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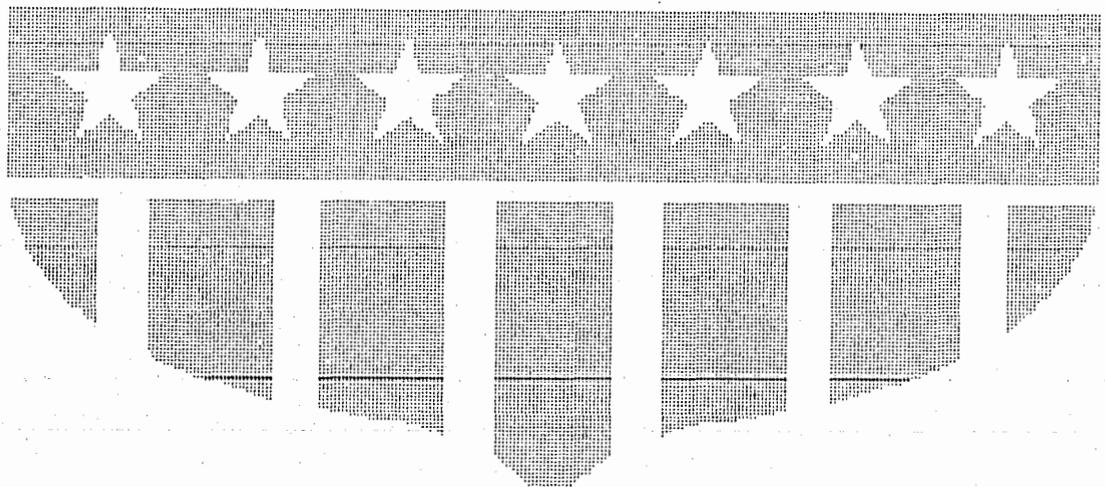
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USAID

MISSION TO PAKISTAN AND AFGHANISTAN

**PROJECT ASSISTANCE COMPLETION
REPORT**

**Institutional Excellence Project
(391-0498)**



*Submitted by Social Sector Program Division
June 1994*

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LIST OF ACRONYMS

BASF	-	Basiche Aniline Soda Fabrik
CEMB	-	Center of Excellence in Molecular Biology
EDC	-	Enterprise & Development Consulting
FPCCI	-	Federation of Chambers of Commerce and Industry
IEP	-	Institutional Excellence Project
JEA	-	Joint Educational Advisor
MOE	-	Ministry of Education
MOST	-	Ministry of Science & Technology
MOU	-	Memoranda of Understanding
MUCIA	-	Midwest Universities Consortium for International Activities
NCEG	-	National Centre of Excellence in Geology
NMC	-	National Management Consultants
OGDC	-	Oil & Gas Development Corp.
PACD	-	Project Assistance Completion Date
PCSIR	-	Pakistan Council for Scientific and Industrial Research
QAU	-	Quaid-i-Azam University
STEDEC	-	Scientific and Technological Development Corporation
UET	-	University of Engineering and Technology
UGC	-	University Grants Commission

PROJECT ASSISTANCE COMPLETION REPORT

INSTITUTIONAL EXCELLENCE PROJECT (391-0498)

June 1994

1. BASIC PROJECT DATA

Project Title	:	Institutional Excellence Project (IEP)
Project Number	:	391-0498
Date of Authorization	:	June 6, 1989
Original PACD	:	May 30, 1999
Pressler PACD	:	March 31, 1994
Amount Authorized	:	\$30.5 million
Amount Obligated	:	\$5.0 million
Pressler Deobligation	:	\$2.0 million
Amount Expended	:	\$2,660,519
Implementing Agencies	:	Ministry of Education (MOE) Ministry of Science & Technology (MOST) University Grants Commission (UGC)

2. PROJECT GOAL AND PURPOSE

The goal of the project was: "to enhance Pakistan's capability to develop, adapt, utilize, and advance scientific and technological innovations for development purposes."

The purpose of the project was: "to assist selected departments of universities and institutions to improve and expand their teaching and research capability in areas of science and technology critical for national development."

