107.00	109.40		
Rape & Mustard oil		66.31	55.99	62.56	84.46	68.50	77.00	76.89		
Sesamum oil		3.35	2.60	2.60	3.35	3.00	2.00	3.70		
Linseed oil		1.33	1.00	1.00	1.33	1.00	1.00	1.10		
Groundnut oil		152.67	151.52	172.60	215.89	196.80	203.00	194.00	234.00	

\* Estimated by Planning Unit, Ministry of Agriculture & Underdeveloped Areas, GOP, Islamabad

TABLE 2. LIVESTOCK NUMBERS AND PRODUCTION OF LIVESTOCK PRODUCTS.

	<u>Total No.</u>	<u>Mature female</u>	<u>Mature male</u>	<u>Young</u>	<u>Meat Production</u>		<u>Milk</u>		
					<u>Total</u>	<u>Per head</u>	<u>Per female head</u>		
					<u>Thous. M. T.</u>	<u>Kg.</u>	<u>Total</u>	<u>Kg.</u>	
	----- (In Million of Herd) -----						(Million M. T.)		
Cattle	17.8	5.12	8.60	4.04	Beef	109.8	6	2.19	435
Buffaloes	9.87	6.30	0.95	2.62	Buff. meat	39.1	4	4.87	857
Sheep	12.42	8.60	1.49	2.32		30.1	2.5	0.24	28
Goats	9.58	6.71	0.84	2.02		30.9	3.3	0.37	55
Camels	0.80	0.36	0.28	0.16		-	-	-	
Total						209.9		7.67	
Poultry	13.41	1.76	6.08	5.64		12.6	1		

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## I. PAKISTAN'S CURRENT SITUATION (CONT'D)

## C. Present Research System

1. Institutions

Most of the agricultural research work in Pakistan is sponsored by the 4 provinces and carried out at the headquarters of the research institutes located at Tarnab (NWFP), Lyallpur (Punjab), Quetta (Baluchistan), and Tandojam (Sind). The institutes also have field stations, varying in number from one for Baluchistan, to forty for Punjab, where some field testing is carried out.

The staffs of the institutes are organized along a combination of commodity specialist (usually geneticists), and discipline groups (e. g. soil fertility, entomology, pathology, etc.). The groups of geneticists concentrate on a single commodity, but their interdisciplinary support must be obtained from the staffs of various disciplines. The discipline staffs, usually with one or a few qualified researchers, are responsible for a great many commodities and other projects. Consequently, interdisciplinary support obtained tends to be weak and often uncoordinated. There is little day to day contact between the geneticists (who normally has principal commodity responsibility) and personnel from the other disciplines.

The substations of the institutes are staffed mostly by subprofessionals and visited periodically by scientists from the parent institutes. However, a few of the substations do have professionally trained researchers assigned on a full time basis.

Funds for operating the Institutes come from provincial budgets, central budget and grants from Agricultural Research Council (ARC), PL-480, etc. Budgets are sub-divided into "development" and "non-development". New programs are funded from the "development" budget for up to 5 years, then from the "non-development" budget, if continued. In the research institutes, salaries of staff (excluding labor) take about 60% of the total budget.

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The educational institutes contributing to agricultural research include Agricultural University, Lyallpur (AUL), formerly (WPAU), and the Colleges of Agriculture at Peshawar and Tandojam. They are controlled by their respective provincial Departments of Education. The staff organization is along discipline lines, reflecting their teaching functions. Staff members at AUL are expected to allocate 25% of their time to personal research. Due to the combination of discipline orientation in teaching and small amount of time devoted to research, most research projects involve scientists from only a single discipline.

Most of the provincial budget for the educational institutions is earmarked for pay of staff and other fixed costs. Additional funds, allowing a greater expenditure for equipment and contingencies are solicited from PL-480, ARC or other grant sources.

A few speciality institutes are doing research related to agriculture in Pakistan. These include the water management research at Mona project area under the Water and Power Development Authority, the Cotton Research Institute (Multan), the Commonwealth Institute of Biological Control (Rawalpindi), the Irrigation Research Institute (Lahore), the Forest Research Institute (Peshawar), the Atomic Energy Research Center (Tandojam), and the Radiation Genetics Institute (Lyallpur).

More information is contained in Agricultural Research in Pakistan, report of the second joint Pakistani-American team, of March 1973, pp 1-10; and Agricultural Research in Pakistan, February 1973, ARC and USAID.

## 2. Current Research Priorities

De facto priorities within the Pakistan agricultural research system include wheat, rice, and cotton. The objectives in these major research efforts are primarily increased yield per acre under optimal growing conditions. Minor research programs are operative for oilseeds, pulses, potatoes, sugarcane, sorghum, pest management, water management, improvement of dairy animals and poultry, but work in these areas tends to be isolated individual efforts, frequently not

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directed toward solution of major problems. Other priority areas include fodder, forage, soil management, beef management, deciduous and citrus fruit production and marketing, vegetable seed production, range management, sheep and goat production.

The distribution of priorities among provinces is shown in the following table:

<u>Program</u>	<sup>(1)</sup> <u>Baluchistan</u>	<sup>20</sup> <u>Northwest Frontier</u>	<sup>21</sup> <u>Punjab</u>	<sup>20</sup> <u>Sind</u>
Wheat <i>4 units (?)</i>	X	X	X	X ✓
Rice		X	X	X
Maize		X	X	X
Oilseeds	X	X	X	X ✓
Cotton			X	X
Pulses	X	X	X	X ✓
Potatoes	X	X	X	X ✓
Sugarcane		X	X	X ✓
Sorghum	X	X	X	X
Pest Management	X	X	X	X
Water Management	X	X	X	X
Soil Management	X	X	X	X ✓
Dairy	X	X	X	X
Poultry	X	X	X	X ✓
Beef		X	X	
Fodder	X	X	X	X ✓
Forage	X	X	X	X ✓
Range Management	X	X	X	X ✓
Deciduous fruit	X	X		
Tropical fruit			X	X
Vegetables	X	X	X	X ✓
Sheep and goats	X	X	X	X ✓ (15)

Many of the research problems are common to all areas of Pakistan, some are common to only a few areas, and some, of course, are unique to a province or district. Illustratively some wheat production problems such as rust and

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lodging are common to all areas but Baluchistan has areas requiring much greater cold tolerance and the Northwest has areas requiring extra lodging resistance because of high winds.

In most cases research on problems common to all areas can most efficiently be handled by concentration of resources, including interdisciplinary teams at a single site, but provision must be made also to deal with site specific problems either by conduct of research at the problem sites or by adequate simulation of conditions at the center followed by testing at the problem sites.

3. Deficiencies in the existing system

a. National Priorities - Some national priorities and targets for agriculture are rather specifically stated, for example, targets for output of wheat and use of fertilizer. However, it does not appear that alternatives are examined systematically, with economic, social and political aspects considered and major biological or former economic constraints to alternatives identified or adequately evaluated in establishing commodity targets. With the lack of definition, research programs often focus on obvious and narrowly defined goals, (such as maximum possible yields per acre under optimum cultural conditions), rather than substantial systems suited to resource and farmer constraints. Poor communication among disciplines, lack of leadership and physical isolation contribute to the difficulty of a researcher obtaining the overview needed to make better decisions on his research time. Organization tends to foster rather than discourage isolation of individual researchers from other disciplines. Most of the commodity research is led by geneticists specialized in that commodity. What should be the cooperating disciplines are organized to deal with resources or special problems (of water, soil fertility, entomology).

Consideration of social and economic impact of a particular research program is constrained by the absence of economists and sociologists on the staffs at the research institutes. Because of the lack of economic input, few experiments are designed to permit economic evaluation of alternatives.

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b. Leadership - Apart from the administrative leadership supplied by the institution director, there is little evidence of the emergence of national leadership within disciplines or research problem areas.

c. Communication among scientists working on the same or related problems is infrequent. Few institutions have developed effective communication linkages intramurally within the same institution. Communications among institutions and provinces has been minimal. But in the past few months, the ARC has started holding national workshops to promote effective communication among scientists.

Most scientists are essentially isolated from the world scientific community. In only a few cases do linkages exist between researchers in Pakistan and researchers in foreign or multinational institutes, and, these for the most part continue on an informal basis frequently through a resident expatriate. Few scientists have an opportunity to travel abroad and few have access to technical journals. Library facilities at AUL approach adequacy, but other institutions lack minimal libraries.

Communication between research scientists and extension personnel are still limited but increasing in frequency and efficacy. However, none of the research programs include an outreach capability in association with extension workers. An extension "subject matter Specialist" as such is unknown. A few research programs (rice, wheat, maize) have started systematic training of extension personnel through "short course" and "field day" channels.

d. Agroclimatic areas served - The major crops research facilities are at Peshawar, Lyallpur, Quetta, and Tandojam. There is a rice station at Dokri and one near Lahore and a cotton station at Multan. In addition to these major facilities there are several substations. All the major stations and most of the substations are in irrigated areas and the current research is primarily for irrigated agriculture.

Although Pakistan is noted for its irrigated cropland (30 million acres), there are about 17 million cropped acres that are rainfed, about 5 million acres are forested

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and over 140 million acres are range land or waste land. GOP plans to develop a research program for arid and semi-arid zones with one major station and several substations. The program will emphasize range and flock management reflecting the current view on potential use of those unirrigated areas receiving less than about 10 inches annual precipitation.

The major area, not being served by existing or heretofore planned research facilities, is the rainfed (barani) cropland, mostly in northern Punjab and North-West Frontier. This area of about 7.5 million acres, has from 10 to 40 inches annual rainfall, with a seasonal distribution pattern that should permit much higher crop and forage yields than those currently obtained. The rabi season field crops (October-November planting) cover nearly 6 million acres, while kharif (July planting) crops cover about 1.7 million acres. The major rabi crops are wheat, chickpea, rape, and mustard, and the major kharif crops are pearl millet, maize, sorghum, and mungbeans. Of these crops, only wheat and maize are currently served by a reasonably adequate research program, and even in these programs the emphasis is on irrigated cultivation.

e. Technical manpower available in most institutions is inadequate. Within the major research institutes there are about 300 research officers, including 18 with doctorate degrees. Only the AUL approaches a critical mass of qualified researchers, with a total of about 80 doctorates in the staff. Some of the staff having master or bachelor level training have been well trained, but many have received masters degree training that did not adequately prepare them for research positions. The current staff at the major research institutions is shown in the following table.

f. Facilities available - Apart from the research program needed for the barani areas including forage legumes and grasses, and perhaps some specialized facilities (such as a cold water rice nursery in NWFP), the land area available on research stations is generally adequate. Most of the stations lack a comprehensive plan for facility development. Some major stations do not have an assured water supply for research

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Current Staff Training Levels at Seven Major  
Agricultural Research Institutions in Pakistan

<u>Institution</u>	<u>Senior Staff</u> <sup>*k</sup>	<u>Training Levels</u>	
		<u>M. Sc.</u>	<u>Ph. D.</u>
Agricultural Research Institute, Lyallpur	136	158	16
Agricultural Research Institute, Quetta	23	26	0
Agricultural Research Institute, Tandojam	65	140	1
Agricultural Research Institute, Tarnab	68	45	1
College of Agriculture, Peshawar	37	29	2
College of Agriculture, Tandojam	38	70	3
West Pakistan Agricultural University, Lyallpur	217	222	79
Total	584		

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\* Class I and II or equivalent, some M. Sc. are junior staff (research assistants).

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on irrigated crops. Many field research plots are not effectively managed for production of reliable data. In some cases the management failure results from impact of unanticipated factors. Field plots often fail despite a good initial research plan because of lack of control in accordance with the research plans, improper, or non-uniform soil or seed-bed preparation, variation in planting rates, improper application of water and fertilizer, ineffective weed, insect or pest control, etc. While some of these are not within the control of the researcher because of either monetary or administrative restrictions, frequently it is a matter of recognizing the important controllable variables and adequate supervision of field hands. Most institutions have inadequate field equipment and what is available is assigned to individual departments where it is inefficiently used. Maintenance facilities are lacking and essential equipment replacement is not programmed, nor resupplied.

g. Laboratory facilities are often insufficient to support practical research programs. A few laboratories lack electrical power and other utilities. Needed equipment is frequently inoperative due to lack of small amounts of foreign exchange for parts or of servicing expertise. Rupee availability also hampers maintenance of equipment.

h. Budgets for agricultural research institutions allow about Rs. 28,000 per senior scientist. About 65% is spent for salaries, the remainder for contingencies, including nearly all labor. Labor is considered cheap, but research supplies and equipment in Pakistan are available only at or above world market prices. The Pakistani scientist thus has the equivalent of about \$900 purchasing capability, compared to about \$10-15,000 for a U.S. scientist doing similar work. Rupee budgets thus severely limit the effective working of scientists in Pakistan. An efficient budget for a productive scientist in Pakistan would be about Rs. 80-100,000 per annum. (The ICRISAT center at Hyderabad, India, anticipates about \$10,000 per scientist)

i. Foreign exchange availability to research institutes is negligible. The largest institute has about \$75 per senior scientist, a smaller one has \$11 in FY 73. This does not suffice or even include spare parts. The procedure for purchasing FX items is laborious, frequently taking a year or more after the allocation of FX.

