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Mail Room INFO.

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SUBJECT - Project Evaluation Summary (FES) - 391-78-7 for Institutional Grants Project 391-0366 (UF/CSU Subproject)

82 p.

REFERENCE -

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attach to be run w/airgram

1. The scheduled date for this FES was 7/78 but it was delayed to accommodate CSU participation.
2. Collaboration between the Faculty of Engineering of the University of Peshawar and Colorado State University will continue upon the completion of this grant, at least on a low key. Approval of a rupee endowment (Action Decision "G") will enable the linkages already established to continue at a more beneficial level of activity.

HUMMEL
CONSULTANT

TE

OTHER AGENCY

Encl: FES 391-78-7 sent Mail Room 10/13/78

PAGE 1 OF 1 PAGES

DRAFTED BY

AHWirtz:ms

OFFICE

Program

PHONE NO.

225

DATE

9/25/78

APPROVED BY:

Acting Director: W. A. Wolffer

AID AND OTHER CLEARANCES

HRD: A Farves

HRD: H Freeman

DD(A): AM Handy

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CLASSIFICATION
PROJECT EVALUATION SUMMARY (PES) – PART I

Report Symbol U-447

1. PROJECT TITLE Institutional Grants (Colorado State University) Note: This evaluation is for the CSU sub-project only	2. PROJECT NUMBER 391-0366	3. MISSION/AID/W OFFICE USAID/Pakistan
		4. EVALUATION NUMBER (Enter the number maintained by the reporting unit e.g., Country or AID/W Administrative Code, Fiscal Year, Serial No. beginning with No. 1 each FY) <u>391-78-7</u> Final <input type="checkbox"/> REGULAR EVALUATION <input type="checkbox"/> SPECIAL EVALUATION

5. KEY PROJECT IMPLEMENTATION DATES A. First PRO-AG or Equivalent: FY <u>1974</u> B. Final Obligation Expected: FY <u>1975</u> C. Final Input Delivery: FY <u>1978</u>	6. ESTIMATED PROJECT (CSU) FUNDING Sub-project A. Total \$ <u>493,753</u> B. U.S. \$ <u>240,000</u> C. U.S. \$ <u>120,000</u>	7. PERIOD COVERED BY EVALUATION From (month/yr.) <u>10/76</u> To (month/yr.) <u>9/78</u> Date of Evaluation Review <u>September 10, 1978</u>
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8. ACTION DECISIONS APPROVED BY MISSION OR AID/W OFFICE DIRECTOR

A. List decisions and/or unresolved issues; cite those items needing further study. (NOTE: Mission decisions which anticipate AID/W or regional office action should specify type of document, e.g., airgram, SPAR, PIO, which will present detailed request.)

B. NAME OF OFFICER RESPONSIBLE FOR ACTION

C. DATE ACTION TO BE COMPLETED

- | | | |
|---|---|---------------------|
| A. Obtain foreign training scholarships for FE/UP faculty members. Sources may be Ministry of Education, University Grants Commission, UNDP and other agencies. | FE/UP | 1/79 and continuing |
| B. Explore the source for payment of international travel cost for three professors from CSU and other US universities who have agreed to visit Pakistan and teach for 3-4 weeks. Rupee cost for their lodging and boarding will be borne by Peshawar University. | Director of Research, FE/UP | 12/78 |
| C. Develop a Rupee endowment follow-on grant, including an agreement from the American Society for Engineering Education to arrange for exchange of professors and provide other professional support to the FE/UP, in order to maintain a continuing institutional relationship between the FE/UP and American engineering institutions. | FE/UP, Ministry of Finance USAID, AID/W | 6/79 |

9. INVENTORY OF DOCUMENTS TO BE REVISED PER ABOVE DECISIONS

- | | | |
|--|--|--|
| <input type="checkbox"/> Project Paper | <input type="checkbox"/> Implementation Plan e.g., CPI Network | <input type="checkbox"/> Other (Specify) _____ |
| <input type="checkbox"/> Financial Plan | <input type="checkbox"/> PIO/T | _____ |
| <input type="checkbox"/> Logical Framework | <input type="checkbox"/> PIO/C | <input type="checkbox"/> Other (Specify) _____ |
| <input type="checkbox"/> Project Agreement | <input type="checkbox"/> PIO/P | _____ |

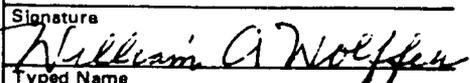
10. ALTERNATIVE DECISIONS ON FUTURE OF PROJECT

- A. Continue Project Without Change
- B. Change Project Design and/or Change Implementation Plan
- C. Discontinue Project
- D. Final Evaluation**

11. PROJECT OFFICER AND HOST COUNTRY OR OTHER RANKING PARTICIPANTS AS APPROPRIATE (Names and Titles)

See listing under item 14 Evaluation Methodology.

12. Mission/AID/W Office Director Approval

Signature

 Typed Name

William A. Wolffer

Date
 September 28, 1978

13. Summary

The major purposes of the project were: (1) to strengthen and improve the expertise of FE/UP and (2) to help establish a continuing relationship between FE/UP and the College of Engineering at CSU. Major accomplishments during the thirty-nine month period include: (1) four faculty members from FE/UP to CSU as part of an exchange professor component; (2) the initiation of graduate study programs for 11 FE/UP staff members to CSU and for two from CSU to FE/UP; (3) appointment of a Director of Research at FE/UP who is actively pursuing cooperative research arrangements; (4) study of an instrumentation center by a CSU consultant and submission of a comprehensive report; (5) Supply of several pieces of equipment for the Equipment Center and of books and professional journals for the library, and (6) visit of four short-term consultants from CSU and organization of seminars and workshops on technical subjects. These accomplishments are believed to have achieved the project purpose of strengthening the quality of expertise at FE/UP. Relationships between FE/UP and CSU developed satisfactorily as long as the dollar cost was funded out of this project. After the termination of this project on September 30, 1978, the major problem will be to find another source of funds to support a continuation of the institutional relationships between the two institutions. Efforts are now under way to find a solution to this problem.

14. Evaluation Methodology

The final evaluation examined the project's technical aspects, administration, funding, and implementation. It also explored alternative future courses of action for continuing the institutional ties between FE/UP and CSU after the termination of grant assistance.

Actively participating in the evaluation review in Peshawar were:

1. Prof. Mohammad Ismail Sethi, Vice Chancellor, University of Peshawar.
2. Dr. M. Athaullah, Dean Faculty of Engineering, (Co-Director), UP.
3. Dr. Iqbal Shah, Prof. and Head of Research, FE/UP.

4. Dr. M. Abdullah, Prof. & Head, Electrical Engineering, FE/UP.
5. Dr. Mian Abdul Qaseem, Dy. Educational Advisor, Ministry of Education, Islamabad.
6. Mr. M. Akmal Baig, Asst. Educational Advisor, Ministry of Education, Islamabad.
7. Dr. M. D. Shami, Sr. Member, Univ. Grants Commission, Islamabad.
8. Dr. Maurice G. Albertson, Prof. of Civil Engineering, CSU (Co-Director)
9. Dr. Harold Freeman, Chief, Human Resources Division, USAID/Islamabad.
10. Mr. Anthony H. Wirtz, Program Evaluation Officer, USAID/Islamabad.
11. Mr. Aziz R. Parvez, Education Advisor, USAID/Islamabad

The review team examined inputs and outputs and the processes + used to attempt to achieve targets and project purposes. Particular attention was given to project process and the impact of the project on re-establishing and maintaining linkages between the FE/UP and CSU. The evaluation was originally scheduled for July 1978 but was delayed to September to accomodate the availability of all participants.

15. External Factors:

There have been no major changes in the project setting or basic assumptions.

16. Inputs:

USAID provided an amount of \$120,000 for this sub-project to be spent by CSU in dollars. A similar amount was provided in Pakistani Rupees to FE/UP for meeting Rupee expenditures of the project. In addition, CSU claims to have spent \$174,460 out of its own resources and FE/UP has shown an additional expenditure of \$79,293 worth of Rupees from the University of Peshawar resources.

The funds available for the project were adequate and timely.

Four professors from FE/UP visited CSU for one to four months each and four short term consultants from CSU visited FE/UP. No CSU professor was available for long-term assignment to Pakistan. A total of 701 books were purchased for FE/UP Library and current issues of professional journals were obtained by acquiring student membership of the American professional associations.

One of the most successful programs of the project was the graduate exchange program. A total of 11 members of FE/UP studied at CSU, some for Masters and some for Ph. D. degrees. Most of them are working at FE/UP and actively contributing towards the improvement of the institution. Two graduate students from CSU visited FE/UP and completed research work for their master's degrees. See attachment A for additional details of inputs provided.

17. Outputs:

Considerable progress has been made towards promoting cooperative and individual research activities at the FE/UP. Graduate research activities have also been carried out by FE/UP faculty members and CSU graduate students. Appendix D of the attachment lists research topics and principal investigators.

Another extremely successful activity was holding of seminars and workshops with the help of short term consultants from CSU. A national seminar and workshop on Solar Energy Application was held in March 1976, and an international seminar on Solar Energy was held in March 1977. A second international seminar on Low Cost Farm Structures was held in February/March, 1978. One of the CSU consultants studied and developed proposals for the establishment of an instrumentation center with repair and maintenance facilities at FE/UP. Some of the instruments have been purchased out of the project funds. The project is now being submitted to UNDP for support. See attachment A for additional details of outputs.