3. BACKGROUND

The Institutional Excellence Project (IEP) as originally approved in April, 1989 was a phased ten-year project designed to strengthen nine to twelve university departments or centers to enable them to contribute to the overall economy of Pakistan. The IEP was planned to operate in two phases. A first five-year phase, to be funded at \$30.5 million was scheduled to develop four to six departments by providing faculty training, faculty exchange with U.S. universities, commodities, library materials, and graduate student support to bring the departments to a substantial world quality level. Initiation of the second phase, scheduled at \$49.5 million, depended upon a positive evaluation of the first phase that was to be conducted after two to three years of operation. The second phase would develop an additional five to six departments to a corresponding level.

A Small Grants program, to be funded at \$4.5 million, was incorporated within the first phase of the project. This funding was intended for support of applied research at other departments or centers in Pakistan which were not included in the large development program, as well as for research institutes and private industry. An additional \$6.2 million was scheduled for the Small Grants program in the second five-year phase.

The project Cooperative Agreement was signed in April, 1990, with the Midwest Universities Consortium for International Activities (MUCIA) as the cooperating contractor and with Purdue University as the lead university. The University Grants Commission (UGC) of the Ministry of Education (MOE) was designated as the GOP counterpart agency.

The project commenced in August, 1990, with the arrival of the MUCIA Chief of Party and the evaluation of the first prospective department and centre. Initially, the GOP provided a list of units to be evaluated which were selected primarily on a geographical basis. This list excluded some departments and centers judged by the contractor and USAID to have the strongest potential for achieving the desired level of strength and making the strongest contributions to the economy at the end of the project. A revised list was used for the first three evaluations at the Department of Geology/Centre of Excellence in Mineralogy, University of Balochistan, Department of Electrical Engineering, University of Engineering and Technology (UET), Lahore, and the Department of Chemistry, Gomal University, D.I. Khan.

Based on extensive questionnaires, a set of criteria established for selection, and evaluation visits of faculty teams organized by MUCIA, the departments of Electrical Engineering/UET and Chemistry/Gomal were selected for participation in the development component. While additional evaluations were being scheduled, the preparation of development plans and budgets for these units commenced.

In January, 1991, four additional evaluations had been scheduled but were postponed because of Gulf War hostilities, and evacuation of MUCIA contractors and USAID personnel. Shortly thereafter, termination of aid to Pakistan was announced, under the terms of the Pressler Amendment. The IEP was included in the list of projects for early termination, with only completion of assessments as concluding activities. The Cooperative Agreement with MUCIA was terminated in June, 1991.

Since assessment of additional departments and centers would yield no applicable results, approval was given to turn instead to an assessment of the feasibility of the final goal of the project, viz., the ability of departments and centers to contribute to economic development by actually demonstrating the achievement of practical, commercially valuable research results in cooperation with industrial counterparts. This became the focus for the remainder of the project, with activities to be completed by the Project Officer and HRD staff.

Beginning in May and June, 1992, sixteen projects were initiated between six university departments/centers and fourteen cooperating industrial companies, all but two of which were in the private sector. The process of implementing the projects included identification of potential applied research areas for each department/centre; identification of cooperating

companies and industry-designated problems; establishment of appropriate goals for each project; preparation of proposals outlining work plans, commodity needs and budgets to achieve the goals; and detailed discussions with the participating companies and final agreements on project details. Projects were funded through Memoranda of Understanding (MOU) signed in May-June, 1992. The projects were completed in December-March, 1993-94. Final IEP activities were completed by the PACD.

4. PROJECT COMPONENTS

Original IEP

The original IEP had two main components: 1) university department/centre development, and 2) a small grants component.

1) Development Component

The primary mechanisms to be employed in the Development Component were the establishment of formal and informal exchanges and collaborative linkages among Pakistani and U.S. scientists and their institutions; the upgrading of graduate and post-graduate education and faculty training; the provision of modern scientific and engineering equipment and supplies; the upgrading of library holdings and information exchange; funds for academic research; and strengthened linkages to the private sector. This development support would be restricted to a limited number of nine to twelve departments or centers.

2) Small Grants Component

The primary intent of the Small Grants Component was to focus research and development capability on improvement in products and processes, and the creation of additional indigenous technology, with industry playing a leading role in identifying the research projects to be undertaken. In this sense it was also considered to be complementary to the Development Component in demonstrating the effectiveness of improved capabilities.