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## L PAKISTAN'S CURRENT SITUATION (CONT'D)

## D. Conditions Expected at End of Project Period

1. Characteristics of the System

At the end of the project period the agricultural research system in Pakistan should have the following characteristics:

- a. Developing needs of the nation as related to the agricultural sector are identified and resources are deployed to overcome principal constraints to agricultural development.
- b. The research resources, including provincial and federal institutions are functioning as a network, with effective program linkages among Pakistani institutions and with the international research community.
- c. The Agricultural Research Council is playing a central role in the development of research programs of national or regional scope, addressed to solution of priority problems and making efficient use of the available resources. /Now?
- d. The provincial institutes have a nucleus of adequately trained staff working for solutions of major problems and have a plan for continued upgrading of staff competence.
- e. The provincial institutes have developed essential basic facilities and they are being maintained and used efficiently.
- f. The provincial institutions have examined their procedural constraints, have corrected those within their control and have recommended actions on others to provincial governments.
- g. The Rupee funds available for research from provincial and federal allocations have increased markedly, and are being allocated to priority programs.
- h. The foreign exchange allocated for support of agricultural research has increased substantially, and procedures for effective and timely procurement of FX commodities have been developed.

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i. The holding of annual workshops for major commodity and research problem areas is an established procedure, with participation by most of the concerned scientists, and are a forum for research program review, problem identification, and planning of future program.

j. The inclusion of an outreach capability in major research programs is an established procedure, effectively linking research and extension with the farmer and encouraging feedback information flows.

k. The geographic areas served by the research system reflect the relative needs and social impact potential of given locations, as well as overall commodity production goals.

l. A national research center has developed into a leading institution for a few specific research programs, forms a focal point for research in Pakistan, has functioning program linkages with most of the major relevant institutions, is a source of talent available for deputation to provincial institutions, forms the primary technical linkage with the international research community.

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m. Several cooperative national or regional research programs, involving a multidisciplinary, multi-institutional approach to the solution of major problems are functioning.

n. The relevant educational institutions are routinely involved in priority research programs.

o. Appropriate research results are published regularly in the form of a respected technical journal of international stature.

## 2. Production of New Technology

During the project period new technology will have been produced and disseminated, including:

a. Higher yielding varieties of sorghum, pulses, forages, oilseeds, etc., identified or developed.

b. More efficient management techniques relating to use of irrigation water, barani soils, dairy herds, ranges, etc.

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c. Varieties of wheat, sorghum, millet, forages, etc., specially suited to lower rainfall areas have been identified.

d. Farming systems alternatives for the barani area that include efficient use of legumes for soil improvement, maximization of rainfall infiltration, increased supplies of milk and animal protein, etc.

During the project period recommendations on varieties, rotations, fertilizer levels, and management practices will have been developed for each major agroclimatic area.

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## I. PAKISTAN'S CURRENT SITUATION (Contd.)

E. Recommendations of Review Team

GOP's recognition of the need for a continuous flow of proven agricultural technology led to a systematic review of Pakistan's research program and the "Report of the Joint Pakistan-American Research Review Team" in 1968. The major recommendations of that report were adopted by a central Cabinet of Ministers decision in 1971, but implemented slowly because of internal and international events.

At the request of GOP, a second joint team reviewed the agricultural research program in 1973. The recommendations of that team are similar to those of 1968 team, modified primarily by the effects of the 1971 and ensuing events. The 1973 Report has been and continues to be carefully reviewed at several levels. There is major concurrence on appropriate courses of action among researchers, research administration to implement substantive elements of the 1973 Report. The Summary of Recommendations from the Report follows:

1. Basic Considerations

- a. There should be a statement of policy with respect to the responsibility of the Central Government in supporting and conducting agricultural research, to minimize present restraints because of the view that "agriculture is a provincial subject."
- b. Positive action should be taken to develop an effective national capability and system for agricultural research.
- c. Research priorities should be related to national development goals.
- d. There should be maximum use of present resources and new institutions or centers should be established only when suitable facilities are not available from existing institutions of the Central Government or provinces.

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2. Pakistan Council for Agricultural Research

- a. The Council should serve as the technical arm of the Ministry of Agriculture and for the Government of Pakistan.
- b. The Council should assume major responsibility for the planning, operation and evaluation of research for problems of major national concern.
- c. The Council should furnish coordinating leadership to insure effective use of all national research resources, as well as effective progress in specific research programs.
- d. The Council should employ scientific staff for research at the headquarters station and also maintain a pool of permanent staff for deputation to cooperating institutions at national or regional centers as and when required in providing multidisciplinary research capabilities.
- e. The Council should furnish support for both national and provincial research personnel, for staff training and development, for seminars and workshops, for operational budgets of research programs and for participation in international meetings. *How? Grant?*
- f. The Central Government resources, including those of the Council, should be applied mainly to coordinated national or regional research schemes, rather than applied to scattered grants to small projects as is now the practice.
- g. The Council staff should be upgraded to furnish the capability for professional leadership consistent with the operational responsibilities.
- h. The Council should be reorganized to provide for effective operational functions, with provision for the degree of autonomy required for effective management and operations.

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3. Provincial Research Institutions and Provincial Research Programs

a. The provincial research institutes would be expected to continue major responsibility for research of particular concern within the province.

b. The provincial research institutes should be strengthened, particularly in Sind, Baluchistan and the N.W.F.P., to handle more adequately the research within the province.

c. The provincial research institutes should participate in national or regional cooperative research schemes in the planning, operation and evaluation of such schemes.

d. There should be a more complete evaluation of the present use of resources in the provinces to consolidate activities, equipment and manpower resources now scattered to an excessive number of substations.

4. The University of Agriculture and Colleges of Agriculture

a. The educational institutions within Pakistan should provide the facilities and programs for the training and education of the major portion of the agricultural research manpower.

b. The capability of the University of Agriculture (AUL) should be broadened by the establishment of such new departments as may be required to furnish education through the B.Sc., M.Sc., and Ph.D. levels.

c. The University of Agriculture should serve more effectively as the "National University for Agriculture."

d. There should be further support to the Colleges of Agriculture of the Sind and N.W.F.P.

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e. The University of Agriculture and Colleges of Agriculture should participate fully in the planning, operation and evaluation of coordinated national or regional research schemes, consistent with their facilities and staff resources.

5. Other Research Organizations

a. The research components of the institutes and departments now falling within the Ministry of Agriculture should be incorporated within the Pakistan Council for Agricultural Research.

b. The agricultural research programs and resources of the Atomic Energy Commission Laboratories should be involved fully in the planning, operation and evaluation of coordinated national and regional research schemes.

c. The agricultural research activities of the CSIR, WAPDA and other organizations should be reviewed and arrangements made for close integration with national research programs through the coordinating leadership of the Council.

6. Funding of Research

a. The Central Government support for research, to be provided through the Council, should be increased commensurate with the importance of agriculture to the national economy and to national development.

b. Provision should be made through the Council for the support of personnel, operations, equipment and supplies, travel etc., to be utilized in the provincial research institutes and other organizations for operation of coordinated national research programs.

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c. Council funds and resources should be applied to selected basic or background research schemes related to critical problems of special concern in Pakistan.

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d. The funds for agricultural research should be set up in an "ARC fund" and made available for use by the executive staff of the Council in the manner to minimize unnecessary delays in operation of research.

7. Research Manpower

a. There should be a comprehensive review of the available trained manpower for agricultural research in Pakistan.

b. The future manpower requirements should be determined, primarily on the basis of staffing needed for national research programs, for upgrading the University of Agriculture and the Colleges, and for selected specialized projects.

c. A staff training and development program should be evolved with attention given to in-service training, to basic degree level and postgraduate level training.

d. The staffing of the Council, as well as other research institutes, should be reviewed and upgraded as necessary to insure the level of competence required for the planning, operation and coordination of effective research program.

e. The personnel policies and procedures in the Council should be modified to insure maximum consideration for competence and merit in the recruitment, selection and promotion of research workers.

8. Facilities

a. There should be established a National Headquarters Research Station for the Council, near Islamabad, for the conduct of selected research programs, for offices of the executive staff and research program leaders or coordinators, and for certain facilities for servicing national research, such as the library and documentation center, conference facilities, etc.

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b. The building of additional research institutes, centers or laboratories should be held to a minimum, with facilities constructed only where it is fully determined that the existing Central Government, provincial or other facilities are not available.

c. Special attention should be given to more effective operations, and to improvement or development of research stations to insure the types of precise experimentation necessary to produce reliable results.

9. Research Relationships to Extension and Development

a. Subject matter specialists should be appointed under the Council at the provincial research institutes and at such other research centers as required to insure prompt transmission of new research results to the organizations responsible for extension and development activities.

b. Special attention should be given to development of effective seed laws and procedures for the release of improved varieties and for the increase and distribution of seed supplies.

c. There should be a continuous critical evaluation of the effectiveness of practices for dissemination and use of new agricultural technology to insure a maximum impact in improving national agricultural productivity.

10. International Cooperation

a. The linkages with the international agricultural research centers, such as IRRI, CIMMYT, and others, should be maintained and improved to insure prompt availability of external research resources.

b. Linkages should be established with the emerging national research organizations in other countries of Asia for exchange of experience in the development of the national institutional capability, and also knowledge and materials from the respective research programs.

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c. External technical assistance resources should be applied in a coordinated manner to insure maximum use of such support and to develop a comprehensive system, in Pakistan, for the conduct of adequate agricultural research. (Report is attached as Appendix II).

11. Reorganization of the ARC

The reorganization of ARC, reflecting the transformation of that body from a "granting" to an "action" agency began in 1971. To date, Directors for Animal Husbandry and Crop Husbandry have been appointed, and the posts of Directors of Economics and Soils have been advertised. Several key staff have been appointed at technical levels.

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## L PAKISTAN'S CURRENT SITUATION (CONT'D)

## F. Funds for research

1. Current Budgets

During the 1960-65 period, GOP spent less than Rs. 5 million per annum on agricultural research. From 1965-70 this increased to about Rs. 18 million per annum. The FY 1973 planned expenditure for research is 15.5 million, up about 18% from the FY 1972 level of 13.1 million for present Pakistan. The following table shows the FY 1972 and 73 planned expenditures for broad categories of research in the 4 provinces.

AGRICULTURAL RESEARCH BUDGET IN PAKISTAN  
(Source: Provincial Annual Development Plans)

	<u>FY 72</u>	<u>FY 73</u>
	(Rs. 000)	
<u>Punjab</u>		
Agriculture Experiments and Research	3758	4414
Veterinary Research	2337	2269
Fisheries Research	45	
<u>N. W. F. P.</u>		
Agriculture Experiments and Research	1341	1494
Veterinary Research	407	515
<u>Sind</u>		
Agriculture Experiments and Research	1825	1966
Veterinary Research	26	28
Fisheries Research	14	25

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	<u>FY 72</u>	<u>FY 73</u>
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Baluchistan

Agriculture Experiments and Research (Giddar Valley Research Cum Seed Farm)	1056	1747
(Pistachio Research)		( 480)
		( 11)

Totals

Agriculture (crops) Experiments and Research	7980	9621
Veterinary Research	2770	2812
Fisheries Research	59	25
Wildlife Research		52
GRAND TOTAL	13141	15503

Agriculture (crops) research claims about 60% of the total expenditure, with veterinary and forestry research each receiving about 20%, while fisheries and wildlife research receive less than 1% of the total funds budgeted.

2. Additional Sources

In addition to the above funds listed in annual development plans, limited funds from external sources (mainly PL-480) support research in several educational or speciality institutions.

The current annual support to agricultural research in Pakistan through the "PL-480" program is about Rs. 5.7 million (1972). The Agricultural University, Lyallpur (AUL) is receiving the most support (Rs. 1.5 million/annum), followed by Commonwealth Institute of Biological Control (CIBC) at Rs. 1 million/annum. Other major recipients include University of Karachi, Pakistan Council of Scientific and Industrial Research and the Forest Research Institute (Peshawar).