18. Purpose:

The major purpose of the project, as mentioned in the FY 1974 Project Agreement, was "to enhance the capability and performance of the Faculty of Engineering, University of Peshawar". This purpose was to be achieved through establishing and continuing linkages

between the FE/UP and the U.S. educational institutions. This purpose has been partly achieved. The amount and quality of research has substantially increased.

19. Goals/Subgoals

The major goal was to establish continuing linkages between the FE/UP and the CSU as well as other institutions in the U.S. The sub-goals are listed below:

1. to initiate masters and doctoral degree programs;
2. to establish extensive research programs;
3. to strengthen capabilities of the faculty members, and
4. to strengthen the under graduate programs.

Satisfactory linkages have been established between FE/UP and CSU which should continue at least on a low key even without the approval of the recommended rupee endowment. (See Action Decision "C" on cover sheet.) With approval of the rupee endowment the linkages of course will be at a higher level of activity. Also, as a critical component of endowment grant, the American Society for Engineering Education has agreed, in principle, to assist FE/UP to continue linkages with the educational institutions, in the United States, but they are looking for a sizeable representation of ASEE in the management of proposed Rupee Endowment Grant. Further negotiations will be held by USAID and AID/W with the ASEE.

Sub-goal No.1 could not be achieved, No.2 was partly achieved and the success rate in Nos.3 and 4 is approximately 70 per cent based on the combined judgment of CSU and FE/UP staffs.

20. Beneficiaries:

Immediate beneficiaries of the project are the students and faculty members of the FE/UP. Indirectly and in the long run, the people of Pakistan will benefit in increased living standards resulting from improved appropriate technology.

21. Unplanned Effects:

As a result of research carried out at FE/UP and the seminars organized on solar energy, the FE/UP has developed a solar cooker that is claimed to be extremely economical and effective. According

to the Director of Research, they are now working only to "take the bugs out" and then the cooker will be placed on the market for large scale production and sale.

22. Lessons Learned. A. In order to accommodate CSU and other US institutions scheduling, the need for exchange professors and short term consultants should be determined nine to twelve months in advance.

B. Any productive research results should immediately be put to the market for commercial feasibility.

C. Joint research should not be considered an independent activity but be developed in conjunction with other activities, such as exchange programs.

23. Special Comments or Remarks

None

Attachment (A): "Final Evaluation Report
Institutional Grants Project"

Drafted by: 
ARParvez:rm
9/27/78

FINAL EVALUATION REPORT
INSTITUTIONAL GRANTS PROJECT

Faculty of Engineering
University of Peshawar
And
College of Engineering
Colorado State University

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I. INTRODUCTION

The relations of CSU and the University of Peshawar date back to the early fifties when the colleges of agriculture, engineering, and home economics, together with the basic sciences departments received large amounts of technical assistance under an inter-college exchange program. This program, however, was terminated in 1965. But again during 1971-72 the efforts were initiated for a linkage program with the college of engineering in the first instance and that the program would be expanded to the colleges of agriculture and home economics, and the basic sciences department at a later stage if circumstances permit.

A program for the development of the Faculty of Engineering was then drawn up and finalized with most of the total financial support being provided by US-AID. This support was planned for three years and then cooperation was to be continued further on a self-supporting basis. The program activities have involved the following items:

- a. Faculty exchange
- b. Short-term consultants
- c. Library exchange
- d. Graduate student exchange
- e. In-service study
- f. Seminars and conferences
- g. Cooperative research
- h. Senior administrator exchange
- i. Instrumentation centre
- j. National advisory board.
- k. Budget.

The purpose of the project has been to provide technical assistance in order to improve the capability and performance of the Faculty of Engineering. This was envisaged to be accomplished through the development of continuing linkages between CSU and the Faculty of Engineering. The technical assistance included such items as staff development, library strengthening, and the development of research programs.

As a matter of fact, various departments in the Faculty of Engineering require immediate attention to improve the teaching standards at the undergraduate level. This is the largest degree-awarding college or Faculty of the Peshawar University campus, functioning since 1952. Unfortunately, however, budgetary allocations to take care of the under-graduate courses are not adequate. The University of Peshawar has, therefore, proposed through a PC-1 Form an allocation of rupees 10.2 million for the existing departments of the faculty and an allocation of rupees 4.4 million for introducing graduate courses in computer science during the next five-year plan (1973-83). These allocations are yet to be approved by the provincial government.

Taking into consideration the growing need of engineering education in the NWFP it is time that annual budget allocations (capital as well as operational) are increased

and facilities and budget are provided for graduate courses for the next academic year.

This project, if extended beyond three years, can play an important role in building up the graduate courses by modifying the components of activities embodied in the institutional development program.

A. Faculty Exchange:

In order to develop and establish long term continuing relationships between the two institutions in research and teaching activities in general, and in the research activities of junior faculty in particular, a senior faculty exchange program was incorporated as one of the very important activities of the CSU-UP institutional development project. The faculty exchange program objectives have been achieved through visits of PU senior faculty to CSU as visiting professor for a period ranging from more than a month to one full semester. The following professors of the Faculty of Engineering, University of Peshawar, visited CSU.

1. S.A.H. Rizvi, Professor and Director of Basic Sciences.
2. Iqbal Shah, Professor in Mechanical Enggr. & Director of Research for Faculty of Engineering.
3. Jamal Khan, Professor & Head, Mechanical Engineering
4. M. Abdullah, Professor & Head, Electrical Engineering

While staying in the United States, the PU faculty was generally involved in studying the research and teaching activities through an active participation in various activities at CSU. More specifically, participation included departmental activities, seminars, meetings with the host faculty, meetings with administrative staff to observe and discuss the academic policy matters, lecturing, and attending and participating in the regular weekly Pakistan Seminar. Activities also included visiting other universities and their related research and other academic activities and facilities, and attending conferences of professional societies.

The detailed activities of each of the foregoing PU faculty with the following specific information is given in Appendix A.

1. Activities at CSU.
 - a. Lectures-Seminars delivered
 - b. Meetings --- with host faculty, administrators, junior faculty research supervisors
 - c. Studies -- e.g. semester system, academic policies, computing systems, research activities and facilities, graduate study programs.
 - d. Lectures-Seminars attended
 - e. Courses attended
2. Other places visited:
 - a. Meetings-discussions
 - b. Conferences
 - c. Short courses
 - d. Seminars

3. Objectives achieved
4. Areas of priority identified for greater attention in future cooperative plans and activities.

It is hoped that the knowledge and experience gained through the foregoing activities will help improve to a great extent the existing academic and research environment of DU in general and will promote the various activities initiated in the implementation period of this project -- such as the semester system, graduate study programs, graduate research activities. It is further hoped that the ties established through this activity will enable the faculty members of the two institutions to exchange knowledge and information on a continuing basis about the latest development in their respective fields. It is expected that this activity will be continued in future cooperative plans.

B. Short Term Consultants:

In order to help in establishing on-going research and educational activities of a cooperative nature, short term consultants from CSU have visited UP. These have been the following individuals together with their areas of specialization:

1. George Lof, Solar energy
2. S.S. Karaki, Solar energy and research organization and administration.
3. Ralph Hansen, Agricultural Engineering
4. Marvin Criswell, Structural Engineering

Mr. George Lof, Director Solar Energy Applications Laboratory, Colorado State University visited Peshawar University in March 1976 and was the Keynote Speaker for the Seminar and Workshop on Solar Energy Applications March 19 - 25, 1976 organised by the Peshawar University in collaboration with Colorado State University. He made valuable contribution to the success of the Seminar as one of leaders of Seminar topics for discussion.

Dr. S. S. Karaki, Associate Director Solar Energy laboratory Colorado State University visited Peshawar for helping and organizing the International Seminar in March 1977 and his participation in the Seminar was invaluable. Apart from seminar activities, both the consultants spent time advising the Director of Research and the faculty in development of research programs in Solar Energy Applications.

Dr. Marvin Criswell visit in February - March 1978 to Peshawar University was very useful in organising research work in Structural Engineering. He contributed to the success of the International Seminar on Low Cost Farm Structures February 26 to March 4, 1978 presenting an excellent paper and generating interest in discussion groups. The expert advice of Dr. Ralph Hansen of Colorado State University in development of Agricultural Engineering is recognised and welcomed by the engineering faculty at Peshawar. His presentation in the International Seminar on "Low Cost Farm Structures" has been widely acclaimed.

C. Library Exchange:

1. Peshawar Library: -- The updating and development of PU Library was recognised as a major factor in the overall development of the PU Faculty of Engineering at the time the project activities were planned. For this reason, it was made a major component in the Institutional Development Agreement and the subsequent annual implementation plans.

The need was not only to equip the library with text books and journals but also to improve its working operations. For obvious reasons, this latter task was left to be accomplished by the administration of the Faculty of Engineering at PU.

For equipping the library with text books and journals and other reference materials, efforts were made in the following ways:

- a. Purchase of text books
- b. Acquisition of current issues of professional journals
- c. Acquisition of books and past issues of professional journals through donations and voluntary contributions.

During the first two years of the project, a sum of \$ 1500 and rupee equivalent of \$ 3000 were spent on the acquisition of books and current issues of professional journals. An additional amount of \$ 1200 made available by PU was spent for the same purpose during the second year. A total of 701 books have been purchased. The books purchased were mainly those required by the PU graduate students at CSU for their course work. Current issues of the professional journals were obtained by acquiring student membership for the PU graduate students in the various professional societies. Both the books and the

journals so obtained have become the property of the PU Library after their use by the participants at CSU.