The Small Grants Component was not limited to university departments, Centers of Excellence or university institutes. Other laboratories, research centers, and private industries were to be eligible for support. Institutions receiving support under the Development Component were not to be directly eligible for support under the Small Grants program, but could participate in joint programs in cooperation with other organizations that were eligible to apply for a grant.

Small Grant awards were to be made in three technological areas per year. Proposals were to be evaluated by a joint committee of Pakistani and American scientists and experts from the private and public sectors, under the direction of the UGC and in collaboration with the Ministries of Education and Ministry of Science and Technology, and USAID.

Revised IEP

The revised IEP combined, on a considerably smaller scale, the components in order to assess the ability of departments and centers to contribute to economic development by demonstrating their ability to provide practical, commercially viable products to industrial partners.

In the initial department centre assessments, a variety of factors were perceived as existing obstacles to successful centre/industrial interaction. To test these perceptions and assess capabilities, a set of practical projects, each with defined commercial goals established by industry, were conceived and implemented.

The departments/centers to be included were selected with the cooperation of the University Grants Commission. The overall process involved:

- Selection of participating departments and centers.
- Submission of preliminary proposals from departments and centers on possible areas of cooperation with industry.
- Contacts with potential cooperating companies for possible areas of cooperation.
- Discussions between faculty members and industrial contacts to develop cooperative plans.
- Submission of formal proposals with proposed budgets to USAID.
- Review of proposals, selection of projects, and approval of budgets and work plans.
- Allocation of funds to departments and centers through Memoranda of Understanding.

The design included: 1) a process for identification of companies willing to participate; 2) a formal mechanism for the selection of participating departments and centers; 3) a process for completing proposals and arrangements to carry out the applied cooperative research and 4) a monitoring and evaluation process which would measure the progress of cooperative projects and the most effective ways to establish cooperative efforts with industry.

Criteria used for selection of participating departments/centers were:

- Sufficient strength (faculty, equipment, etc.) to carry out successful applied research;
- Diversity of areas to cover major segments of Pakistani industry;
- Focus on areas with potential for significant economic impact of applied research results;
- Selection of mix of departments/centers of diverse sizes, location with respect to industrial counterparts, and geographical setting.

Pakistani consulting firms were employed to assist in the implementation of the project. Primary consultant responsibilities under the contract included the identification of potential

cooperating industries; arrangements for collaborative university/industry efforts; participation in monitoring of individual project progress; and arrangement of seminars and materials for dissemination of research and project results on a national basis.

National Management Consultants (NMC), a consulting firm with wide industrial contacts, was employed to identify and facilitate cooperative arrangements with companies. Enterprise & Development Consulting Ltd. (EDC) continued assistance as participants in monitoring projects and in presentation of final project results to the Pakistan community.

Six departments and centers judged to have the highest potential for successful interaction with industry were selected for participation from the original assessment list. The departments and centers selected were:

- 1) National Centre of Excellence in Geology - University of Peshawar
- 2) HEJ Institute of Chemistry - University of Karachi
- 3) Centre for Advanced Molecular Biology - University of Punjab
- 4) Department of Biological Sciences - Quaid-i-Azam University
- 5) Department of Electrical Engineering - University of Engineering and Technology
- 6) Department of Chemistry - Gomal University

Direct contact was established between specific industrial companies and the department/centre faculty. NMC surveyed 47 companies and prepared a final list for discussions with departments and centers.

Initial discussions with departments resulted in twenty five preliminary project proposals. After contacts and discussions with industry, formal proposals following a predetermined outline were prepared by the departments and centers, giving specific research plans and details of cooperation with the companies. After review of the proposals, a total of sixteen projects were selected for funding, with the confirmed participation of fourteen companies. Twenty six faculty members plus research associates and graduate students were involved in the projects. A total of \$1,125,429 was allocated for the projects.

5. **INPUTS** - Inputs provided by USAID are summarized in the following two tables.