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The level of research support by these funds has increased rapidly recently and is expected to continue increasing. These funds are an important source of money for agricultural research in Pakistan and commit a major segment of the research manpower capability. To the extent these programs can be expected to supply information to solve Pakistan's more important agricultural problems, the programs are an asset. Funds that employ research manpower on less important problems can retard Pakistan's agricultural development if technology is limiting, and if the involved scientists would be producing more useful results if the funds were not available.

Recognizing that any research program might produce a scientific breakthrough of virtually infinite value, some judgement can be made on the probability that a given program will supply immediately useful results for the solution of a major problem. For example, the information supplied by research on the taxonomy of cuttlefish is likely to be less important for Pakistan than research on the population dynamics of rice stem borers.

On the basis of project title and knowledge of specific programs, we arbitrarily classified 18 of the current projects as reasonably expected to yield "quickly useful results". These 18 are receiving Rs. 1.8 million annually, and 9 of the 18 projects are at AUL. Other institutions receiving major support through "PL-480" programs would be severely short of funds without these programs and are mostly outside the "mainstream" of agricultural research. The current "PL-480" research program in Pakistan is judged a positive asset.

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## I. PAKISTAN'S CURRENT SITUATION (CONT'D)

## G. Expected contributions by other donors

1. Third Countries

a. Australia - Australia supported the initial development of a dairy farm near Islamabad, including the supply of a farm manager, equipment, and 100 animal herd. Since the advisor left, this farm has regressed. The Australian Embassy has indicated little interest in continuing to support a commercial dairy, but has evidenced interest in cooperatively supporting a dairy research effort. Our TA schedule assumes that Australia will supply a dairy herd management specialist for 4 years.

b. France - The French Embassy has indicated that France expects to supply technical assistance in the area of agricultural mechanization. The program will emphasize adaptation of exogenous bullock drawn implements to Pakistan conditions, and the development and testing of new implements as needed. We assume that as the NRC develops facilities, this advisory will use NRC as a base and contribute significantly to the production systems and other research programs.

2. UNDP and UN-Related Agencies

In on-going and new projects, UNDP has programmed expenditure of \$5.8 million during 1972-77 on programs related to agricultural research. The GOP commitment for the same programs and period is Rs. 63 million.

FAO is assisting the Poultry Research Institute at Karachi with a training program and in executing applied extension and research in poultry husbandry. The program is reasonably comprehensive, including investigation of rations, health, equipment, breed performance, and extension of developed technology. It began in late 1970 and is scheduled to continue for 5 years.

The Veterinary Research Institute at Lahore is being assisted by FAO with a program to upgrade the VRI's diagnosis, vaccine production, and research capability. This program included TA, commodities and training. It is expected to be completed in 1973. FAO is also assisting the Plant Protection

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Department, Ministry of Agriculture, in developing a plant quarantine center. This program, including TA, training and commodities, is expected to begin in 1973. The Plant Protection Department is also receiving FAO assistance for establishing a rodent control research center in Karachi. This program will probably continue through 1975.

The Livestock Research Institute, Bahadurnagar, Punjab, will be assisted from 1973-76 in research on problems impeding livestock development. Controlled breeding, management studies, feeding patterns and product processing will be emphasized. The Artificial Insemination program in Punjab will receive advisors, equipment, and training to establish a semen production center.

Fruit and vegetable grading and processing in Baluchistan will receive UNDP assistance from 1974-77 in the form of 3 advisors, equipment and training. Cotton breeding and improvement will receive assistance from UNDP from 1973-79. About 20 man-years of advisory services will be sponsored, and some equipment will be supplied. Mutation breeding using isotopes will be assisted from 1974-77 by supply of advisors, fellowships and equipment.

Integrated Rural Development will be assisted by UNDP as precise external inputs needed are identified. Support began with an international seminar in April 1973. Commodity policy studies (cotton, sugar) are underway with UNDP assistance. The programmed assistance by UNDP and GOP expected commitment for the same programs are as follows:

<u>Program</u>	<u>UNDP \$</u>	<u>GOP Rupees</u>
Veterinary Research Institute, Lahore	422,900	2,200,000
Poultry Research Institute, Karachi	1,229,500	3,175,000
Vertebrate Pest Control, Karachi	623,200	1,957,000
Livestock Development Center	976,800	17,200,000
Artificial Insemination Center	580,300	6,727,000

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<u>Program</u>	<u>UNDP \$</u>	<u>GOP Rupees</u>
Fruit and Vegetable Grading and Processing	335, 100	1, 200, 000
Cotton Breeding	1, 033, 400	9, 200, 000
Mutation Breeding	100, 000	5, 000, 000
Integrated Rural Development	220, 000	15, 700, 000
Commodity Policy Studies	251, 000	1, 000, 000

3. The World Bank

In April, 1973, the IBRD concluded a study of the seed production and marketing system in Pakistan. They expect to propose a loan to GOP (financing TA and equipment), to assist in the development of a seed production-marketing system.

The ARC, as it develops its capabilities, will become a focal point for efforts by the several donors and should be able to solicit additional donor interest in agricultural research.

4. Ford Foundation

Ford Foundation has been supporting research and production of maize, wheat and rice in Pakistan. The support for wheat and rice research has decreased recently and is now limited to sponsorship of visits by CIMMYT and IRRI scientists, supply of limited training of Pakistani staff, and of a few FX commodities. Ford Foundation support for maize research and production is substantial, including two resident advisors, practical training, and commodities to equip a maize research station. This program will probably continue. Ford Foundation also supports overseas training of agricultural planners. Ford Foundation has evidenced interest in developing a program of combined support with USAID for research on the major cereal grains.

We believe the assistance being provided and planned by other donors substantially complements the proposed AID assistance.

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## I. PAKISTAN'S CURRENT SITUATION (CONT'D)

H. Previous USAID Support

USAID and other donors, recognizing research as an essential component of a developing agriculture, have encouraged Pakistan's import and adaptation of available technology and the development of an indigenous capability for technology generation. The efforts in wheat, rice, maize and university development have helped Pakistan develop its technology generating capability.

In 1968, a joint Pakistani-American team reviewed the extant research capability in Pakistan and recommended a course of action to upgrade Pakistan's research capability. Since 1970, USAID staff have worked closely with the Ministry of Agriculture, the Agricultural Research Council, provincial agricultural officials, provincial research stations and scientists, to jointly identify the type of research system most suitable for Pakistan, the major constraints, and a strategy for alleviating the limiting factors. Since July 1970, USAID has supplied a research administration advisor to GOP and a Mondale Rupee Grant of Rs. 3.4 million to ARC.

This effort was reinforced in March 1973 with a second joint Pakistani-American review, at the request of the Secretary of Agriculture, GOP. The consensus of expert counsel is that Pakistan should systematically upgrade the provincial institutes, improving their capability to respond to province needs, and that the ARC should become actively involved in a few major research programs of national importance, assuring their successful execution through a multidisciplinary, coordinated approach to priority problems. This would develop a research system that emulates the Indian and U. S. systems wherein states and federal governments share the responsibility for development of agricultural technology.

Expert counsel is that this effort will require additional training, budget and FX commodities for the provincial institutions, the development of a national research center, and expatriate advisors for some major research programs.

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## II. DEVELOPMENT STRATEGY

### A. Selection and Definition of Research Targets and Projects

Broad national goals relevant to agriculture generally change slowly and many are inherently similar over the world (e.g. provide most food and fiber to meet domestic needs; contribute to an acceptable international trade position, maximize contribution to income and generation of investment resources.) Goals reflecting distributive or social justice relating to agriculture are more variable over time and certainly among political entities.

It is of prime importance that within broad national goals, research personnel and organizations be alert to the economic, social and political changes that imply different future requirements for research output. For example: trends in relative scarcity and abundance of different commodities due to shifts in supply and demand functions; need to find alternative uses for land and labor employed in crops with declining demand or likely to be outlawed (poppies); need for conservation or development of land, water or other resources; servicing economically depressed areas or areas accorded political priority; increasing rural employment.

An important objective of the proposed research program is to develop an operational research system which effectively translates broad policy guidelines into specific actionable research activities and concentrates sufficient resources in a manner that provides maximum probability that identified obstacles to goal achievement will be expeditiously removed. This will include:

1. Development of a system and an attitude that anticipates new issues and searches out policy decisions emanating from the political process at national, provincial and local levels.

2. Development of analytical capabilities and procedures which will translate issues and political decision into operational targets, such as output levels for specific commodities, areas or resources to be developed and amount of inputs (including labor), to be used, or required changes in levels of efficiency. Provision will be made for encouraging such analysis within the agricultural research system as well as continuing contact with analysts in the Planning Commission, the relevant provincial authorities, extension workers and farmers.

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3. Application of analytical and administrative systems which identify obstacles to achievement of specific commodity and resources use and other targets, and result in financing and effective execution of discrete research projects and activities to remove obstacles within acceptable time and cost framework.

To help achieve this, special interdisciplinary teams are being established for areas being accorded priority. These technical teams, working in priority areas with support of ARC, will provide continuing analyses of progress on solving old problems, and on identification and definition of emerging new research problems (e.g. development of new strains of wheat rust, soil fertility problems, water logging, salinity, etc.). The responsible technical personnel will translate identified problems and needs into discrete actionable research activities and solicit additional support in the provinces and ARC. The research will, insofar as possible, be done by existing research entities in the various provinces.

4. Development of linkages with the international research community to assure fullest possible use of knowledge and experience generated outside Pakistan, and to insure that Pakistan's unique experiences become available to others. It is planned to establish formal and informal relationships with the international research community, particularly the international centers and U.S. institutions, by contracts under the loan which will finance training and technical personnel.

5. Development of linkages within Pakistan among research, extension, farmers, livestock producers and other interested personnel to insure that research technology generated by research is applied in a timely and appropriate fashion to achieve intended goals.

#### B. Increasing Institutional Effectiveness

Major elements of the development strategy thus include the alleviation of important institutional impediments (including adoption of more effective personnel management procedures where possible, the substantial strengthening of communication capabilities, and the development of a more efficient FX commodity procurement system), the development of research networks within Pakistan, the incorporation of selected educational institutions into the mainstream of research, the development of effective linkages between research and extension, the increased funding of research and the development of a national research center.

## 1. Personnel Management

Personnel management within the ARC-NRC will be improved by adopting personnel evaluation and promotion procedures designed to reward excellence of performance. This will be attempted with ARC remaining as a line organization within the Ministry of Agriculture. A pool of unassigned, vacant positions at each of the higher classifications will be maintained, thus a scientist deserving promotion will not have to await a vacancy at the higher level. The use of approved research projects will allow scientists to be evaluated annually on the basis of how effectively they have executed an approved approach to a research problem.

The NRC will begin operations without departmentalization and will establish a precedence of having several officers of equal rank working on a single program. This is possible, but not practiced, under the current system. The Ministry of Agriculture has suggested that if these operating guidelines are found insufficient for effective personnel management, the ARC will be given semi-autonomous status.

The current personnel hiring procedures (rules of recruitment) used by the ARC, wherein all positions are filled by open recruitment, appear satisfactory.

The personnel management practices used in provincial institutions are inherited from colonial days and entrenched in the culture. With minor exceptions, the limitations imposed by these procedures on adoption of more effective personnel management procedure (including open recruitment and promotion based on performance), can be alleviated either slowly over a long time period or by revolutionary changes. The GOP is fully aware of the difficulties and is attempting to slowly adopt better procedures.

In individual research programs excellence of performance can be rewarded through training opportunities and work experiences that will qualify deserving workers in provincial institutions for higher positions. These employees can then compete for those positions (50% of total) where selection is based on open recruitment, and seniority has little weight.

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## 2. Communication

Communication among scientists working on the same or related problems will be substantially strengthened through the national research programs. In addition, ARC will develop a technical literature reprint service to keep the scientists abreast of the world literature. ARC will import journals, send copies of tables of contents of a few journals to each department head, his staff will select the articles needed in their work, these will be reproduced by ARC and sent to the department. The scientists will thus have at least functional access to 5-10 of the most relevant international journals in their fields, with a minimum FX cost.

Communication will also be fostered by the regular publication of at least one reputable technical journal for agricultural research in Pakistan. If necessary, the ARC will take leadership in the publication of this journal by supplying a chief editor and funds for publication. The development of professional societies and eventually publication of additional journals, will also be encouraged by ARC.