This mechanism was adopted with a dual purpose: to allow the PU graduate students to have ^{their} own books during their stay at CSU and to equip the PU library with the most recent reading materials that would be readily available to them upon their return as well as to others who might want to use it. This mechanism seems to have ^{been} very well. Starting the first year of the project, efforts were made to obtain donations of books and past issues of professional journals from American engineers who are retired or for some other reasons did not have any further use for their collections. These efforts were very successful and a large collection of 82 books and about 700 journals were shipped to Peshawar during the second and third years of the project. Part of the shipping costs were met through a grant from Asia Foundation.

Efforts are now being made with the help of the Statistics Department at CSU to acquire books and journals in the field of statistics. An important collection of statistical journals has already been offered by Dr. Siddiqui of the statistics faculty. This collection will be shipped to Peshawar in the near future.

As part of the overall exchange program and with a view to having a continuous exchange of information between

PU and CSU, it was decided that the CSU library would also receive publications from PU. A number of such publications, mostly government publications and publications of WAPDA, PAEC, PCSIR and other government and semi-government agencies, was selected for this purpose. However, no arrangements seem to have been made so far for sending these publications to CSU.

On the whole, efforts made to develop and update the PU library during the implementation period of this project seem to have been successful. However, such efforts should be regarded only as beginning steps forward in a process that has to be continued into the future. It is hoped that the junior faculty will continue their memberships in the professional societies and thus continue to provide the library with the latest issues of the journals in their fields in the future. Moreover, it is hoped that both the senior and junior faculty who went to CSU have established links with their respective departments which will enable them to exchange information on a continuing basis about the latest developments in their fields. This exchange of information has relevance for the library in the sense that as and when resources permit each individual would have a better idea of the needs for books and other reading material in his field.

D. Graduate Student Exchange:

1. UP to CSU:-- The following UP Faculty members who came to CSU, have already completed their work:

1. Inam Ur Rahim M.S. (Electrical Engg), 1977
2. Mussarat Shah M.S. (Civil Engg), 1978
3. Fazli Qayum M.S. (Electrical Engg), 1977
4. Jani Alam Abbassi M.S. (Mechanical Engg), 1977
5. Arshad Aziz M.S. (Agricultural Engg), 1978
6. Sahib Din M.S. (Civil Engg), 1978
7. Adam Khan M.S. (Statistics), 1978

The following Faculty members are still working on their research:

1. S. Faruq Ahmad M.S. (Mechanical Engg)
2. Ahmad Murtaza M.S. (Mechanical Engg)
3. Mahmood K. Qazi M.S. (Civil Engg).

Adam Khan (Statistics) has finished his course work requirements and will receive his M.S. later this year. He now hopes to find an assistantship so that he can complete his Ph.D. in Statistics.

Inayat K. Bhatti of Civil Engineering Department went to CSU in Summer 1978 and successfully completed a Special Study in Geotechnical Engineering from CSU.

Appendix B lists the subjects taken by each of the above faculty members while they were at CSU -- together with a summary of their research topics.

Although he has been on a Pakistan Government scholarship, Sajjad Ahmed has participated throughout this project. He has received both his M.S. and Ph.D degree in Civil Engineering and will be returning to UP soon after he has completed writing three technical papers.

2. CSU to UP:-- From CSU, two graduate students, Norman Illsley in Agricultural Engineering, and Greg Hurst in Civil Engineering, went to UP and completed their research work. Illsley worked on developing a manual harvester. He received his MS degree in 1977. Hurst has completed his field work and will complete his thesis on "On-Farm Water Management". The details of their activities are reported in Appenix C. Dennis Holt worked as a graduate research assistant the first year, but for family reasons was unable to go to Peshawar to do his research.

E. In-Service Study:

In this program, it was initially planned that with the return of the Junior Faculty and Senior Visiting Faculty members, together with the short term CSU consultants,

there would be opportunity for in-service training programs to be set up and conducted for other UP faculty members who did not have an opportunity to participate in training at CSU. This has not been achieved to the desired level. However, there are still possibilities for it in the future.

F. Cooperative Research:

Cooperative Research is one of the most important activities responsible for establishing strong and long lasting institutional links between CSU and PU. The type of research activities, as envisioned in the implementation plan, has a very broad scope. It varies from the research work which forms the graduate student theses to research being conducted for outside organizations. However, the major contribution of this project is to develop the potential at PU to study the basic needs of the country, identify the problems, and evolve methods and develop facilities and research projects to solve those problems. Whereas the cooperative research helps to develop the foregoing potential at a faster rate, it also is a source of providing the necessary instruments and equipment, and the funding to continue other on-going activities.

Considerable success has been achieved in this direction and the graduate research activities have been carried out in PU by both the PU junior faculty and by US graduate

students. Most of the funding for this research was sought through outside sources. In addition, cooperative research work is going on in areas identified by outside organizations. Some of the specific areas of research are the low cost micro-hydropower development, the application of solar energy (solar grain drier and solar water pump), development and use of bio gas as an energy source, low cost housing and farm structures, water management through improvement of water courses, and low cost agricultural machinery development.

The cooperative research will form an essential part of the effort to promote research activities and facilities and to transform PU from basically an undergraduate teaching program to a centre of excellence in both graduate engineering education and research.

The following is a list of some of the cooperative research activities which were planned jointly by the graduate students studying at CSU and the CSU faculty members, and for which the research work was conducted at the UP. This cooperative research work also led towards completion of the advanced degrees of the PU and CSU students working under this project. The additional funding for carrying out these research activities -- specifically, for developing the miscellaneous research facilities in addition to providing instruments and equipment -- were sought from different Pakistani and U.S. funding agencies.

<u>Name of Research</u>	<u>Research Area</u>	<u>Status of Work/ Remarks.</u>
Mussarat Shah	Low Cost, Small Scale Water Turbine.	Completed.
S. Faruq Ahmed	Solar Water Pump for Less Developed Countries	Work in progress at Kuwait
Ahmed Murtaza	Solar Grain Drier	Work in progress
Mahmood Khalid Qazi	Structural Sandwich Panels for Low Cost Housing	Work in progress
Normal Illsley	Hand Operated Mowing Machine for Harvesting Grain	Completed
Greg Hurst*	On-Farm Water Use and Management	In progress

* The research work was closely coordinated with the research work presently underway in Pakistan with a U.S. team based in Islamabad, Lahore and Lyallpur.

In addition to the foregoing, many projects pertinent to the basic needs of Pakistan -- specifically related to energy conversion and to solve the rural energy problems -- were identified jointly by the UP senior and junior faculty and by CSU faculty -- particularly the co-director of the project. Many of the research proposals submitted for funding are under review. The CSU co-director of the project has also been involved in some of the research activities initiated by outside organizations and conducted as a service by UP.

Appendix D is a list of Research Topics and Principal Investigators.

G. Seminars and Conferences:

The idea behind this component of the Institutional Development Agreement was to stimulate and further develop the existing research potential of the PU Faculty of Engineering,

During the first year of the project, a seminar and workshop on "Solar Energy Applications" was held at PU in which eminent scholars from the U.S., Australia, Pakistan and some other countries participated. Proceedings of the seminar were issued at the time which summarized the papers and discussions on the subject. Another successful seminar was held on "Low Cost Farm Structures" at PU in March 1978. Participants in the seminar included Drs. Albertson, Criswell and Hansen, CSU; Dr Merle Esmay, Michigan State; Dr. Jerry O. Newman, Clemson University; Dr. Louis J. Goodman, East West Centre, Honolulu; and Dr. Ronald Terrel, University of Washington and others. Proceedings of the seminar are being compiled for publication.

Funds for these seminars, beyond those allocated from the project, were obtained from other sources with active help from the co-director at CSU.

Regular weekly "Pakistan Seminars" were held at CSU during the first two years and through part of the third year of the project. The purpose of these seminars was to acquaint the participants with the research and development activities both in the U.S. and Pakistan.

Possibilities that are being considered for holding seminars and or/ short courses at PU in the future are in the following areas:

1. Systems analysis and its applications in engineering
2. Statistics in hydrology.

Activities in these fields are expected to be initiated at PU when the PU junior faculty working in these areas return to Peshawar.

Detailed information about each of these seminars workshops is given in Appendix E.

H. Senior Administrator Exchange:

The purpose of this program has been to enable the administrators of the participating institutions to have a periodic exchange of views about the administrative policies of their respective institutions. Since the main objective of the project is that of developing an on-going relationship between PU and CSU, it was considered important that administrators of the two institutions have a better understanding of the academic and fiscal policies of the other institution. In particular, the intention was to allow the PU administrators to acquaint themselves with CSU's vast experience and knowledge of planning and administration of research programs.

Under this program, Professor Ismail Sethi, Vice Chancellor UP visited CSU in June 1976 and July 1978. Dr. A.R. Chamberlain, President CSU, visited UP in September 1976. The activities of the Vice Chancellor and the President during their respective visits are described in detail in Appendix F.

Mr. Yousaf Ali Khan, Deputy Registrar, UP has recently visited CSU under the same program. He held discussions with the President, Vice Presidents, the Foreign Students Advisor and some other officials of CSU. Details of his discussions and other activities at CSU are described in a separate report which he has written, Appendix G.

As stated above, the senior administrator exchange Program is important for an on-going relationship between PU and CSU and is expected to be continued into the future.