TABLE 1 - SUMMARY OF USAID FUNDING

Line Item	Amt. Obligated	Amt. Expended
IEP (revised per Pressler)	3,000,000	2,702,472
Technical Assistance	1,595,000	1,517,117
Commodities	1,140,000	979,194
Training	-0-	-0-
Construction	-0-	-0-
Other Costs	264,000	206,431

TABLE 2 - SUMMARY OF IEP-FUNDED PROJECTS

Research Institution	Counterparts	Project Title	Total Amount of Commodity Funding (\$US)	Total Amount of R&D Funding (\$)
CEG, Peshawar (4 projects)	Khawaja Glass Co. Khawaja Glass Co. Khawaja Glass Co. Oil & Gas Development Corp. (OGDC)	1. Identification & Characterization of Quality of Silica Sand for Glass Making. 2. Inclusion Studies of Sheet Glass 3. Review of Analytical Processes at Khawaja Glass Company 4. Sedimentological Studies in Potential Hydrocarbon bearing Strata.	247,376	42
AU, Islamabad (2 Projects)	Bio-Tech. Ciba Geigy, Multan	1. Bating Enzymes from Animal Sources. 2. Bioinsecticides in the Control of Insect Pests of Cotton	136,115	14
NET, Lahore (3 Projects)	Descon Escorts Multiline	1. Microprocessor based Multimetering, Energy & Tariff Meter 2. Design & Development of an Expert Logic Controller 3. Uninterrupted Power Supply (UPS)	89,474	16
EMB, Lahore (2 Projects)	Ciba Geigy, Lahore Punjab Drug House, Lahore	1. Microbial Control of Insect Pests in Cotton 2. Hormone Receptors as Prognostic Factors in Health & Disease	193,600	15
OMAL, D.I. Khan (2 Projects)	PCSIR STEDEC	1. Commercial Exploitation of Taxol Anti-Cancer Drug 2. Commercial Exploitation of Azadirachtin	133,300	17
EJ, Karachi (3 Projects)	Hamdard Labs. BASF Ehsanullah Labs. A.K. Labs.	1. Investigation of Medicinal Plants for Anti-Diabetic Activity 2. Bating Enzymes from Animal Sources 3. Development and Pilot Plant Production of Medical Diagnostic Kits	211,420	8
6 Universities	14 Counterparts	16 Projects	1,011,285	114

G: National Centre of Excellence in Geology, University of Peshawar
 E: University of Engineering & Technology, Lahore
 IAL: Gomal University, D.I. Khan
 R: Pakistan Council for Scientific and Industrial Research
 F: Basico Aniline Soda Fabrik

QAU: Quaid-i-Azam University, Islamabad
 CEMB: Center of Excellence in Molecular Biology, Lahore
 HEJ: H.E.J. Research Institute of Chemistry, University of Karachi
 STEDEC: Scientific and Technological Development Corporation

6. PROJECT ACCOMPLISHMENTS

Original IEP

The original IEP was short-lived but had accomplished a great deal of preparatory work in anticipation of commencement of actual allocation of funds early in 1991. The results are transportable for use in any similar project under USAID. They include:

- Preparation of a detailed methodology for assessment, criteria and a point system for evaluation of departments/centers to be selected for the development portion of the project;
- Preparation of a detailed questionnaire for collection of preliminary information to be used during evaluation visits;
- Preparation of guidelines for operation of the Small Grants program, and criteria for evaluation of proposals to be submitted;
- Establishment of a planning structure for individual department/centre development.

Revised IEP

The revised IEP confirmed the ability of departments/centers to cooperate productively with industry. The process and the results obtained provide a basis for analysis of the original project and recommendations for the preparation of any similar projects in the future.

Specific accomplishments during this phase of the project include:

- The effectiveness of cooperative applied research between university researchers was tested by establishing sixteen research projects involving twenty-six researchers in collaboration with fourteen companies;
- Credibility was established in the ability of university researchers to solve company-defined problems of immediate commercial importance. Seven to nine commercial products can be marketed from the results of the thirteen successfully completed projects;
- A systematic procedure for arrangement of cooperative efforts in applied research between industry and university researchers was organized and tested. A monitoring and reporting system utilizing industrial representatives was established to measure project progress and adherence to company objectives;
- The system and process have been summarized in an Operational Guidance Manual and given wide distribution. The system provides a basis for continuation of cooperative activities depending on government/private sector collaboration.

7. LESSONS LEARNED

The original goal and purpose of the IEP were valid and important. The strengthening of universities is, and will increasingly be, a crucial element in technological economic development for Pakistan. In the absence of industrial research and development capabilities in Pakistan, the universities represent, for the foreseeable future, the main reservoir to provide applied research results for development of indigenous technology. Results from the modified project, however, indicate some important additional considerations for any future project.