## 3. Purchasing Capability

Commodity procurement capability will be strengthened by the supply of both FX funds and the development of a procurement system. ARC will establish a small cell for procurement of offshore commodities to support research. A foreign technical consultant will be supplied to assist the procurement cell in developing procedures and learning the relevant commodity market. Major commodities needed to support priority research programs and to develop basic central service facilities in major stations will be requested from the ARC, with justification for each item. Decision on purchasing will rest with ARC.

To alleviate the problem of supply of spare parts and low cost research commodities the ARC will establish a FX "line of credit" for each major institution. The Director of the institution will be able to order items (below a specified amount, probably \$500) through the ARC, at his discretion, against his institution's line of credit.

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C. Fuller Utilization of Research Capability Within Educational Institutions

Educational institutions, including AUL and the Colleges of Agriculture at Tandojam and Peshawar, currently play a peripheral role in priority research, yet AUL has the greatest concentration of research talent in Pakistan. Educational institution development is not a major objective of this program, but the talent in these institutions will be actively encouraged to participate in priority research programs, and their capability to do important research will be strengthened as for research institutes.

D. Linkage of Research and Extension

Linkage of the research programs to the extension service and directly to the farmers will be facilitated by including an "outreach" capability in each major program. The equivalent of "subject matter specialists" in each program will be responsible for developing communication channels, including short courses, brochures and field days, and be responsible for the on-farm testing program. Most of the research scientists would be expected to participate in the training programs.

Direct farmer-scientist communication will be fostered through a substantial program of "off-station" testing. These tests, involving extension and research personnel, will be the final step before releasing a technology innovation, and will serve to keep the scientists and extension workers aware of the daily problems and decision factors affecting the farmers.

E. Promoting Multidisciplinary Research

Multidisciplinary, problem solving approaches to priority problems will be fostered. The ARC will have a key role in this procedure, linking the technical programs of the several institutions within Pakistan to each other and to the international research community. The sponsorship by ARC of annual commodity or research problem area workshops will play an important part in the effective functioning of these programs, as will the selective strengthening of provincial institutions for the execution of priority programs. During the workshops the scientists will review their

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past year's work, identify major impediments of effective program functioning, plan the research program for the following year, and recommend actions by the ARC and institution Directors to overcome impediments.

F. Developing Linkages Among Researchers

The linkages formed among institutions within Pakistan and with the international research community will promote the import of relevant technology and its adaptation to Pakistan with maximum efficiency. The ARC will become a formal channel through which the Pakistani scientists can develop beneficial linkages with colleagues in other countries and international institutes. Unessential duplication of efforts with Pakistan will tend to be minimized as work loads increase and mutual trust among researchers develops. The role of foreign advisors in initiating these linkages is crucial to the process.

A key element of these cooperative research programs, which must have time to evolve, is the development of interdependent research networks wherein individual institutions or provinces recognize that they can meet their objectives more effectively by sharing a total research effort with other institutions, than by assuming that their institution must supply answers to all aspects of a problem.

G. Developing Professional Leadership

Leadership development among working groups of scientists will be promoted by having ARC employ well qualified scientists to serve as national program leaders. These leaders, whether based in Islamabad or at a provincial institution, will work throughout Pakistan to facilitate the work of their fellow scientists, encourage exchange of information and materials, arrange for workshops, insure effective linkages with the international community, and assist the provincial scientists in solving their operational problems. In most instances the development of this leadership capability will require the assistance of a foreign advisor.

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#### H. Improving Facilities

Facilities, including budgets for both Rupee and FX commodities and services, will be strengthened in the research institutions through the national and regional priority programs. Essential items and services needed at each institution to execute a portion of a total program will be identified during the research planning phase, and ARC will augment budgets (Rupee and FX), as required for the efficient execution of the major programs.

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#### I. Upgrading Staff Competence

The competence of scientific staffs will be enhanced by the provision of practical and degree training by ARC. Trainees will be nominated by the Directors of institutions to ARC. ARC will determine which trainees are of highest priority and arrange for their training within Pakistan, at international institutes, in 941 category countries, or in the U.S., as appropriate. ARC will thus sponsor a limited number of degree and non-degree training programs each year. The first priority for training will be in direct support of the national and regional research programs, but the longer term needs of the institutions will also be considered, especially in doctoral level training. Roughly half the supported doctoral candidate training will be done at AUL, the remainder at U.S. universities or international institutes. It is anticipated that master's degree candidates supported under the program will go mainly to AUL and American University, Beirut, but exceptions will be made when justified. International institutes are expected to provide a major share of the practical training done outside Pakistan. Intensive practical training courses within Pakistan will also be organized, drawing upon internal and external expertise.

#### J. Foreign Technical Assistance

Technical assistance will be supplied through ARC by contractual arrangements with international institutes, 941 category country sources, USDA and U.S. Universities. In most instances the foreign advisors will support major national or regional research programs. In exceptional circumstances, technical assistance may be supplied to a research program involving a single province or

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institution, if the research program is of highest priority to that province (i. e. deciduous fruit production-marketing in NWFP), or when the supply of technical assistance to a single institution would lead to a substantial contribution by that institution to Pakistan's current or future research capability (i. e. animal or human nutrition at AUL)

Most foreign technicians will thus work throughout Pakistan, contributing know-how, assisting in the development of major research programs and fostering the development of research leadership among Pakistani scientists.

K. Imported Equipment and Supplies

Equipment and supplies (FX) made available to provincial institutions will be primarily for support of specific major research programs which have been selected for priority action. In several instances the first priority will be for field equipment needed for the effective functioning of the research station (tractors, tillage implements, planters, threshers, etc.).

The ARC will develop a FX commodity purchasing cell, expected to function beyond the life of the project. The provincial institutes will be able to utilize their current procedures for purchasing FX commodities with their own funds, or if they choose, can use the ARC procurement capability. It is expected that ARC will become the primary procurement source for FX commodities required by the agricultural research community in Pakistan.

L. Role of ARC and the National Research Center

The strategy for developing Pakistan's agricultural research capability places the ARC in a demanding but essential role. The ARC, currently housed in a few scattered offices in Karachi, will be moved to Islamabad. It has been reorganized, assigned new responsibilities, and new staff is being appointed. In its new role (closely paralleling that of the Indian Council of Agricultural Research), ARC will become an active research organization.

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It is essential that Pakistan have a national research center (NRC) as a focal point for research in Pakistan. The site for the NRC has been selected near Islamabad where 1000 to 1500 acres are under GOP control and available. The NRC will initially focus on a few essential services including:

1. Development of research programs in:
  - ✓ a. soil management and farming systems for the barani area;
  - ✓ b. pest management, with emphasis on integrated control of major serious pests and diseases;
  - ✓ c. sorghum and millets, with emphasis on the barani areas;
  - ✓ d. dairy management, with emphasis on provision of adequate quantities of nutritious feeds and forages and on identification of principal diseases, parasites and related factors responsible for low fertility and development of control measures;
  - ✓ e. forage legumes and grasses, with emphasis on increasing productivity in barani areas and in areas with limited irrigation capability.
2. Development of a plant introduction center.
3. Operation of a national professional communications center, including library, reprint service and technical journal editing.
4. Development of a training facility, concentrating on short term practical training for scientists, extension personnel and government officers.
5. Serve as a resource base for scientists deputed to provincial institutions by agreement.
6. Serve as a focal point for research in Pakistan, including an official linkage between Pakistan's research network and the world research community.

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In the development of its research programs NRC will fully integrate the capabilities and activities of other central and provincial elements in Pakistan's research network. Thus the involvement of NRC in the wheat research program would be primarily its contribution in rust pathology (program transferred from the Plant Protection Department and substantially strengthened), while the research to serve the barani area would include major inputs by NRC in the areas of soil management and tillage equipment development, but would rely on the wheat breeding program in provincial institutes if special varieties were needed for the barani area. Similarly, the dairy research program would be linked to the breeding work at Bahadurnagar and the animal nutrition work at AUL. In most instances the capability of provincial institutions will be strengthened to allow them to contribute significantly to a larger integrated program, and the proliferation of institutes will be discouraged.

The ARC will be responsible for the operation of the NRC, and its new offices will be on the NRC campus.

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## III. PROJECT DESCRIPTION AND IMPLEMENTATION

A. Introduction

This project is designed to augment agricultural research funds and personnel available to Pakistan, increase efficiency in operation of research activities and focus research more sharply on the most pressing problems inhibiting achievement of national and local goals.

The total program of assistance includes:

- provision for the development of multidisciplinary, national or regional research programs designed to identify and seek solutions to Pakistan's most pressing agricultural problems;
- provision for the strengthening of provincial and national research institutions for the effective execution of these major programs through supply of foreign advisors, FX commodities, training and additional Rupees funds;
- provision for the development of a National Research Center (NRC) to serve as a focal point for agricultural research, form the primary linkage between Pakistan and the international research community, and perform specific research and allied functions.

B. Magnitude of Project

This program proposed herein is a augmentation of existing multilateral and bilateral aid, through a loan of \$8.0 million to pay dollar costs of training outside Pakistan, foreign advisors and imported commodities and a grant of U.S. owned rupees in the

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amount of approximately Rs. 80 million. It is anticipated that, subject to availability of dollar grant funds, AID will continue to provide annual dollar grants over the period at past levels of approximately \$400-500,000 per year. Plans for application of the dollar grants have been presented separately as required through a PROP. The local currency under the Mondale amendment for the amount of Rs. 80 million will be used for support of priority research in provincial institutions, local training, and the construction and operation of a national research center over the five year period.

At the end of the project life, Pakistan's research community should have achieved a self sustaining growth based on local human and material resources and established linkages with the international research community.

C. Project Implementation Plan

1. ARC Actions

Once the loan agreement is signed the ARC will:

- a. convene the executive committee of the ARC to determine the priorities for expansion of research programs, provide guidelines on research objectives, and consider the planned development of the NRC;
- b. contract for the services of a research station development specialist; who will be responsible for planning the physical development of the NRC;
- c. contract for the services of an architectural firm to design and supervise construction of the buildings and physical facilities of the NRC;

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- d. contract for the services of a commodity procurement specialist to assist in the purchase of required FX commodities;
- e. contract for the services of essential foreign advisors to develop those priority research items that can begin operations without the physical facilities of the NRC (i. e. wheat. sorghum, etc.)
- f. determine through the technical committees, what commodities and facilities are required in provincial institutions for effective execution of priority programs, and initiate procurement;
- g. procure the services of essential Pakistani staff for the execution of the NRC programs as they develop;
- h. determine, with the assistance of the station development specialist, the field equipment needed for the initial operation of NRC and initiate procurement;
- i. contract for the services of essential foreign advisors to be associated with programs requiring NRC facilities as those facilities become available;
- j. request nominations of trainees from the several relevant institutions, select trainees and arrange training programs.

## 2. Training

Training of Pakistani researchers is essential in a program to upgrade research capability. The short-term emphasis will be on practical (non-degree) training in direct support of major research program. For a sustained research

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capability, Pakistan's scientists must also have a major input of formal (degree) training. Considering the time required for advanced degree training, the degree training supplied must reflect the overall development of an institution as well as the immediate priorities.

a. Estimate of Needs

The training needs (practical, masters and doctoral), in each major institution were estimated with the help of the Director and staff. These identified needs were tempered by considering the availability of qualified trainees within the institution, the need to stabilize staff numbers, the number of staff that could be absent from each institution and the availability of positions at AUB. The estimates are as follows:

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	Current Staff			FY 74			75			76			77			78			Total		
	<u>B. Sc.</u>	<u>M. Sc.</u>	<u>Ph. D.</u>	<u>P</u>	<u>M</u>	<u>D</u>															
Agr. Res. Inst., Lyallpur	165	188	18	5	8	7	7	8	7	7	8	7	7	8	9	7	8	10	33	40	40
Agr. Res. Inst., Tarnab	159	59	3	5	5	3	5	5	3	6	5	4	8	5	4	8	5	6	32	25	20
Agr. Res. Inst., Tandojam		87	5	5	5	2	5	5	2	6	5	3	10	3	4	10	5	4	36	25	15
Agr. Res. Inst., Quetta	32	21	0	3	2	1	3	2	1	3	3	1	5	3	2	5	3	2	19	13	7
Plant Protection Dept.				2	0	2	2	1	2	2	1	2	2	1	0	2	0	0	10	3	6
College of Agr., Peshawar	11	51	3	0	3	2	0	3	3	0	3	3	0	3	4	0	3	3	0	15	15
College of Agr.,	7	33	4	2	6	3	2	6	4	3	6	5	3	6	4	3	6	4	13	30	20
Subtotals	374	439	33	22	29	20	24	30	22	27	31	25	35	31	27	35	30	29	143	151	123
WPAU	36	217	102	4	0	5	4	0	5	4	0	4	4	0	3	4	0	3	20	0	20
Totals				26	29	25	28	30	27	31	31	29	39	31	30	39	30	32	163	151	143

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During the project period about 170 scientists are expected to receive practical training (outside Pakistan), 185 Masters level training and 135 doctoral level training. It is assumed that much of the practical training must be done outside Pakistan that all Masters level training will be done at AUL or AUB, and (in consultation with the Vice-Chancellor, AUL), that about 50% of the doctoral level training can be done at AUL, with the remainder outside Pakistan.