I. Instrumentation Center:

The need for a well equipped and properly maintained instrumentation center can hardly be over emphasized because of the role it must play in boosting the educational standard and developing the research potential at PU through the joint cooperative activities between CSU and UP. Whereas the various other activities of the project such as the junior faculty exchange program and the cooperative research program

were formulated such that their operation will eventually help develop instruments, equipment and other miscellaneous research facilities at PU, the planning and development of an instrumentation center at PU was identified as a specific major activity of the institutional development project because of its immense importance.

Considerable progress has been achieved in planning for the instrumentation center at University of Peshawar. Mr. Robert Vandenberg, Director of the Instrumentation Center at CSU, visited UP in January 1976 to study the situation with regard to the facilities presently available to repair and maintain the various kinds of scientific and engineering equipment -- including both the instruments and personnel.

In his visit, Mr. Vandenberg studied the foregoing situation for most of the facilities available at the University of Peshawar, including all the engineering departments, all post graduate science departments and the affiliated professional colleges and the research institutes. On the basis of his personal observations and the discussions with the concerned laboratory staff, faculty and administrative staff of the University of Peshawar, he prepared a detailed report -- which describes his activities, status of the various existing instrumentation facilities, needs, and plans for developing an instrumentation center at Peshawar and other general recommendations, see Appendix H.

Following the recommendations of Mr. Vandenberg, efforts are underway to implement the plans and it is hoped that the necessary financial assistance -- already requested to provide funds for developing facilities and purchasing instruments -- and with the completion of the necessary training of personnel to operate it, a well equipped and properly maintained center will be made available to serve the maintenance and repair needs of the engineering and scientific equipment on the university campus.

A summary of the Proposal to the U.N. for financial support is given in Appendix I.

J. National Advisory Board:

1. The main objective proposed to be accomplished by setting up NAB was to have advise from leading administrators, planners and engineers of Pakistan on development of UP - CSU programs in a manner beneficial to the needs of the country.
2. The function of NAB were:
 - a. To suggest new areas of expansion of engineering education at UP.
 - b. To suggest and participate in the research and development activities in the Faculty of Engineering.
 - c. To advise and assist in obtaining funds for activities envisaged in the UP- CSU program with with a view to continue and enhance the activities.
 - d. To suggest topics for holding Seminars/workshops.
3. The proceedings of the meeting of NAB is given in Appendix

K(A)

DOLLAR EXPENDITURES

<u>Subsistance:</u>	<u>75-76</u>	<u>76-77</u>	<u>77-78</u>
UP Graduate student	\$ 18,150.00	22,634.10	6,574.99
CSU Graduate student	400.00	400.00	900.00
UP Visiting Faculty	3,000.00	500.00	2,400.00
 <u>Salaries:</u>			
CSU Consultants	1,886.00	9,914.30	
CSU Co-Director	6,137.39	9,914.36	
CSU Research Assistant	2,800.00	4,000.00	1,100.00
 <u>Domestic Travel:</u>			
	1,133.22	795.00	1,289.28
 Local Expenses	 15,991.65	 14,212.98	 4,380.29
 Total	 \$ 49,999.00	 52,906.44	 17,094.56

K(B). Rupee Expenditure (Ending 31.8.78)

	<u>75-76</u>	<u>76-77</u>	<u>77-78</u>
A. <u>Subsistence:</u>			
CSU Co-Director	1440.00	1350.00	-
Short-term Consultant	810.00	-	-
CSU Technician	1260.00	-	-
CSU Grad: Students	3712.09	2258.87	15,000.00
CSU Administrator	360.00	540.00	-
Conferences/Seminars	-	-	3,600.00
B. <u>Travel:</u>			
UP Senior Faculty	16276.00	-	46,000.00
UP Grad: Students	82930.00	63150.00	23,000.00
CSU Grad: Students	9680.00	7020.00	23,000.00
Senior Administrators	19359.00	36484.00	-
Co-Directors	38955.40	43991.00	46,000.00
Short-Term Consultant	19359.00	-	46,000.00
CSU Technician	31741.50	2228.00	-
Seminar & Conferences	-	-	69,000.00
Domestic Travel	10372.75	13675.50	23209.58
C. <u>Miscellaneous:</u>			
Instruments & Equip:	-	100.00	45,682.00
UP Library	-	6433.80	54,856.59
Seminar & Conference	1581.25	635.50	17,715.80
In-Service Study	-	-	192.00
Cooperative Research	1700.00	23057.75	40,650.00
Teaching Aids	-	-	17,370.00
UP Co-Director	4937.50	5000.00	5,000.00
Local Expenses	6753.76	19197.63	12,586.00
D. <u>Carried over Expenses</u>			
Teaching Aid & Cooperative Research	-	60800.00	-
Travel & Books	-	-	43042.90
Total Expenditure:	251228.25	285922.05	531904.60
Total Grant for three years ...		Rs. 11,88,000.00	
Total Expenditure for three years		Rs. 10,69,054.90	
Committed amount		Rs. 1,18,945.10	

J(C) Expenditure by CSU
(in US dollars)

	<u>1975-76</u>	<u>1976-77</u>	<u>1977-78</u>
1. GRA tuition Waivers	\$ 12,070	29,400	6,000
2. Indirect costs	\$ 21,590	45,900	28,000
3. Salary CSU Co-Director	-	3,500	18,000
4. Miscellaneous	-	-	10,000
Total	\$ 33,660	78,800	62,000

J(D) Contribution of the University of Peshawar:

	<u>1975-76</u>	<u>1976-77</u>	<u>1977-78</u>
1. Salaries to the participants.	Rs. 1,66,800	2,20,000	90,000.00
2. Logistic Support, University services etc.	Rs. 1,14,200	1,30,000	65,000.00
Total	Rs. 2,80,000	3,50,000	1,55,000.00

II. ANALYSIS AND EVALUATION

Whether a project, program, or activity has been successful, or the degree to which it has been successful, must be determined by assessing the extent to which the goals and objectives have been achieved. For this reason, the following assessment is built around first a statement of the goals and objectives. Then an analysis and evaluation of each component of the project is made as an assessment of the extent to which the initial goals and objectives have been achieved.

Goals and Objectives:

Various goals have been stated for this project which can be summarized as the following:

1. To help in building the Faculty of Engineering at the the University of Peshawar into a Centre of Excellence in education, research, and service for the NWFP in particular , but also for all of Pakistan and the world.
2. To help in establishing an immediate and permanent relationship between the Faculty of Engineering at UP and the College of engineering at CSU which will help each to grow and become more effective in accomplishing its assigned responsibilities.

These long range goals were translated into broad objectives, which are really means to the ends described as goals. The objectives are as follows:

1. To initiate Masters and Doctoral programs as soon as possible.
2. To establish extensive research projects, programs, and activities which will have ^{the} very practical purpose of helping to solve immediate and urgent problems of the NWFP in particular and Pakistan in general.
3. To strengthen the capability of ^{the} Faculty of Engineering to work in cooperation, and as a co-equal, with other universities throughout the world.
4. To strengthen the undergraduate program so as to produce better B.Sc engineers for Pakistan.

To achieve these broad objectives, it is necessary to set up more immediate and more specific objectives and activities by providing or developing the following:

- A. An Exchange of Faculty.
- B. Short Term Consultants.
- C. Exchange of Library Materials
- D. A Graduate Student Exchange Program
- E. In-Service Study Program
- F. Cooperative Research Programs
- G. Seminars, Workshops, and Conferences
- H. Senior Staff/Administrators Exchange
- I. An Instrumentation Center and Equipment & Instruments.
- J. A National Advisory Board.

Each of these specific objectives and activities is now analysed and evaluated in light of the broad goals and objectives.

A. Faculty Exchange: During the 39 months of this project, a total of 4 faculty members from UP have visited CSU and other parts of the USA and Canada for periods of time ranging from 25 days to three months. From the view-point of the goals and objectives, these visits have been successful -- some more than others. The first objectives of getting acquainted with CSU and the semester system were achieved in each case.

However, due to the indefinite dates of arriving (in part because of the delayed government approvals) and/or the short time of stay, it was not possible to make arrangements for a specific teaching assignment. Also, three of the four came during the summer term when the number of courses was very limited. Each did get acquainted with research in progress with CSU Professors. Therefore, a first step has been taken in establishing an on-going relationship between faculty members at UP and CSU.

Although more than 50 % of this objective was achieved, any future visits should be planned in greater detail in advance, both at UP and at CSU, in order to bring the accomplishments to a higher percentage of realization.

B. Short Term Consultants:

One of the more disappointing aspects of this project has been the inability of CSU to arrange for top members of its staff to spend adequate time at PU to gain a full knowledge and understanding of the situation at the UP and to

develop opinions of what must be done in order for PU to achieve its goals and objectives. Great stress and effort was placed upon obtaining the most successful of the more senior faculty members for periods of 2 to 4 weeks but after numerous delays, and loss of time these attempts were unsuccessful. As a consequence, the 4 who did go to PU were attracted by a seminar/workshop for one week and were able to put in only limited time and effort getting acquainted with PU in depth and analysing the situation in order to make recommendations for change and for cooperative research.

As a whole, this component of the project is regarded as about 30 % successful in achieving the desired objectives. A large part of the problem, however, is the short 3-year period of the project. This effort should be continued in the future in order to get traveling CSU staff to stop off for a few days, and faculty on sabbatical leave to spend more extended periods of time. The cooperative research program can also do much to bring such people to PU.

A highly successful part of the short term consultant program was the visit of Robert Vandenberg who studied the need and possibility for an Instrumentation Center during a period of one week and wrote a comprehensive report which has proven to be perceptive and useful.