The original IEP was an open-ended project, in the sense that planning for developments was flexible, and no definite set of objectives had been established to measure actual contributions to economic development by the strengthened units. In establishing the original list of departments and centers to be used for selection, no coherent set of goals had been set by the GOP to coincide with critical national needs or priority areas for application of department outputs. Most seriously, no definition was made of the types of output that would be required with respect to research results and interactions with industry and other productive sectors.

In the operation of the modified IEP, the "leap-fragging" to an actual test of these goals and outputs allows an assessment of the original project structure. The following may be classified as lessons learned:

- ***Defined and required output***, not funding input, should be the basis for development of Pakistani higher education institutions. In terms of economic benefit to the country, general plans for faculty training and exchanges, strengthening of equipment and research facilities, etc., can lead to a diffusion of objectives unless the end goals, e.g., cooperation with industry are being organized from the earliest stages of the project;
- ***Selection of participating departments/centers*** should depend on two main criteria: 1) the overall importance of the area of expertise of the unit to technological economic goals; and 2) the demonstration at the time of selection that the unit is, through its own efforts, already striving to achieve a high professional level. From the evaluations of departments in the early stages of the original IEP, it was clear that only those departments with strong entrepreneurial leadership could have attained the desired level of productivity with the resources available from the IEP.
- ***Competition for support*** should be the goal of any similar development project. Over the long term, a competitive atmosphere should be established, where provision of funds for departments or universities would be made based on their demonstrated determination to improve. A positive result would be that scarce government or donor funds could be focussed selectively over a period of years for these improvements, rather than a broad distribution of funds to universities which has no measurable impact on strength;
- ***Changes in incentives***, promotion criteria, financial management and research management at universities must accompany any departmental development. The need

for these changes as well as an overall change in attitude of university administrators was strongly evident from the operation of the modified IEP, where serious delays and difficulties in cooperation with industries occurred at the university level because of existing policies and procedures.

- ***Structured arrangements for cooperative efforts*** such as the Resource Center recommended in the IEP Operational Manual and training for participants in cooperative applied research activities must accompany any strengthening process from its initial stages. Isolated efforts by universities to contribute to economic development clearly failed in the past. Economic contributions will occur only by assistance in extending cooperation to other research units and aid in achieving clear understanding of the requirements of industry and other productive sectors.
- ***Changes in eligibility for funding from the Small Grants Program*** and the funding schedule for the original IEP would have been required to produce the effective cooperation achieved in the modified project. Funding for cooperative research by industry requires establishment of credibility. Developing departments would require support for initial cooperative research efforts to establish overall working relationships and complete initial research projects.
- ***Funding from the Small Grants Program*** should be restricted to projects which have clearly defined problems to be solved which have been defined by a cooperating industrial counterpart. Researchers should have completed the steps outlined in the Operational Manual to obtain preliminary agreement for cooperation before submitting a research proposal.

8. SUSTAINABILITY

Strong endorsements of the IEP concepts and process were given by industrial participants in an IEP workshop and at the final project conference. The same responses were received in meetings with the Special Assistant to the Prime Minister, the Joint Educational Advisor (JEA) of the Ministry of Education (MOE), the Acting President and Secretary General, Federation of Chambers of Commerce and Industry (FPCCI), and the University Grants Commission (UGC).

In a proposal sanctioned by the Special Advisor to the Prime Minister, the Ministry of Education (MOE) will request an earmarking of Rs. 100 million (approximately US\$3,270,000) in a revolving fund to sustain and enlarge cooperative research activities. The University Grants Commission will establish the Resource Center recommended in the manual for the facilitation of cooperation. The Federation of Chambers of Commerce and Industry (FPCCI) will establish a coordinating office to facilitate contacts between companies and researchers. The FPCCI and MOE will seek additional funds from the industrial sector and other donors to complement the earmarked funds.

If these commitments are fulfilled, and the necessary supporting units are appropriately structured, the potential for extensive participation by industry is substantial. During the early years of the cooperation, it can be anticipated that main funding from companies themselves will not be large, until substantial levels of productivity and confidence have been reached.

There is a critical need for follow-up by USAID to provide advice on the process for establishing the necessary supporting offices and ways in which difficulties can be overcome. The process of cooperation is essentially a completely new one for Pakistan and must be nurtured. Done properly, the process can provide major economic gains to Pakistan.