Intensive practical training will also be done within Pakistan in-depth training programs covering basic information and research methodology on a single commodity or research problem area will be developed, using both training and short-term technical assistance funds. These short courses of 6-12 weeks are expected to provide the operational knowledge and practical experience essential for productive research in a given commodity or research problem area. For example, a course in wheat research would probably cover (through both discussion and field observation), the physiological changes of the plant throughout the growth cycle, various common pathological conditions, understanding of inheritance of basic characteristics observation of water-soil-plant interactions, determination of chemical composition of the grain, storage problems under differing conditions, the scientific design and maintenance of research plots to obtain valid tests (probably most important), direct performance of field operations and supervision of field hands under demanding control conditions, data collection-analysis and interpretation, and preparation of simple reports for discussion with farmers. These courses will be organized by NRC staff in cooperation with the provincial staff draw heavily on talent from AUL and research institutes, but will also use short-term foreign advisors as needed for portions of the training program.

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b. Procedures

The procedures for training are:

1. Application Procedure - Application for training will be forwarded from the Director (or similar chief officer), of each institution through minimal proper channels, to the Director General, ARC.

2. Selection of Trainees - The D. G., at least two Directors of ARC, and a representative of USAID, will meet as needed but not less than every 6 months, to consider training applications. Training needed for effective functioning of national, regional or provincial research programs, and supporting the development of the institution, will receive priority. The principal officer of each institution will be notified of the approved training applications relating to his institution, and will be responsible for meeting all clearance formalities.

3. International Travel for approved trainees (except AUB), will be paid by ARC, restricted to round trip economy fare, (usually by most direct route).

c. Locations of Training

1. Practical training, including observation, on-the-job and specialized training, will be arranged at international, U. S. or third country institutions as required.

2. Training of master's degree candidates will be sponsored at Agricultural University, Lyallpur (AUL) and at American University, Beirut (AUB), when possible. Training of doctoral level candidates will be sponsored at AUL, AUB, or when required, at U. S. universities. Training at U. S. universities will be limited to those training fields unavailable at AUL or in consideration of other compelling reasons. It is assumed that about half the doctoral level training required can be done at AUL.

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To encourage research institutions to train their staff, ARC will endeavor to assist selected institutions defray part of the costs associated with training sponsored by ARC. For each regular staff member receiving full time training at other than his employing institution, the ARC will grant the employing institution Rs. 5,000 per annum, plus capitation fees charged by AUL to all non-residents of Punjab provinces. Grants for each student will be limited to 2 years for a master's degree candidate and to 4 years for a doctoral candidates.

d. Expected Costs

The costs of the proposed training per project year are:

	<u>Year 1</u>	<u>Year 2</u>	<u>Year 3</u>	<u>Year 4</u>	<u>Year 5</u>
(\$000)	259	434	539	644	994
(Rs. 000)	880	1555	1755	1915	1955

Training costs will extend through year 8 for doctoral trainees beginning training in year 5, but residual costs will be incurred in year 5.

3. Technical Assistancea. Magnitude and Function

Technical assistance is required for the rapid development of Pakistan's research capability. This program estimates the need for TA at about 80 man years during the project period of 5 years. Most of the TA will be in the form of commodity specialists or research problem area specialists. These experts will work throughout Pakistan to assist Pakistani scientists in identifying the priority problems relating to a particular commodity or research problem

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area, in detailed planning and execution of research programs directed to the solution of those problems. The long run objective is to develop standards and experience which will continue such procedures on systematic problem identification and scientific inquiry and foster the development of scientific leadership within the research community.

A few advisors will have a more limited function, including one advisor to ARC for procurement of FX commodities and about 7 man years to AUL, Lyallpur to help the University develop research capability in specialized areas.

The TA which will be financed through the dollar loan funds under the project will augment that available through bilateral and multilateral grant funds. Advisors from U. S. and 941 category countries and related dollar costs will be funded under the loan.

ARC will contract with international institutes, USDA, US Universities or category 941 country entities to supply the TA required. These contracts will be reviewed by AID before execution to assure compliance with AID contract regulations.

The ARC will be responsible for arranging support of foreign advisors, including housing or Rupee costs for housing, educational allowance, office space, transportation, and program resources including local personnel and equipment. The scheduling of such inputs will be reviewed by USAID before contracts for TA are signed by ARC.

b. Timing of Technical Assistanc

The need for TA during the project period has been estimated, considering de facto and expected priority research programs. It is not possible at this time to define precisely specific talents which will be required, or the exact timetables. It is expected that the priorities will change over time and

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flexibility is needed to respond to changing needs. The estimates provided herein are therefore expected to serve as guidelines, with flexibility retained to change programs, talents, schedules and sources of TA to reflect Pakistan's priorities. The current estimate for technical assistance to support this effort is as follows:

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FOREIGN ADVISORS

Program	Talent	Man Years	Schedule					Possible Source
			Year 1	Year 2	Year 3	Year 4	Year 5	
Commodity Procurement		3						
Wheat	Pathology and Agronomy	4						CIMMYT
Sugarcane	Agronomy	3						USDA
Sugarbeets	Agronomy	3						USDA
Research Station Development	Engineer and short-term Architect	4						IRRI
Production Economics	Economics	4						USDA
Production Systems	Agronomy, Engineering	8						ICRISAT
Pulses	Pathology and Agronomy	4						USDA
Sorghum-Milleta	Agronomy, Breeding	9						ICRISAT
Oilseeds	Agronomy	4						USDA
Forage grasses & legumes	Agronomy	16						USDA
	Pathology							
	Microbiology							
	Research Organization		3					
Dairy-AUL	Herd Management	2					Cornell	
Fodder-AUL	Dairy Nutrition	2					Cornell	
Nutrition-AUL	Human Nutrition	2					Kansas	
Extension Methods-AUL	Methods Evaluation	1					Kansas	
Unforeseen and short-term	Various	7					Various	
	Total	78*						
NOT FUNDED BY THIS PROJECT, BUT SUPPORTING								
Maize (Ford Foundation)	Breeding Agronomy	9						CIMMYT
Water Management	Engineering Agronomy Economics	12						AID/W
Dairy (Australia)	Production Management	3						Australia
Farm Machinery (France)	Engineering	4						France

\*Of this, total, it is expected that continuing AID grant funding will supply approximately 36 man years and the loan 42 man years.

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c. Costs

Assuming the above level and timing of foreign advisors, and assuming \$51,000 and Rs.120,000 per man year, the T.A. costs by project year from the loan (and expected D. G.) are:

	<u>Year 1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>Total</u>
T. A. Costs: DL (\$000)	102	561	612	510	357	2142
DG	281	434	408	408	306	1837
Total	383	995	1020	918	663	3979
(Rs.000)*	900	2300	2400	2200	1600	

\*Includes rupee support costs of D. G. financed T. A.

In the above the continuation of U. S. dollar grants is expected to finance approximately \$1.8 million in dollar cost of T. A. with D. G. drawn more heavily in the early period as the loan is just becoming operational.

4. Commodities

Commodities requiring FX to support the execution of major national or regional research programs will be supplied by dollar loan. The following procedure will be used for supply of major commodities (cost per item exceeding \$500).

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a. Procurement of Offshore Commodities

1. Services of an experienced procurement officer (probably from USDA-ARS), will be contracted to assist in establishing acceptable procedures.
2. ARC will establish a cell for procurement of off-shore commodities consisting of one procurement officer and essential clerical personnel.
3. Requests with justification for major pieces of equipment or commodities to support priority research will be forwarded by the directors of institutions to the appropriate Director of ARC. At least two Directors of ARC and the Director General in committee will approve or disapprove the request by majority decision. (Specialists from any research institution may be called as counsel). Approved requests will be forwarded to the procurement office for procurement action.
4. The Director General of ARC will be appointed by GOP as the Borrower's Authorized Representative (BAR).
5. For each year the BAR will request AID/W to open a letter of commitment in a U.S. bank to cover costs of commodities expected to be purchased during that year. For the first year this will be approximately \$1,221,000. Letters of commitment will be requested in each fiscal year in time to allow orderly scheduling of procurement.
6. Using acceptable procedures and assisted by the advisor, the procurement officer will arrange for supply of commodities.
7. Purchase orders will be issued to the supplier, and Letters of Credit opened on U.S. bank to pay for purchases.
8. The procurement officer will arrange for clearing the commodities and onward shipment to the end user, who will receipt delivery.

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9. All items will enter Pakistan duty free and upon delivery will become the property of the end user or ARC, as appropriate.

b. Procurement of Minor Commodities

To facilitate the procurement from abroad minor commodities (cost per item of less than \$500) needed to support research, the ARC will establish a dollar "line of credit" for selected institutions. Eligible items would include small items of equipment, supplies, and publications. Upon request by the Director of the institution, ARC will procure items for each institution up to the established dollar limit per annum. Single items costing more than \$500.00 will be considered a major commodity and will be purchased through the "line of credit" arrangement only upon justification and approval as for a major commodity. Residual funds will be carried forward for not more than one fiscal year.

Subject to amendment by the executive committee of ARC, the following institutions will have an indicated "line of credit" available annually with ARC for the procurement of minor FX items to support research:

<u>Institution</u>	<u>Amount (\$000)</u>
ARI, Lyallpur	5
ARI, Tandojam	5
ARI, Quetta	5
ARI, Tarnab	5
College of Agriculture, Tandojam	5
College of Agriculture, Peshawar	5
College of Animal Husbandry, Lahore	5
Agricultural University, Lyallpur (AUL)	10

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Forestry Research Institute, Peshawar	3
Cotton Research Institute, Multan	3
Veterinary Research Institute, Quetta	2
Veterinary Research Institute, Lahore	5
Veterinary Research Institute, Peshawar	2

c. Estimate of Needs

The need for FX commodities in the major agricultural research institutes during the first two years of the project has been estimated by ascertaining the individual items needed in each institute. Need for future years has been projected, considering the expansion of programs, upgrading of staff and expected life of equipment.

The need for FX commodities in the NRC has been estimated by developing an equipment list for field operations, by assuming an initial cost per laboratory of \$10,000, a sustained level of laboratory and field equipment of \$5,000 per scientist man year during year 4 and 5, and specific costs of major individual items, including trucks, bus, glasshouses and airconditioning equipment.

d. Costs

The estimated costs of FX commodities per project year are:

Commodity schedule (\$000)

	<u>Year 1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>Total</u>
Total	860	670	540	430	430	2930
Provincial Institutes						
Major items	200	210	180	170	170	930
Minor items	60	60	60	60	60	300
National Research Center	600	400	300	200	200	1700

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The estimated need for FX commodities in provincial institutions is:

*BACK DOWN*

<u>Institution</u>	<u>Year 1</u>	<u>Year 2</u>	<u>Year 3</u>	<u>Year 4</u>	<u>Year 5</u>
ARI-Tandojam	40	30	30	30	30
ARI-Quetta	50	40	20	20	20
ARI-Lyallpur	40	50	50	40	40
ARI-Tarnab	30	30	20	30	40
Others	40	60	60	50	40
Total	200	210	180	170	170

Representative items to be purchased during year 1 and 2.

- ARI Tandojam - Plot planters, threshers, field sprayers, shellers, gins, tractors, trucks (6), maintenance units, laboratory equipment.
- ARI Tarnab - Sprayers, planters, threshers, shellers, tractors, field implements, trucks (6), laboratory equipment (soils).
- ARI Lyallpur - Tractors, field implements, trucks (12), maintenance unit, laboratory equipment.
- ARI, Quetta - Fruit and seed grading, testing and processing equipment, glasshouse, trucks (1) laboratory equipment.

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The FX equipment needed for the NRC has been estimated as follows:

<u>Item</u>	<u>Year 1</u>	<u>Year 2</u>	<u>Year 3</u>	<u>Year 4</u>	<u>Year 5</u>
Farm equipment	250	100	70	} 200	200
Mobility equipment	150		80		
Air conditioning equipment	150	100			
Glasshouses		100	100		
Laboratory equipment	50	100	50		
Total	600	400	300	200	200

#### D. Evaluation of Progress

Evaluation of individual research programs will be done by participating scientists in an annual workshop. Progress and problems will be succinctly stated, with suggestions for solutions of problems. A report will be completed during workshop and sent to Director General, ARC and to USAID by workshop convener. The report will be the responsibility of the program coordinator, the appropriate Director of ARC and one provincial scientist appointed by the Director.