C. Library Exchange:

A significant number of publications has been sent to the UP library as a part of this project. These have included both donated publications and publications purchased with project and UP funds. Initial steps have been taken to catalog these publications and to make them conveniently available to both faculty and students in a controlled manner so they will not become lost. However, it is imperative that even greater progress be made in the future to insure both convenient use and safe keeping of the publications.

This part of the library exchange program has been about 70 % successful.

During the three years of the project, however, no publications have been received by CSU from the UP.

The library exchange activity is an important one and should be stressed very heavily in the future.

D. Graduate Student Exchange:

One of the most successful activities of this project has been the exchange of graduate students. A total of 11 junior faculty from the UP have gone to CSU for up to 3 years to work on advanced degrees, and to establish contacts and ongoing relationships with CSU faculty. (Generally, these junior faculty have been of high quality, although each of those who already had a masters degree and were attempting a

Ph.D were unsuccessful and settled for a second masters degree

A twelfth graduate student came at the beginning of the project under a GOP scholarship. He has completed both a masters and Ph.D. and will be returning to the UP soon.

Those graduate students who completed their course work and returned to UP to do their research for a thesis, as originally intended, have been making progress. Two have completed their research and one has already received his degree. The others will no doubt receive their degrees during the coming year. There are 6 of the graduate students who received a masters degree under a Plan B arrangement which requires additional course work in lieu of research and a thesis.

A total of 8 of the junior faculty have returned to UP, one is doing his research in Kuwait, one is staying in the U.S. and one is staying on for a Ph.D under a CSU assistantship. This is considered a successful program thus far -- at least 90 % successful.

The next step is for those junior faculty to initiate the programs at UP which are necessary for upgrading:

- a. The undergraduate curriculum
- b. The other faculty members through in-service training programs.
- c. The quality and quantity of research projects and pr
- d. The service activities for the NWFP in particular and Pakistan in general.

Thus far very little has been taken on these

Thus far very little action has been taken on these steps, but more time must be allowed before making a judgement.

Another important part of the graduate student exchange program is the US students who have gone to the UP to do their masters thesis research. There have been 2 such students -- both of whom are older and more mature than most U.S. masters students. Each has completed his research on a topic of importance to socio-economic development of the NWFP. One has obtained his masters and has returned to Pakistan under another development project to do field work on the subject of on-farm water management. Both his selection for the job and his success on the job can be attributed in large part to his experience at the UP. The other US graduate student will complete his thesis and receive his masters degree during the coming year. He also has decided to work abroad on socio-economic development of other countries.

This part of the program is at least 90 % successful in obtaining the initial objectives.

E. In-Service Study:

This activity has not been as successful as initially expected -- in part because more was expected than was realistic. There has been very little incentive for either the initiation of in-service study programs or participation in them. The basic pattern of operation at the UP is for

each faculty member to go home at 2 pm and he is rewarded not for in-service study but for:

1. Time years on the job
2. Papers written (not necessarily in refereed journals)
3. Advanced degrees obtained
4. His influence with the administrators.

If a junior staff member seems to be too eager, he is some times chided by his less energetic colleagues.

Although there is a sprinkling of UP faculty who would be willing to help organize in-service study, or to participate, there is not a "critical mass" which would be self generating, and there is no one who is willing or able to play a leadership role.

This activity must be rated about 10 % successful. However, the idea should not be abandoned, but rather a search should be continued to find ways and means to make it attractive.

F. Cooperative Research:

This activity has been moderately (say 70 %) successful that is, successful enough to demonstrate that it is a good idea and should be pursued vigorously in the future. Although a number of contracts have been made by UP senior faculty towards cooperative research, these faculty do not have an adequate record of research to be highly successful in developing cooperative research. It is now evident that the

cooperative research programs will develop in the future mainly through the junior faculty who have made contacts with CSU faculty while students at CSU. Each of the junior faculty who are doing their thesis research at UP have established contacts and have developed a research momentum which can be useful for continuing cooperative research in the future. Great effort must be put forth to fully develop this activity, and the Research Director of the Faculty of Engineering can do much to help. Further more, ways must be found to provide incentives and rewards for faculty to initiate and continue research activities.

An important step is to realize that adequate funding for research can never come from the general budget of the UP, but must be found from outside sources. This requires the writing of sound and attractive research proposals and the location and convincing of outside funding agencies. It also requires that high quality research be conducted and completed on time to maintain the interest of the funding sources. All this requires great effort on the part of the Director of Research as a leader of the faculty.

G. Seminar, Workshops, and Conferences:

This activity has been at least 95 % successful. The only improvements needed are the number of such activities and the advanced publicity and geographical breadth of the participants. These have been an important factor in publicising UP and establishing it as a well-known university, as well as *raised status* bringing together both information and people on an important

engineering subject. These have been supported entirely by outside funding and should be continued and expanded at UP in the future.

H. Senior Staff/Administrator Exchange:

This activity has also been at least 95 % successful in helping both UP and CSU administrators to understand the problems, plans, and activities of each institution. This should be continued in the future.

I. Equipment and Instruments:

A few instruments and equipment items have been obtained through the project, and more are in the process of being obtained, see Appendix H. However, really significant amounts can and will be obtained only through the outside funding of research projects and programs. This should be stressed very heavily in the future.

The most significant outgrowth of this immediate objective has been the development of plans and a proposal for an Instrumentation^C center. Although this began with a very high degree of success, including the visit and report of Vandenberg, the subsequent proposal to the UNDP (who have stated they are interested and urged that the proposal be submitted to them) has become bogged down in government red-tape and the most valiant efforts of the UP administrators have been unable to jar it loose and get it to the UNDP.

So far as the UP and CSU are concerned, this activity has been about 90% successful.

J. National Advisory Board:

This activity has been only partially successful, and meetings of the group should probably not be attempted again until greater knowledge and skill has been acquired on:

1. The selection of Board members
2. Preliminary correspondence and discussions with the Board members prior to a meeting.
3. The establishment of an agenda for a meeting.
4. The conduct of the meeting.
5. The recognition, development, and implementation of the results of the meeting.

Nevertheless, this basic idea remains a good one for several reasons and should be pursued further in the future when the time and circumstances are right.

III. SUMMARY AND RECOMMENDATIONS

In summary, this project can be considered successful by any standards -- say 70 % successful in moving towards attainment at the original goals and objectives. The total impact of the 39 month activity cannot be fully assessed at this point in time. However, based on past experience, it is highly likely that the following factors will have a significant influence on the achievement of the goals and objectives:

1. The further education at CSU of 10 junior faculty who are taking back to PU new information and skills, and an enthusiasm for goals achievement.
2. The contact of visiting administrators, senior, faculty, and short term consultants who now have a better understanding and appreciation for the two universities.
3. The establishment of a few cooperative research projects which can grow into many additional such projects.
4. The establishment of graduate courses and masters programs at PU.

These factors are irreversible, and the only question is how rapidly they can and will expand into full bloom to make the Faculty of Engineering at PU truly a Center of Excellence.

It is people who determine the speed of development. People who are:

1. The faculty members
2. The administrators.
3. The government officials.

The faculty members will do the work and actually create the the Center of Excellence. But regardless of how eager the faculty may be to play their part, the enthusiasm and accomplishment cannot be sustained without full cooperation and support from the administrators and government officials, who must clear away the road block and hurdles so that the faculty can proceed "full steam ahead".

Important immediate steps that need to be taken by the administrators and government officials are the following:

1. Make the Faculty of Engineering a full fledged "Engineering University" so that it has much greater autonomy and does not have to be bound and hamstrung by regulations and policies which do not apply to an engineering educational institution.
2. Develop a reward system and structure which will encourage faculty to be creative and hard working, and to take initiative in moving toward the attainment of the goals and objectives. The present reward system tends to encourage mediocrity. Advancement in rank and increases in salary are only two components of an effective rewards system. Many others with little or no cost can also be included to help to encourage faculty and make happy with a feeling of accomplishment.

IV. FUTURE PLANS

It is important that gains achieved through the Institutional Grants Project are consummated, reinforced and continued on a permanent basis enabling the Faculty of Engineering, University of Peshawar to develop and maintain a high quality staff and to support research and development capabilities. This project is due to terminate September 30, 1978, and it will be most unfortunate if all the activities generated through the project cease and the institution is confronted with a loss of momentum in R & D activity due to the absence of support from Colorado State University and other U.S. inputs.

The Deputy Director, Education & Public Services U.S. Agency For International Development is convinced of the desirability to continue the activities of the Institutional Grants Project. is proposing a rupee Endowment - Grant for the college of Engineering, University of Peshawar. It is hoped that the proposal will receive the due consideration of the Government of Pakistan and will be agreed upon by all concerned agencies.

The future plans for continuing the momentum generated by this project are affected very much by the availability of of the endowment of rupees --- primarily with respect to the rate of progress. However, it is anticipated that the following pattern will be followed -- with or without the endowment.

A. Research Expansion:

Recognising that the funding for research must come from sources outside the UP budget, and recognising the need to have immediate practical application for the research results, it becomes important to have the research supported by mission oriented action organizations such as government agencies and industries. For these reasons, heavy emphasis

will be placed on seeking financial support, through the Director of Research, for both small scale and large scale research projects in every department of the Faculty of Engineering.

It is expected to continue to initiate cooperative research projects with CSU and with other research organizations.

Proposals will be submitted for funding to such organizations as:

1. NSF (National Science Foundation) USA.
2. ERDA (Energy Resources Development Agency) USA
3. AID (Agency for International Development) USA.
4. RCD Science Foundation.
5. Pakistan Science Foundation.
6. University Grants Commission
7. Pakistan Government (through PC-I Forms)

Each research project will need to be planned, organized, conducted, analysed and reported by one or more of the individual faculty members. This cannot be done by the Director of Research -- he can only facilitate in these steps and encourage the faculty member. This places a heavy responsibility on the faculty -- which requires a large number of extremely competent faculty members.

Each research project will include in its plan one or more graduate student theses. In this way the research activities will become and remain an integral part of the graduate program. Each project will also add to the equipment and instruments-- which will gradually build up the physical capability for research.

B. Graduate Programs:

One of the most important parts of the Faculty of Engineering development is the graduate program which will produce students with master degrees and ultimately with doctorates. This will help very much to provide the manpower required for the socio-economic development of the country.

The same faculty members who are especially skilled in research are also the ones who will be adding more and more graduate programs and the necessary courses for these programs. In the immediate future, graduate programs will be initiated in solar energy, water resources planning and management.

C. Faculty Development:

As a result of the cooperative program with CSU, there has been an increase in the number of faculty with masters degrees by 7, and another member will be returning with a Ph.D. This then makes a total of 14 masters and 4 doctorates on the faculty. With this nucleus, it is possible to initiate a sizable number of new courses and new research projects.

In order for the Faculty of Engineering to make the contribution for which it is responsible, however there must be many times this number of faculty with masters and doctoral degrees. To accomplish this, it will be necessary to have a continued stream of junior faculty going to other institutions in Pakistan and abroad. It is hoped to accomplish this through Pakistani government scholarships, assistantships, and the cooperative research programs with CSU and other universities.

There will also be a program of upgrading faculty through in-service study and exchange programs.

In order to provide the maximum incentive for faculty members to work hard on research and graduate programs, and on self improvement programs, special study is being given to a new and improved reward system. It is hoped to put this into operation during the coming year.

D. Seminars and Conferences:

It is anticipated that at least one conference or seminar/workshop will be conducted each year with the help of outside funding sources. Topics under consideration at the present time are:

1. Electrical Distribution Systems.
2. Production Engineering.
3. Potential Water Resources Development, in Pakistan
4. Communication Engineering.
5. Appropriate Technology.

Proceedings volumes will be prepared for each meeting where appropriate and made available to the profession.

E. Instrumentation Center:

Great stress will be placed in the immediate future on getting the UNDP funding for the Instrumentation Center. This is a follow-up action for the original proposal that was prepared and initially submitted 2 years ago.

In the mean time, instruments and supplies which are needed for the Center will be purchased and used on individual projects as they develop.

F. Computing Center:

To conduct the research and educational programs which the UP will be developing in the next few years, it is imperative that a major Computing Center be created and maintained. This Center will be needed for both teaching and research, and to provide a service facility for the entire NWFP. Plans will begin immediately to select a computer and ancillary equipment and then search for funding.

G. Library Exchange:

Stress will continue to be placed on finding books, journals, and other publications for completing the library collection at the Faculty of Engineering. At the same time the publications arranged for CSU will be sent.

H. Importance of the Endowment:

Due to the progress made during the past 3 years the momentum gained will not be lost. Instead, there must and will be a steady gain in momentum in the years ahead. This will be primarily through outside funding provided for research projects, seminars and conferences and service projects.

Although progress will continue to be made regardless of the Endowment income, the progress can be increased with the Endowment far out of proportion to the funds provided -- by carefully and judiciously using the money to attract much larger funds from other sources. The attached budget indicates how the Endowment income is proposed to be spent.

The travel expanses will be used to take research engineers and specialists to and from Pakistan to investigate new projects and programs. Likewise the funds spent for conferences etc etc, and for research initiation will be spent only if it is an urgent item and if it has a strong expectation that it will attract arger amounts of additional funds from outside sources. Some funding agencies require certain matching funds, in which case the Endowment income will be spent if necessary.

The equipment and instruments will be those which can be obtained in Pakistan with rupees.

The desk top computer are needed immediately for both undergraduate and graduate instruction as well as for research projects.

I. 1978-79 Proposed Endowment Budget:

(US dollar equivalent)

1. Travel Expenses	30,000
2. Conferences, ^S eminars & Workshops.	10,000
3. Research initiation	15,000
4. Library	5,000
5. Equipment & Instruments	25,000
6. Desk top Computers	<u>15,000</u>
Total.	100,000

APPENDIX A

PROFESSOR DR. M. ABDULIAH'S ACTIVITIES
AT CSU.

A. Purpose of Visit:

1. Participate in power engineering and high voltage engineering research program at CSU.
2. Deliver special lectures in high voltage engineering.
3. Attend power engineering courses at CSU and at University of Colorado, Boulders.
4. Attend and participate in Seminars.
5. Study the Instrumentation Center of CSU.

B. Activities at CSU.

- i) Visits:
- a) Electrical Engineering Laboratories.
 - b) Instrumentation Center.
 - c) Engineering Research Center.
 - d) Center for continuing Education.
 - e)
- ii) Meetings
- a) Dr. R. Chamberlain, President CSU.
 - b) Dr. Simons, Associate Dean, Research.
 - c) Dr. Baddwin, Dean Graduate School.
 - d) Dr. Ferry, Head., EE Deptt:
 - e) Dr. Churchill, Professor of EE Deptt:
 - f) Dr. Lord, Associate Professor, EE Deptt.
- iii) Other Places
Visited:
- a) Flatiron Hydroplant, Loveland.
 - b) Nuclear power plant, Fort St. Varain.
 - c) Hewlett-Packard, Instrumentation Division, Loveland.
 - d) Bureau of Reclamation; Engg & Research Center, Denver.
 - e) National Bureau of Standards, Boulder.
 - f) University of Colorado, Boulders.
 - g) University of Missouri, Columbia.
 - h) University of Missouri, Rolla.
 - i) Iowa State University, De Moines.
 - j) Massachusetts Institute of Technology.
 - k) Electric Power Research Institute, Palo Alto, Calif.
 - l) System Control Incorporation; Palo Alto, California.
 - m) Stanford Research Institute, Menlo Park, California.
 - n) University of California, Burkely.
 - o) East West Resource System Institute, Hawaii.

iv) Meetings:

- a) M/S Philip Winter, Steve Bonnist, and Peter Fraenkel -- I.T.D.G. London.
- b) Dr. Riggs -- USAID Washington DC.
- c) Mr. L.E. Evans -- ^Deputy Co-Ordinator for Administration, International Program Division, National Rural Electric Cooperative Association, Washington, DC.
- d) M/S Rudman, Frank Young, Palo Alto.
- e) M/S Lazlo Hadju and Alexander Levis -- Systems Control, Palo Alto.
- f) Dr. O.J. Smith, University of California, Burkely.
- g) M/S Hightower and Voelker -- Bureau of Reclamation Denver.
- h) Dr. Boynes -- N.B.S. Boulder.
- i) Drs Barnes, Fuller, Hanna and Whitelead University of Colorado, Boulder.
- j) Drs. Todur, Walker & Hoft, -- University of Missouri, Columbia.
- k) Dr. Beten, Moring & Meaphirson, University of Missouri, Rolla.

v) Objectives Achieved:

The main accomplishment are summarized below:

1. Studied teaching and research programs in Elect power engineering at CSU and at few selected US Universities.
2. Observed the working of Instrumentation Center at CSU.
3. Identified Research Projects in Electrical Engg: to be conducted jointly by faculties at CSU & UP.
4. Studied research activities in Electrical Power Engineering at research institutions in USA and Japan.
5. Sought Willingness of US Professors in offering short courses/seminars at UP.
6. Established contacts with several individuals and institutions engaged in research and education in electrical power engineering.
7. Collected laboratory reports and research reports from a number of institutions.

IQBAL SHAH ACTIVITIES AT CSU

Delivered Lectures:

1. On various alternative energy sources for countries like Pakistan (e.g. bio-gas, solar, small hydro).
2. On bio-conversion systems (bio-gas) research in Pakistan.
3. For Pakistan Seminar series on "Men, Money, And Machines Move a Mountain" (Tarbella its different construction stages and problems).

Studied:

1. The Semester system at CSU
2. Policies of various departments regarding graduate studies.
3. Engineering research activities at CSU, and methods of research coordination with various departments and CSU Administration.
4. The Computer facilities at CSU.
5. The American way of life and American culture.
6. The Workshop facilities at the CSU Engineering Research enter.

Participated in:

1. In various departmental seminars (e.g. Solar Energy Seminars).
2. In ASEE annual convention at Knoxville, Tennessee, June 14 to 17 1976. Paper presented on "Practical Projects as Part of Undergraduate Courses".
3. In International Solar Energy Society, US Section meeting at Winnipeg, Manitoba, Canada, August 1976.
4. In Peshawar Staff Meetings at CSU.
5. Led the preparation of 6 projects proposals and submitted them to funding agencies in Washington DC.

Observed:

1. Preliminary examination for MS students at CSU.
2. Engineering Department heads meetings at CSU.
- 3.

Discussions:

1. Held discussions with various department heads and Engineering Dean on various topics of interest to UP & CSU.
2. Met President Chamberlain.

PROFESSOR S.A.H. RIZVI ACTIVITIES
AT CSU.