Evaluation of the overall research program will be done annually (beginning 18 months after program inception) by the Director General and Directors ARC, two representatives of USAID, one representative of AID/W and one representative of the international research (CIMMYT, IRRI). The Director General,

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ARC will be responsible for preparing a report of progress, problems encountered, remedial steps to be taken and when appropriate, recommendations for action by Ministry of Agriculture. Copies of the report will be supplied to USAID.

E. Rupee Budget Support, while not a part of this loan will form an indispensable part of the total program of increasing research capability. The current budget level in relevant research institutions is too low to permit a positive return from most research programs. A few programs, although funded far below optimum return level, produce technology to offset the negative expenditures on other programs.

1. Objectives

The first objective in providing additive Rupee support to specific priority programs is to assure the efficient functioning of those programs, but the results obtained are also expected to demonstrate to decision makers that inadequately funded research programs are a poor investment while appropriately funded and efficiently executed research programs have an extremely high investment return rate.

Research institution directors are aware of the inadequacy of Rupee funds. Their judgement is that the major institutions could efficiently use about a 10-15% per annum increase in funds. From effective research programs operating in similar situation and from estimates by foreign advisors from other donor agencies, an ultimate funding target would seem to be about Rs. 80-100,000 per scientist per annum (in current purchasing power).

2. Estimate of Needs

Our estimates for total Rupee requirements over the project period include increases in provincial budgets at about 5% per annum, and increases in ARC fund availability to allow:

- a. the equivalent of a 10% per annum increase in budgets to major provincial institutes;

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- b. approximately 10% of the current budget of AUL and the colleges of agriculture, to support research at these institutions and increasing at about 10% per annum;
- c. funds for the operation of a national research center, calculated at Rs.100,000 per scientist man year;
- d. funds for support of in-country training;
- e. funds for support of local costs of TA;
- f. funds for the building of NRC facilities;
- g. funds for provision of housing for ARC-NRC staff.

### 3. Expected Funds, by Source

The funds to support research in existing institutions, including AUL and the Colleges of Agriculture, will be available to support to execution of priority research programs in the existing institutions. The procedures for allocating such funds have been operative for the past two years, whereby ARC provides additive funds for the execution of approved research programs in provincial institutions. The availability of these funds will allow an approximate doubling of funds available for research in Pakistan over a 5 year period, excluding the costs of building a NRC and of moving the ARC to Islamabad. The expected sources of these funds are as follows:

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## Expected rupee funds for agricultural research, by source

	<u>Year 1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>
Total	18.1	24.3	28.0	31.6	34.9	35.6
From provinces	13.1	13.8	14.5	15.2	16.0	16.8
From ARC	5.9	11.7	15.1	18.2	21.0	19.3
By COP grant	.8	1.0	2.0	4.0	6.0	19.3
By USAID grant	5.1	10.7	13.1	14.2	15.0	

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4. ARC Expendituresa. Direct Research Expenditures

Expected rupee expenditures by ARC for research  
(excluding ARC-NRC construction costs) are as follows:

## Background of rupee expenditures by ARC

	<u>Year 1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>
To existing research institutes for selected programs	1.3	2.8	4.6	6.8	9.3	11.2
To colleges and universities	2.0	2.2	2.4	2.8	3.2	3.6
For operation or NRC	0.5	2.0	3.0	3.5	4.0	4.0
Training	0.3	0.8	0.9	1.0	0.9	0.5
Transport of trainees*	0.9	1.6	1.8	1.9	2.0	
Technical assistance support	0.9	2.3	2.4	2.2	1.6	
Total	5.9	11.7	15.1	18.2	21.0	

\*Funding for participant travel has been provided for under the Mondale Rupee grant, (since that travel will originate in Pakistan), while travel of foreign technicians, (which will originate outside Pakistan), has been provided for with dollars from the loan. It is anticipated that during the course of the project it may be desirable to shift travel costs from Rupees to Dollars or the other way, depending on relative availabilities and competing project requirement for Dollars and Rupees. If the GOP, in submission of its budget, indicates plans to make such shifts, and if review of circumstances by USAID indicates such a shift is reasonable, the USAID would approve the budget incorporating the shift.

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b. Total Expenditures, including ARC-NRC facilities

The total need for Rupee funds by ARC during the project period is as follows:

<u>Component</u>	Rupees (million)					<u>Total</u>
	<u>Year 1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	
Direct support of research (from table above)	5.9	11.7	15.1	18.2	21.0	71.9 ✓
Construction of NRC facilities	3.4	2.5	2.4	0.3		8.6
Construction of ARC-NRC staff housing	7.0	7.0	7.5			21.5
Total	16.3	21.2	25.0	18.5	21.0	102.0

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c. Use of Mondale Grant

USAID expects to make available a Mondale grant to cover the cost of NRC construction, ARC-NRC staff housing and a portion of the amount for direct support of research programs. This grant will total Rs. 88.2 million, and will be made available to ARC by ProAg amendments, subject to acceptable program development, on the following schedule.

	<u>Year 1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>Σ</u>
Grant (Rs. Million)	15.5	20.2	23.0	14.5	15.0	88.2

During the same period GOP expects to make annual grants to ARC on the following schedule:

Grant (Rs. Million)	0.8	1.0	2.0	4.0	6.0	13.8
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*Amend - 57%*  
*TRK - 40%*  
*Agency - 040%*

F. Financial Presentation

1. Summary of Costs

U.S. \$ Costs (\$000)

Item	Year 1	2	3	4	5	6	7	8	
Commodities, major items Provinces	200	210	180	170	170				930
Commodities, minor items Provinces	60	60	60	60	60				300
Commodities National Research Center	600	400	300	200	200				1700, <i>us</i>
Subtotal Commodities	(860)	(670)	(540)	(430)	(430)				(2930)
Practical Training	210	280	280	280	140				1190
Degree Training	49	154	259	364	371	266	161	56	1680
Subtotal Training	(259)	(434)	(539)	(644)	(511)	(266)	(161)	(56)	(2870)
Technical Assistance									
Loan Financed	102	561	612	510	357				2142
Grant Financed	281	434	408	408	306				1837
Subtotal Tech- nical Assistance	(383)	(995)	(1020)	(918)	(663)				(3979)
Grand Total	1502	2099	2099	1992	1604	266	161	56	9779
Pakistan Rupee Costs (Rs. million)									
ARC	5.9	11.7	15.1	18.2	21.0				71.9
NRC Construction	3.4	2.5	2.4	0.3					8.6
ARC - NRC Staff Housing	7.0	7.0	7.5						21.5
Total	16.3	21.2	25.0	18.5	21.0				102.0

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## 2. Sources of Funds

## U.S. \$ Loan (\$000)

<u>Item</u>	<u>Year 1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>11 PC</u> <u>1,000</u>
Commodities	860	670	540	430	430	2930
Training	259	434	539	644	994	2870
Technical Assistance	102	561	612	510	357	2142
Total	1221	1665	1691	1584	1781	7942

## U.S. \$ Grant (\$000)\*

Technical Assistance	281	424	408	408	306	1837
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## Pakistan Rs. (million) Mondale Grant

ARC Funds	5.1	10.7	13.1	14.2	15.0	58.1
NRC Construction	3.4	2.5	2.4	0.3		8.6
Staff Housing	7.0	7.0	7.5			21.5
Total	15.5	20.2	23.0	14.5	15.0	88.2

## Pakistan Rs. (million) GOP Grant to ARC

	0.8	1.0	2.0	4.0	6.0	13.8
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\*Subject to availability

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ANNEX I

Checklist of Statutory Criteria

The following abbreviations are used in the checklist:

FAA - Foreign Assistance Act of 1961, as amended, incorporating amendments affected by the Foreign Assistance Act of 1971.

APP - Foreign Assistance Act and Related Agencies Appropriations Act, 1972.

MMA - Merchant Marine Act of 1936, as amended.

1. COUNTRY PERFORMANCE

A. Progress Towards Country Goals

1. FAA Sec. 201(b)(5), 201(b)7, 201(b)(8), 208. Discuss the extent to which the country is:

(a) Making appropriate efforts to increase food production and improve means for food storage and distribution. -- With the introduction of high yielding seed varieties, Pakistan's increase in foodgrain production was dramatic during the mid-sixties. Following two years in which production was reduced by poor water conditions, farm output is expected to increase substantially in 1973. The GOP has recently taken steps to rationalize its price policy on foodgrains and fertilizers. Its decision to increase the funding of agricultural research by 15% in FY 1973 is further evidence of the high priority accorded to agriculture by the new Government.

(b) Creating a favorable climate for foreign and domestic private enterprise and investment. -- The takeover by the Government of the management of 31 large firms shortly after the Bhutto Government came

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into power created uncertainty among businessmen and dampened the investment climate. Nevertheless, Pakistan's leaders appear to have recognized and publicly affirm that a substantial degree of domestic and private investment is essential to Pakistan's economic development.

(c) Increasing the people's role in the developmental process. -- The present Government describes itself as a "People's Government." The convening of the National Assembly, the framing of a constitution, the planned local government elections, and the termination of martial law portend a widening of the people's role in the development process. Similarly, the Peoples Works and Integrated Rural Development Programs contemplate more active participation in development at the village level.

(d) Allocating expenditures to development rather than to unnecessary military purposes or intervention in other free countries' affairs. -- Development expenditures are planned to increase from Rs. 2620 million in FY 72 to Rs. 4150 Million in FY 73 but will be below defense expenditures for the second consecutive year. Hopefully, implementation of the Simla Agreement will reduce internal pressures for increased military spending.

(e) Willing to contribute funds to the project or program. -- Under the Loan Agreement, the GOP will be required to provide sufficient local currency support through Mondale and normal budgetary resources and to provide continued funding at the expanded levels upon the completion of this project.

(f) Making economic, social, and political reforms such as tax collection improvements and changes in land tenure arrangement; and making progress toward respect for the rule of law, freedom of expression and of the press, and recognizing the importance of

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individual freedom, initiative, and private enterprise. -- The Bhutto Government promulgated a quick succession of land, labor, banking, education, health and law reforms which, if implemented, will enable it to achieve development objectives. The rule of law is publicly endorsed. Notwithstanding occasional actions against newspaper editors, press freedoms are greater than under the previous regime.

(g) Responding to the vital economic, political, and social concerns of its people, and demonstrating a clear determination to take effective self-help measures. -- As the responses to I. A.1(a), (c) and (f) above suggest, the Bhutto Government is committed to meet the vital economic, political and social concerns of the people. Among the self-help measures that the Government has taken in the past 12 months are: rupee devaluation, import liberalization, increases in taxes and government revenues, price stabilization measures, steps to increase foodgrain prices and production and to decrease subsidies on farm inputs, and export promotion.

B. Relations with the United States

1. FAA Sec. 620(c). Is the government indebted to any U.S. citizen for goods or services furnished or ordered where: (a) such citizen has exhausted available legal remedies including arbitration, or (b) the debt is not denied or contested by the government, or (c) the indebtedness arises under such government's or a predecessor's unconditional guarantee? -- No.

2. FAA Sec. 620(d). If the loan is intended for construction or operations of any productive enterprise that will compete with a U.S. enterprise, has the country agreed that it will establish appropriate procedures to prevent export to the

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U. S. of more than 20% of its enterprise's annual production during the life of the loan? -- Not applicable.

3. FAA Sec. 620(e)(1). Has the government or any government agency or subdivision within the country (a) nationalized or expropriated property owned by U. S. citizens or by any business entity not less than 50% beneficially owned by U.S. citizens, (b) taken steps to repudiate or nullify existing contracts or agreements with such citizen or entity or (c) imposed or endorsed discriminatory taxes or other exactions, or restrictive maintenance or operational conditions? If so, has it failed within a reasonable time to take appropriate steps to discharge its obligations under international law toward such citizen or entity? -- Although the March 1972 Life Insurance (Nationalization) Order affected one American Company, the GOP has expressed its intention to discharge its obligations under international law. The company has refused to accept the Government's offer of compensation, but negotiations between the parties are continuing. In addition, the nationalization of schools potentially affects one American church organization which owns substantial property in Pakistan. However, discussions are taking place between church and Government representatives aimed at clarifying the situation.