A. Purpose of Visit:

Participation in a program of activities in the Institutional Development Program as a Senior Faculty Member, and foster closer relationships with the country part in related field of study, as detailed in B.

B. Activities at CSU.

Observed various research activities in progress in several departments of engineering, statistics and Humanities, and Research Centers at CSU. A Project on Techniques, Policies and Procedures for evaluation of Research Projects was studied in great detail. This wonderful work (part of a doctoral Thesis) was analysed through several questionnaires, and it provided a vision into a statistical manner of assessment of an on-going project. Spent several hours in discussion with the Dean, various faculty Members, Heads of Deptt and Research students regarding teaching policies & techniques, including the Video Tape scheme of Lectures which are currently supplied to various Countries. Some deptts. at CSU were more developed than others and our discussions pinpointed regions where the Peshawar University Faculty could mostly benefit. The mode of teaching, scrutiny and examination was also compared and discussed and these discussions helped in managing the Semester system at Peshawar and also encouraged to hold departmental meetings and Seminars my experience in class rooms (where the teacher were kind to allow me) was exhilarating.

1. Visits: On the Campus and in Fort Collins my visits were limited to Research Centers (Computer, Solar House wind Tunnel, Engg research center medical research center Instrument Center and atmospheric Laboratories. On my own, I also visited GOLDEN (famous for the Mining school) I also visited the Library, Students Center and various Administration Units.
2. Meetings: Attended the group meetings, the faculty to introduce Senior Faculty Peshawar to CSU Faculty members.
3. Seminars: The Friday noon Seminar under EI was novel idea, and some of the lectures were inspiring (The enjoys were on:
 - i) Cardiac Rehabilitation,
 - ii) Geothermal Energy.
 - iii) Water
 - iv) Pollution Controls.

I also attended (almost regularly) the Wednesday afternoon Seminars where I met CSU Faculty who had stayed in Pakistan for years. The Lectures here were more of a general nature, and covered mostly the area of International Agroculyural develop- ment, One very pertinent lecture that was extremely informed, was on field methods and problems in Water course surveys in Pakistan. I also attended departmental Seminars in Satis Statistics and Mechanical Engineering.

Lectures Delivered:

The following lectures were delivered at CSU:

- i) Muslim Food Laws (College of Home Economics)
- ii) Rumi's Concept of Gongemity (Deptt of Philossphy)
- iii) Ideal fluid flow (Deptt of civil Engg)
- iv) Mechanics upto ARCHIMEDES (" ")
- v) Muslim Contributions to the Deptt of History.
- vi) Development of Science.
- vii) Pakistan as seen one Thousands years ago.
- viii) The common Philosophical. Threads in Rumi, Iqbal & Geothe (Pak seminar).

Lectures Seminars Attended:

and Courses atteded:

My most thrilling experience was a full 10 week lecture course on Stockaetic Calculus and its Aoplications on Physics and Engineering Problems: Even to barely keep in track a lot of areas had to be covered as the subject is fairly modern. The toughness of the subject could be guaged by the mere fact that the emolment of 20 reduced to three at later stages. Another interesting Course of lectures that I attended was on 'Alternate Source of Energy'.

Other Places Attended: As mentioned in the Gneral note above my activities were restricted to Fort Collins (with the exception of Golden) The lectures I had to deliver and the course of lectures I had taken (and to my own benefit) left me little time for any other activity.

1. Meetings (deptt as mentioned earlier)
2. Conferences: Read a Paper on "Muslim Scientific Though and Contribution from entral Asia" at INDIANAPOLIS under the aspices of the Society for Muslim Scientists and engineers of Northern America.

APPENDIX B

LIST OF SUBJECTS AND RESEARCH TOPICS
FOR UP JUNIOR FACULTY

Adam Khan Mohmand joined CSU in September 1975 as a graduate student. He has finished his course work detailed below and will receive his M.S. in Statistics this year. He is still in Colorado working on his graduate research work.

<u>Subjects Studied.</u>	<u>Credits.</u>
ST. 401	4
ST. 520	5
ST. 432	3
ST. 460	3
ST. 521	3
ST. 570	2
CS. 403	3
M. 517	3
M. 518	3
ST. 605	3
ST. 631	5
ST. 632	5
ST. 531	2
ST. 586	2
ST. 525	3
ST. 699	8
ST. 792	6
ST. 795	4

Total 67.

Ahmad Murtaza joined CSU in January 1975 and completed the following course work requirements for Master Degree. He is presently on his graduate research work in Peshawar Pakistan and is expected to finish soon.

<u>Subjects</u> <u>Studied:</u>	<u>Credits:</u>
CE. 695HV	3
ME. 431	2
ME. 463	2
ME. 467	3
ME. 692	1
ME. 699 HV	2
ME. 468	3
ME. 531	3
CE. 676	3
CE. 496	3
ME. 692	1
ME. 699HV	4
CE. 699CV	2

Syed Faruq Ahmed joined CSU in January 1975 and after completing the following course work requirements at CSU he left for Kuwait where he is presently involved in Solar Energy Applications Research leading towards his graduate research requirement.

<u>Subjects Studied:</u>	<u>Credits:</u>
ME. 467	3
CE. 695GX	2
CE. 695HV	3
ME. 463	2
ME. 692	1
ME. 799	1
ME. 610	3
CE. 696GX	3
ME.HV695	3
ME 692	1

Mussarat Shah came to CSU in January 1975 and after completing the following course work requirement he started working on the graduate research work in Peshawar. He received his Master degree in Civil Engineering after finishing his research work successfully in Pakistani environment.

<u>Subjects Studied.</u>	<u>Credits.</u>
CE. 422	3
CE. 514	2
CE. 544	3
CE. 545	2
CE. 613	2
CE. 615	3
CE 695HV	1
CE. 716	3
AE. 534	3
ST. 301	3
CE. 699H	5

Mahmood K. Qazi joined CSU in Spring Semester 1976 and registered for the following subjects and credits noted against each subject for his Advanced Degree of Master of Science (Civil Engineering) Having completed his course work requirements at CSU he presently working on the graduate research work in Peshawar University, Pakistan.

<u>Subjects Studied.</u>	<u>Credits.</u>
CE. 568	3
CE. 550	3
CE. 496	3
CS. 403	3
M. 531	3
CE. 551	2
CE. 666	3
CE. 699F	3

Thesis: Low Cost Housing (Sandwich Construction)

Sahib Din joined CSU in Spring 1976 and registered for the following subjects and credits noted against each subject for his Ph. D. degree in Civil Engineering. However, he could only earn a Master Degree and dropped the idea of completing Ph.D. program.

<u>Subjects</u> <u>Studied.</u>	<u>Credits:</u>
CE. 550	3
CE. 568	3
CE. 753	3
M. 531	3
M. 532	3
CE. 666	3
CE. 560	3
CE. 751	3
CE. 667	3
CE. 766	3
CE. 563	3
CE. 261	3
CE. 536	3
CE. 562	3
CE. 570	4

Arshad Aziz came to CSU in July 1976. He took the following subjects and credits noted against each subject to complete his advanced degree in Agricultural Engineering:

<u>Subjects Studied:</u>	<u>Credits:</u>
M. 340	2
AE. 530	3
AE. 531	2
AE. 793	1
M. 531	3
AE. 532	3
ME. 410	2
CE. 714	3
M. 532	3
AE. 795A	2
AE. 538	4
EG. 410	2
CE. 712	2
CE 403	3
CE. 615	3
CE. 631	3
AE. 733	3

Jani-Alam Abbasi joined CSU in July 1976 and took the following subjects and credits. He earned Master Degree in Mechanical Engineering in Summer 1977.

<u>Subjects Studied.</u>	<u>Credits.</u>
BL. 400	3
EN. 620	3
EG. 410	2
ME. 409	2
ME. 692	1
ST. 309	2
CE. 438	4
CE. 574	2
CE. 714	3
ME. 410	2
ME. 412	2
ME. 610	3
ME. 692	1
CE. 695V	3
CE. 746	2
EG 510	3
ME. 495V	1
ST. 795V	3

Fazli Qayyum Yousafzai came to CSU in July 1976 and completed the following course work requirement at CSU. He received his Master Degree in Electrical Engineering in Summer 1977.

<u>Subjects Studied:</u>	<u>Credits:</u>
EE. 331	4
EE. 451	3
EE. 531	4
EE. 332	4
EE. 532	4
EE. 575	3
CE. 714	3
EE. 795	2
EE. 481	3
CS 403	3
EE. 795	1
EE. 795	4

Inamur Rahim joined CSU in Spring 1976 and completed the following course work requirement at CSU. He received his Master Degree in Electrical Engineering in Summer 1977.

<u>Subjects Studied.</u>	<u>Credits.</u>
EE. 621	3
EGE 505	2
EE. 451	3
EE. 795	2
EE. 531	3
ME. 519	3
CS. 403	3
M. 531	3
EE. 431	3
EE. 412	3
EE. 452	3
EE. 651	3

Inayat K. Bhatti went to CSU in Summer 1978 and joined a Special Study Course in Geotechnical. The course was designed by the Civil Engineering Department for 6 weeks. He completed his work and went back to Pakistan.

Course
Studied:

Credits:

CE 695	Geotechnical Engineering (Soil Mechanics, Rock Mechanics and Foundations Engineering).	6
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APPENDIX C

Abstract of Normal Illsley Thesis
on
DESIGN AND TESTING OF A HAND OPERATED MOWING MACHINE

Western harvesting methods are not applicable in many grain farms of North West Pakistan due to the small size and inaccessibility of many fields. These conditions are not unique to Pakistan, but are seen in most of the less developed countries.