4. FAA Sec. 620(j). Has the country permitted, or failed to take adequate measures to prevent, the damage or destruction of mob action of U. S. property, and failed to take appropriate measures to prevent a recurrence and to provide adequate compensation for such damage or destruction? -- No.

5. FAA Sec. 620(l). Has the government instituted an investment guaranty program under FAA Sec. 221(b)(1) for the specific risks of inconvertibility and expropriation or confiscation? -- Yes.

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6. FAA Sec. 620(o). Has the country seized or imposed any penalty or sanction against, any U.S. fishing vessel on account of its fishing activities in international waters? -- No.

7. FAA Sec. 620(q). Has the country been in default, during a period in excess of six months, in payment to the U.S. on any FAA loan? -- Pakistan's default under a debt moratorium in May 1971 was relieved by a debt Rescheduling Agreement dated September 30, 1972.

8. FAA Sec. 620(t). Have diplomatic relations between the country and the U.S. been severed? If so, have they been renewed? -- Pakistan has not severed diplomatic relations with the United States.

C. Relations with Other Nations and the U.N.

1. FAA Sec. 620(i). Has the country been officially represented at any international conference when that representation included planning activities involving insurrection or subversion directed against the U.S. or countries receiving U.S. assistance? -- No.

2. FAA Sec. 620(a), 620(n). Has the country sold, furnished, or permitted ships or aircraft under its registry to carry to Cuba or North Viet-Nam items of economic, military, or other assistance? -- No.

3. FAA Sec. 620(u); App. Sec. 108. What is the status of the country's U.N. dues, assessments, or other obligations? Does the loan agreement bar any use of funds to pay U.N. assessments, dues or arranges? -- Pakistan is not delinquent in any obligations to the United Nations. Use of loan funds for any purpose unrelated to the project is not permitted under loan agreement.

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D. Military Situation

1. FAA Sec. 620(i). Is the country engaged in or preparing for aggressive military efforts directed against the U.S. or countries receiving U.S. assistance? -- No.
  
2. FAA Sec. 620(e). What is (a) the percentage of the country's budget devoted to military purposes, (b) the degree to which the country is using its foreign exchange to acquire military equipment, and (c) the amount spent by the country for the purpose of sophisticated weapons system? (d) Is the country diverting development assistance to military expenditures? (e) Is the country diverting its own resources to unnecessary military expenditures? --  
The FY 1973 budget showed about 40% of expenditures going to defense, about 7% of GNP. We do not have a very close estimate of the amount of foreign exchange resources used to acquire military equipment but a study of published balance of payments estimates shows them to be in the range of \$100 million per year. We have even less information available on purchases of sophisticated weapons. It is known, however, that Pakistan received jet aircraft and other "sophisticated" equipment during the 1971 crisis year, and will be replacing some items lost in the war. The war resulted in the reduction in Pakistan's population by more than half and it is hoped that with this fact, the prospects for detente with India and the Government's strong desire to give renewed development its first priority will create a situation in which Pakistan's military expenditures can be reduced markedly (As President Bhutto remarked in a recent speech). Resources intended for development are not being diverted to military purposes.

## II. CONDITION OF THE LOAN

### A. General Soundness

#### -- Interest and Repayment

1. FAA Sec. 201(d), 201(b)(2). Is the rate of interest excessive or unreasonable for the borrower? What capacity does the borrower have to repay the loan at a reasonable rate of interest? Is the rate of interest less than 2% per annum during the grace period? Less than 3% per annum following the grace period? Is the rate of interest higher than the country's applicable legal rate of interest? -- The funds will be lent in compliance with the laws of the United States and of Pakistan, and the lending terms are considered reasonable. The rate of interest is less than Pakistan's discount rate. See Section on Repayment Prospects.

#### -- Financing

1. FAA Sec. 201(b)(1). To what extent can financing on reasonable terms be obtained from other free-world sources, including private sources within the U.S.? Other financing for this loan is not available. Other donor agencies are also planning to assist in agricultural research. See Loan Paper Section on Other Donor Assistance.

#### -- Economic and Technical Soundness

1. FAA Sec. 201(b)(2), 201(c). The activity's economic and technical soundness to undertake loan; does the loan application, together with information and assurances, indicate that funds will be used in an economically and technically sound manner? -- Yes. See Loan Paper Section on Economic Rationale.

2. FAA Sec. 611(a)(1). If substantive technical or financial planning is required, have engineering, financial, and other plans necessary to carry out assistance, and a reasonably firm estimate of the cost of assistance to the U.S., been completed? -- To the extent practicable, such planning has

been completed. This loan will support a project-oriented package of technical assistance, training and commodities. Specific research activities will evolve over the project period through the machinery of the Agricultural Research Council.

3. FAA Sec. 611(b); App. Sec. 101. Have plans for a water or related land-resource construction project or program included a cost-benefit computation? Does the project or program meet the relevant U.S. construction standards and criteria used in determining feasibility? -- Not applicable.

4. FAA Sec. 611(e). If this is a Capital Assistance Project with U.S. financing in excess of \$1 million, has the principal A.I.D. officer in the country certified as to the country's capability effectively to maintain and utilize the project? -- Yes. Copy of the Section 611(e) certification is attached hereto as Annex .

B. Relation to Achievement of Country and Regional Goals

-- Country Goals

1. FAA Sec. 207, 281(a). Describe this loan's relation to:
  - a. Institutions needed for a democratic society and to assure maximum participation on the part of the people in the task of economic development. -- This loan is designed to support Pakistan's agricultural development program by making new technology available to the farmer. It thus gives the farmer an opportunity for maximum participation in the task of economic development.
  - b. Enabling the country to meet its food needs, both from its own resources and through development, with U.S. help, of infrastructure to support increased agricultural productivity. Pakistan has undertaken, in recent years, a vigorous program of agricultural improvement, designed to make Pakistan self-sufficient in foodgrains. The loan directly supports agricultural development by increasing the flow of production technology.

- c. Meeting increasing need for trained manpower. -- We expect that research efforts will emphasize labor intensive agricultural technology.
- d. Development programs to meet public health needs. -- Not applicable to this loan.
- e. Assisting other important economic, political, and social development activities, including industrial development; growth of free labor unions; cooperatives and voluntary agencies; improvement of transportation and communication systems; capabilities for planning and public administration; urban development; and modernization of existing laws. -- An important element of this Loan is the strengthening of the Agricultural Research Council's capability for research planning and administration.
2. FAA Sec. 201(b)(4). Describe the activity's consistency with and relationship to other development activities, and its contribution to realizable long-range objectives. -- Pakistan's agricultural program which this loan supports is designed to bring about an accelerated rate of economic growth in Pakistan.
3. FAA Sec. 201(b)(9). How will the activity to be financed contribute to the achievement of self-sustaining growth? -- The introduction of new technology through research will increase agricultural production and decrease Pakistan's dependence on food imports.
4. FAA Sec. 201(f). If this is a project loan, describe how such project will promote the country's economic development, taking into account the country's human and material resource requirements and the relationship between ultimate objectives of the project and overall economic development. -- The loan is designed to increase the capability of Pakistan's existing research system as well as to expand that system. Increased research capability will mean increased agricultural production. For a predominately rural economy, agricultural development is an essential element of economic development.

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5. FAA Sec. 201(b)(3). In what ways does the activity give reasonable promise of contributing to development of economic resources, or to increases of productive capacities? -- The sustained flow of new technology through research will contribute substantially to the development of agriculture and will increase production.
  
6. FAA Sec. 281 (b). How does the program under which assistance is provided recognize the particular needs, desires, and capacities of the country's people; utilize the country's intellectual resources to encourage institutional development; and support civic education and training in skills required for effective participation in political processes? -- This loan is designed to assist Pakistan in utilizing its scientists to solve the major problems facing agriculture. The solution of these problems will support the farmer's efforts to increase agricultural production by making more productive use of the land under cultivation.
  
7. FAA Sec. 601(a). How will this loan encourage the country's efforts to: (a) increase the flow of international trade; (b) foster private initiative and competition; (c) encourage development and the use of cooperatives, credit unions, and savings and loan associations; (d) discourage monopolistic practices; (e) improve technical efficiency of industry, agriculture, and commerce; and (f) strengthen free labor unions? -- (a) Trade will take place between the U.S. and lower income countries and Pakistan since all purchases financed from the loan have their source and origin in the U.S. and lower income countries. To the extent that the production of exportable products is increased, trade will be encouraged. (b) All commodity purchases will be made from private firms through normal commercial channels. (c) The loan will not necessarily have any direct effect on the development and use of cooperatives, credit unions, and savings and loan associations. (d) The Loan will not

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directly discourage monopolistic practices. (e) The technical efficiency of the agricultural sector will be augmented since the loan will stimulate the introduction of new technology. (f) Not applicable.

8. FAA Sec. 202(a). Indicate the amount of money under the loan which is: going directly to private enterprise; going to inter-mediate credit institutions or other borrowers for use by private enterprise; being used to finance imports from private sources; or otherwise being used to finance procurements from private sources. -- All commodity purchases will be made from private firms through normal commercial channels. Services will be obtained from other U.S. Government agencies, universities, international organizations and private entities.
9. FAA Sec. 611(a)(2). What legislative action is required within the recipient country? What is the basis for a reasonable anticipation that such action will be completed in time to permit orderly accomplishment of purposes of loan? -- There is no legislative action required by Pakistan.

-- Regional Goals

1. FAA Sec. 619. If this loan is assisting a newly independent country, to what extent do the circumstances permit such assistance to be furnished through multilateral organizations or plans? -- Not applicable.
2. FAA Sec. 209. If this loan is directed at a problem or an opportunity that is regional in nature, how does assistance under this loan encourage a regional development program? What multilateral assistance is presently being furnished to the country? -- The U.S. is collaborating with IBRD-IDA and other free world countries in an aid consortium to provide foreign exchange assistance to aid Pakistan in its economic development. Other donors are contributing to agricultural research in Pakistan.

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**C. Relation to U.S. Economy****-- Employment, Balance of Payments, Private Enterprise**

1. FAA Sec. 201(b)(6); 102 Fifth. What are the possible effects of this loan on U.S. economy, with special reference to areas of substantial labor surplus? Describe the extent to which assistance is constituted of U.S. commodities and services, furnished in a manner consistent with improving the U.S. balance of payments position. -- A substantial amount of the goods and services contemplated under this loan will be procured directly from U.S. suppliers, thus benefitting the U.S. economy. No particular benefit to areas of labor surplus is anticipated.
2. FAA Sec. 612(b), (d), 636(h). What steps have been taken to assure that, to the maximum extent possible, foreign currencies owned by the U.S. and local currencies contributed by the country are utilized to meet the cost of contractual and other services, and that U.S. foreign-owned currencies are utilized in lieu of dollars? -- A portion of the local currency required to support the program under this loan will be provided by U.S. - owned (Mondale) rupees. GOP and U.S. owned local currency will be used to pay project costs which can be paid in local currency.
3. FAA Sec. 601(d); App. Sec. 1. If this loan is for a capital project, to what extent has the Agency encouraged utilization of engineering and professional services of U.S. firms and their affiliates? If the loan is to be used to finance direct costs for construction, will any of the contractors be persons other than qualified nationals of the country or qualified citizens of the U.S.? If so, has the required waiver been obtained. -- This loan will finance the equipping, but not the construction, of the National Research Center.

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4. FAA Sec. 608(a). Provide information or measures to be taken to utilize U.S. Government excess personal property in lieu of the procurement of new items. -- It is unlikely that commodities financed under this loan would be available under the U.S. excess property program. The loan agreement will, however, include the standard Excess Property clause.
5. FAA Sec. 602. What efforts have been made to assist U.S. small business to participate equitably in the furnishing of commodities and services financed by this loan? -- The procurement procedures to be utilized under this loan will permit the equitable participation of U.S. small business.
6. FAA Sec. 621. If the loan provides technical assistance, how is private enterprise on a contract basis utilized? If the facilities of other Federal agencies will be utilized, in what ways are they particularly suitable; are they competitive with private enterprise (if so, explain); and how can they be made available without undue interference with domestic programs? -- See Loan paper sections on project implementation. We anticipate that USDA may be a suitable source of technical assistance (along with the international agricultural research organizations). Specific cost comparisons and availabilities will be obtained through requests for proposals by the Agricultural Research Council.
7. FAA Sec. 611(c). If this loan involves a contract, for construction that obligates in excess of \$100,000, will it be on a competitive basis to the maximum extent practicable?  
-- Not applicable.  
  
-- Procurement
1. FAA Sec. 604(a). Will commodity procurement be restricted to U.S. except as otherwise determined by the President? -- Yes. The Loan will incorporate the limited untying policy of the President.

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2. FAA Sec. 604(b). Will any part of this loan be used for bulk commodity procurement at adjusted prices higher than the market price prevailing in the U.S. at time of purchase? -- No.

3. FAA Sec. 604(c). Will any part of this loan be used for procurement of any agricultural commodity or product thereof outside the U.S. when the domestic price of such commodity is less than parity? -- No.

D. Specific Requirements

1. FAA Sec. 201(b). Is the country among the 20 countries in which development loan funds may be used to make loans in this fiscal year? -- Yes.

2. App. Sec. 106. Does the loan agreement provide, with respect to capital projects, for U.S. approval of contract terms and firms? -- Yes. The Loan Agreement will so provide.

3. FAA Sec. 620(k). If the loan is for construction of a productive enterprise, with respect to which the aggregate value of assistance to be furnished will exceed \$100 million, what preparation has been made to obtain the express approval of the Congress? -- Not applicable.

4. FAA Sec. 620(b), 620(f). Has the President determined that the country is not dominated or controlled by the international Communist movement? If the country is a Communist country (including, but not limited to, the countries listed in FAA Sec. 620(f) and the loan is intended for economic assistance), have the findings required by FAA Sec. 620(f) been made and reported to the Congress? -- Pakistan is not controlled by the international Communist movement.

5. FAA Sec. 620(h). What steps have been taken to encourage the fact that the loan will not be used in a manner which, contrary to the best interest of the United States, promotes or assists the foreign aid projects of the Communist-bloc countries? -- The loan agreement

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will contain a provision ensuring that the loan financed items will not be used to promote or assist projects associated with or financed by such Communist-bloc countries.

6. App. Sec. 110. Will any funds be used to finance procurement of iron and steel products for use in Viet-Nam other than as contemplated by Sec. 110? -- No.
7. FAA Sec. 636(i). Will any part of this loan be used in financing non-U.S. Manufactured automobiles? If so, has the required waiver been obtained? -- No non-U.S. - manufactured automobiles will be financed.
8. FAA Sec. 620(a)(1) and (2), 620(p). Will any assistance be furnished or funds made available to the government of Cuba, or the United Arab Republic? -- No.
9. FAA Sec. 620(g). Will any part of this loan be used to compensate owners for expropriated or nationalized property? If any assistance has been used for such purposes in the past, has appropriate reimbursement been made to the U.S. for sums diverted? -- No.
10. FAA Sec. 201(f). If this is a project loan, what provisions have been made for appropriate participation by the recipient country's private enterprise? -- Not applicable. The project beneficiaries are the Agricultural Research Council, Central and Provincial Research Institutes and Agricultural Colleges and Universities.
11. App. Sec. 104. Does the loan agreement bar any use of funds to pay pensions, etc., for persons who are serving or who have served in the recipient country's armed forces? -- Loan funds will not be provided under the loan agreement for any of the prohibited purposes.

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MMA Sec. 901(b). Does the loan agreement provide for compliance with U.S. shipping requirements, that at least 50% of the gross tonnage of all commodities financed with funds made available under this loan (computed separately by geographic area for dry bulk carriers, dry cargo liners, and tankers) be transported on privately owned U.S. flag commercial vessels to the extent such vessels are available at fair and reasonable rate for U.S. flag vessels? -- Yes. The loan agreement will cover this requirement.

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1. App. Sec. 102. Will obligations from loan funds for engineering and architectural fees and services to any individual or group of firms on any one project in excess of \$25,000 be reported to the Senate and House of Representatives? -- The loan does not contemplate such services.
2. FAA Sec. 604(f). Will suppliers be required to certify information relating to the eligibility and suitability of commodities for financing? -- Not applicable.
3. FAA Sec. 481. Has the President determined that the recipient country has failed to take adequate steps to prevent narcotic drugs produced or procured in, or transported through, such country from being sold illegally within the jurisdiction of such country to U.S. Government personnel or their dependents or from entering the United States unlawfully? -- No.
4. FAA Sec. 620(u). Does the loan provide assistance to Greece? -- No.
5. App. Sec. 111. Are funds provided pursuant to this loan to be used to carry out the provisions of sections 209(d) and 251(h) of the FAA? -- No.

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6. App. Sec. 112. Are funds being provided to India or Pakistan hereunder, other than refugee relief and rehabilitation and humanitarian relief, while these countries are in armed conflict with one another? -- No. India and Pakistan are no longer in armed conflict with one another.

7. FAA Sec. 604(d). Will provision be made for placing marine insurance in the U.S. if the recipient country discriminates against any marine insurance company authorized to do business in the U.S. ? -- An appropriate provision will be included in the loan agreement.

8. App. Sec. 501. Will any funds be used for publicity or propaganda purposes within the U.S. ? -- No.



**UNITED STATES AGENCY FOR INTERNATIONAL DEVELOPMENT  
MISSION TO PAKISTAN**

**Cable: USAIDPAK**

**HEADQUARTERS OFFICE  
ISLAMABAD**

May 23, 1973

Honorable John A. Hannah  
Administrator  
Agency for International Development  
Washington, D. C. 20523

Dear Dr. Hannah:

As principal officer of the Agency for International Development in Pakistan it is my responsibility under Section 611(e) of the Foreign Assistance Act of 1961, as amended, to certify as to the financial and human resource capability of Pakistan to effectively maintain capital assistance projects estimated to cost in excess of \$1,000,000, taking into account, among other things, the maintenance and utilization of projects in such country previously financed or assisted by the United States.

Based upon the maintenance and utilization by the Government of Pakistan in projects previously financed or assisted by the United States, and upon the facts set forth in the attached loan paper, I hereby certify that Pakistan has the capability to effectively maintain and utilize the project to be financed by the proposed \$8.0 million loan for agricultural research.

Sincerely yours,

  
Joseph C. Wheeler  
Director

UNITED STATES GOVERNMENT

# Memorandum

TO : Dr. R. R. Newberg, Chairman, Agricultural Research Loan Committee      DATE: May 24, 1973

FROM : Joseph C. Wheeler, Director

SUBJECT: Country Team Clearance

At its meeting on May 24, the Country Team approved submission to Washington of the Agriculture Research Loan paper in the amount of \$8 million.



ANNEX III

AGRICULTURAL RESEARCH IN PAKISTAN

Report of the Second Joint Pakistan-  
American Team

March 1973

Being Distributed Separately

ANNEX IV

AGRICULTURAL RESEARCH IN PAKISTAN

Report Prepared by Agricultural Research  
Council, Government of Pakistan and  
USAID/Pakistan

February 1973

Being Distributed Separately

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ANNEX V

Copy of letter No. 13(4)US-VII/73, dated 17th May 1973 to:

Dr. William A. Wolffer, Deputy Director  
USAID Mission to Pakistan  
Islamabad

From:

Mr. Muhammad Ahmad, CSP, Deputy Secretary  
Economic Affairs Division  
Government of Pakistan  
Islamabad

Dear Dr. Wolffer:

As you know, the agriculture sector in Pakistan has benefitted greatly because of the introduction of the high yielding improved varieties of wheat, rice and maize which were evolved through the efforts of the various International Agriculture Research Institutes. However, in order to sustain and improve the productivity of basic food crops, constant research is necessary to cope with the problems associated with the high-yielding strains and varieties so as to continue to evolve better varieties through selective and cross-breeding studies. Although we are continuing to derive the maximum benefit from the discoveries made by other nations, in these fields, it is evident that no country can hope to resolve its own peculiar and multifaceted problems of agricultural production by depending totally on foreign research efforts. It is vital for Pakistan, therefore, to build up its research competence through a proper institutionalization and strengthening of its existing research capabilities.

The Federal Government is responsible for the availability of sufficient food and fibre to meet the national requirements through local production to the extent possible and by imports of balance. The Federal Government has, therefore, a vital stake in securing improvement in agricultural practices to secure maximum production within the country. Pakistan has, therefore, established

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an Agricultural Research Council, which, along with the proposed national research institutes, will assume the full responsibility for planning, evaluation, coordination and administrative innovations in agricultural research efforts made in the country. The Agricultural Research Council has to establish new research centers, units and institutes, as and when necessary, to execute research studies in the areas of neglect and to bridge gaps as well as to eliminate weaknesses encountered in the national agricultural research endeavours.

The Second Joint Pak-American Agricultural Research Review Team established in February, 1973 at the request of the Ministry of Agriculture and supported in part by the USAID Mission in Islamabad, was charged with the task of reviewing the status of the national research capabilities and providing further guidance for their improvements. In order to implements [sic] a number of recommendations of the team, which Pakistan feels are of highest priority, the Agricultural Research Council and the other Provincial and Semi-autonomous agricultural research institutes and establishments will need assistance in foreign exchange and rupees. It is estimated that \$8 million in foreign exchange and Rs. 73-74 million of U.S. own uses funds will be [sic] needed for a period of 5 years. The break-up is as given below:

- I. Eight million US \$ are needed, for the following:
    - i. Commodities: To strengthen Provincial Research Institutes and Agriculture Establishments and to develop National Research Centers .  
(NRCS) \$2.6 million
    - ii. Training of personnel in various disciplines \$3.4 million
    - iii. Technical Assistance in the shape of advisers etc. for wheat, rice, sorghum, oilseeds, barani, NRC Station Manager, Production Economics and Procurements etc. \$2.0 million
- Total: \$8.0 million

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II. Similarly, Pakistan will need assistance in rupee out of PL 480 funds for a period of five [sic] years for the following purposes:

A. Establishment of a national research center with the following functions:

- i. Center for production systems (including barani research)
- ii. Agricultural Research Council Campus
- iii. Plant Introduction Center
- iv. Communication Center
- v. Sorghum and Millet Research Center
- vi. Fodder and Forage Research Center
- vii. Pest Management Center
- viii. Economic Research and Training Center
- ix. Animal Research Institute

B. Strengthening existing Provincial Institutions

C. Training of Scientists within Pakistan

The break-up of the major rupee assistance required is briefly given below:

- |   |    |    |                 |
|---|----|----|-----------------|
| i. Building cost of National Research Center (NRC) .. | .. | .. | Rs. 20 millions |
| ii. Operational cost of NRC ..                        | .. | .. | Rs. 15 millions |

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iii. Strengthening of Provincial Research Institute and Agricultural Establishments	Rs. 35 million
iv. Local training at the Agriculture University Lyallpur and other Agriculture Colleges as well as to defray expenditures on transportation of trainees abroad	Rs. 3-4 million
Total:	<u>Rs. 73-74 million</u>

The requirements given above are tentative and given in general terms.

During the next few weeks the Agriculture Wing want to discuss the joint team report with the scientists and administrators of Provincial Government, autonomous bodies, and Ministries of the Central Government to work out the proposed projects in detail and to develop a consensus for an action program that would focus our resources on priority problems, strengthen the provincial capabilities, and broaden the responsibilities of the Council.

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In view of the urgency and importance of the financial needs as explained above it is requested that this process proceed rapidly so that the requisite agreement could be signed before the end of the current fiscal year.

I shall be grateful if you could kindly explore the possibility of financing this proposal.

Yours sincerely,

/sd/

Muhammad Ahmad

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(Draft)

ANNEX VI

LOAN AUTHORIZATION

Provided From: Development Loan Funds  
Pakistan-Agricultural Research Loan

Pursuant to the authority vested in the Administrator, Agency for International Development ("A.I.D."), by the Foreign Assistance Act of 1961, as amended, and the delegations of authority issued thereunder, I hereby authorize the establishment of a loan ("The Loan") in accordance with Part I, Chapter 2, Title I of such Act, to the Government of Pakistan ("Borrower") of not to exceed eight million United States dollars (\$8,000,000) to finance the foreign exchange costs of goods and services required to support a multi-year program of agricultural research in Pakistan. The Loan is subject to the following terms and conditions:

1. Interest Rate and Terms of Repayment: Borrower shall repay the loan to A.I.D. in United States dollars within forty (40) years from the first disbursement under the Loan including a grace period of not to exceed ten (10) years. Borrower shall pay to A. I. D. in United States dollars interest on the disbursed balance of the Loan at the rate two percent (2%) per annum during the grace period and three percent (3%) thereafter.
2. Other Terms and Conditions
  - (a) Goods and services financed under the Loan shall have their source and origin in the United States or any country included in A. I. D. Geographic Code 941.

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- (b) The Loan shall be subject to such other terms and conditions as A. I. D. may deem advisable.

\_\_\_\_\_  
Assistant Administrator for Asia

\_\_\_\_\_  
Date

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