A simple, hand powered mowing machine was proposed by Saran and Ojha as a solution to the problems of hand cutting grain crops. The present project was to design, fabricate, and test a machine similar to that proposed by Saran and Ojha. It was fabricated with materials available in Pakistan. Two distinctly different types of cutter bars were tested in the field.

The results of the field tests indicate that both styles of cutter bar will cut a crop, and that the machine is relatively easy to handle. However, a man cannot deliver enough sustained power to the machine for it to cut anything heavier than very light hay. It is therefore necessary that a machine developed for cutting grains in small fields be equipped with a small engine to operate the cutter bar alone, while the operator can supply the energy to move the machine.

APPENDIX D

RESEARCH INTEREST AT UP

The following projects are already underway and/or of interest at the University of Peshawar. The name of the Principal investigator is given with each project.

Department of Mechanical Engineering:

1. Production and utilization of biogas from organic Waste --- Iqbal H. Shah.
2. Utilization of biogas for water pumps -- Iqbal H. Shah.
3. Design and construction of hydraulic press for mass production of Solar Cookers, -- Mumayyuz Zia.
4. Design and construction of a biogas plant to run 40HP gas engine. -- Iqbal H. Shah.
5. Determination of optimum water/dung ratio for the production of biogas. -- Iqbal H. Shah.
6. Effects of temperature on the production of biogas. Iqbal H. Shah.
7. Vegetable dehydration in controlled environment using solar energy. -- Ahmad Murtaza.
8. The potential role of nuclear power in Pakistan and the prospects of setting a nuclear power plant in North Western Frontier Province. -- Dr. Jamal Khan.
9. Design and construction of simple Low Cost Wind Mill for Pakistan. -- Ahmad Murtaza and Abdul Hafeez.
10. Determination of present level of pollution, remedial measures, and projections for the future . Dr Jamal Khan.
11. Design and construction of a Propeller Driven Car. Dr. Jamal Khan.
12. Plan for Metallurgical control on production of hand made Guns in Darra Adam Khel, -- Abdul Hafeez.
13. Prediction of High Temperature by Inverse Heat Conduction Method.--- Dr. Jamal Khan.
14. Design of Compact Heat Exchangers . Dr. Jamal Khan.
15. Determination of Thermal Conductance of Metallic Contact Surfaces. -- Dr. Jamal Khan.
16. Dehydration of fruit by Solar Energy . Ahmad Murtaza.

Electrical Engineering Department:

1. Study and analysis of energy use in transport sector
Abdullah.
2. Study and analysis of energy use in agriculture and
food processing (Dr. M. Abdullah)
3. Energy conservation techniques (Dr. M. Abdullah)
4. Insulation requirements for transmission and distribution
lines under Pakistan environment (Dr. M. Abdullah).
5. Development of techniques for determining the energy
losses in power systems (Mr. Qaid)
6. Induced voltages around power lines (M. Qaid)
7. Development of cheap storage batteries (Dr. M. Abdullah)
8. Development of special educational machines and devices
(M. Abdullah)
- 9.

Civil Engineering Department:

1. Structural Sandwich pannels for Low cost housing (M.K.Qazi)
2. Low Cost Farm Structures (Qazi and Athaullah)
3. Rural Electrification through local Resources (Shah)
4. Low Cost, Low Head Turbines for Small Scale Power Generation
Shah).
5. Study and Design of Tube well Strainers (Athaullah)
6. Low Cost Precast Building Components (Qazi)
7. Control of dampness in buildings by Electro-oms (Qazi)
8. Study of Low Cost energy dissipation Hydraulic Structures
(Dr. Athaullah)
9. Investigations of Fiber Reinforced Concrete for Structural
Purposes (Qazi)
10. Study of the use of Fiber glass as suitable for steel
reinforcement in structural components (Qazi)

APPENDIX E

International Seminar & Workshop

On

"Low Cost Farm Structures"

An International Seminar on "Low Cost Farm Structures" was organised by the Faculty of Engineering, University of Peshawar in collaboration with Colorado State University and was held from February 27 to March 4, 1978. It was funded mainly by the National Science Foundation, Washington D.C. The countries represented in the Seminar include USA, Canada, Switzerland, United Kingdom, Jordan, India, Bangladesh, Thailand, Malaysia, Kenya, Iran and Pakistan. The delegates from all the four Provinces within Pakistan participated in deliberations of the seminar and contributed to the seminar's success. The Seminar provided an excellent opportunity for exchange of ideas on problems of Farm Structures in developing countries and more developed countries. The existing conditions of rural housing, grain storage, animal shelter, farm irrigation facilities, transportation of food products, farm mechanization etc need serious consideration and development.

The Seminar on "Low Cost Farm Structures" has brought in focus focus the problems of the developing countries as listed below:

1. Low Cost Farm Housing for rural developments.

PROGRAM
INTERNATIONAL SEMINAR & WORKSHOP
ON
LOW COST FARM STRUCTURES

Location: (i) Inauguration at Pakistan Forest Institute Hall.
(ii) All Technical Sessions at Khyber Inter-Continental Hotel, Peshawar.

Dates: 26th February - 5th March 1978.

SUNDAY 26th FEBRUARY:

1.00 - 8.00 pm. Registration.

MONDAY 27 FEBRUARY:

8.00 - 9.45 am. Opening Ceremony.

10.30 - 12.45 pm Plenary Session.

LOW COST FARM HOUSING FOR RURAL DEVELOPMENT

1. Kenneth Old,
Pakistan Technical School, Gujranwala.
2. S. Sibtal Hussain Shah,
Ali Mohammad,
Building Research Station, Lahore.
3. Dr. N. Athaullah,
Dean of Engineering, University of Peshawar.
4. Wajahat Hussain Mirza,
M.S. Qureshi,
Asghar Hussain Bukhari,
Engineering University, Lahore.
5. Brian Wolffe,
CARE Representative, Pakistan.
6. J. C. Newman,
USDA Clemson, South Carolina, USA.

Workshop: 2.00 - 5.00 pm.

TUESDAY 28 FEBRUARY:

8.00 - 12.00 Noon Plenary Session on:

LOW COST FARM CROP STORAGE AND ANIMAL HOUSING

1. Davis Dichter, Switzerland.
2. Ralph Hansen, CSU, USA.
3. M. Gulzar A. Qazi, Lahore.
4. Merle Esmay, CSU USA.

5. K. Mahmood,
Engineering University, Lahore.
6. Ahmad Mukhtar Khan,
7. Narendra Verma, Roorkee, India.
8. Abdul Quyyum.

Workshop: 2.00 - 5 pm.

WEDNESDAY 1 MARCH:

8.00 - 12.00 pm. Plenary Session on:

LOW COST STRUCTURES FOR ON FARM WATER SYSTEMS
FOR RURAL DEVELOPMENT.

1. Maurice L. Albertson & Rahim Kia,
CSU, USA.
2. Mohammad Munir,
M. S. Shafique,
Tom Trout,
CSU Project, Lahore.
3. Ghulam Sarwar Sheikh,
Khalid Pervez,
Faisalabad.
4. Dr. N. M. Awan,
Engineering University Lahore.

Workshop: 2.00 - 5.00 pm.

THURSDAY 2 MARCH:

Field ^Trip - Visit Farm Structures enroute Tarbella Dam.

FRIDAY 3 MARCH:

8.00 - 12.00 pm. Plenary Session on:

NEW TRENDS IN DESIGN AND INNOVATIVE TECHNIQUES
FOR RURAL DEVELOPMENT:

1. S. Sibtal Hussain Shah,
Ali Mohammad,
Building Research Station, Lahore.
2. Ronald L. Terrel, Washington University USA.
3. Iqbal Hussain Hamdani,
Irrigation Research Institute, Lahore.
4. Narendra Verma, Roorkee, India.

5. Javed Butt, University of Peshawar.
6. Said Quyyum, Government College, Nowshera.

2.25 - 6.00 pm Plenary Session on:

LOW COST FARM STRUCTURES FOR AGRICULTURAL INDUSTRY
AND RURAL DEVELOPMENT:

1. Abdul Shakoor Khan,
Amir Khan, IRRI/Pak, Rawalpindi.
2. Rafiq Ahmad,
Agricultural Engineering, Peshawar University.
3. Mohammad Saeed, Faculty of Agriculture UP.
3. Manohar Gill,
Bethlehem Technical Foundation, Rawalpindi.
4. Richard T. Shen,
University Sains, Malaysia.

SATURDAY 4 MARCH:

8.00 - 12.00 pm. Plenary Session on:

RESEARCH FOR LOW COST STRUCTURES AND RURAL DEVELOPMENT;

1. Marvin E. Criswell,
CSU, USA.
2. M. K. Qazi,
Faculty of Engineering University of Peshawar.
3. Prof. Iqbal H. Shah,
ESCAP Bangkok.
4. Dr. S. A. Hasan,
Karachi.

APPENDIX G

INSTRUMENTATION CENTER PROPOSAL TO UNDP

A proposal was submitted in 1977 to the Government of Pakistan for transmittal to the UNDP for funding to implement and operate the Instrumentation Center. This proposal has the following objectives and activities:

A. Development Objectives:

The project is not included in the Country Program for 1976-1980 but it is envisaged that the Government will give high priority to the Project in view of its importance for the development of the University and its rôle in the support of the applied research activities in the Province, and the assistance given by the University to the many and various scientific institutions for research and higher education and training situated in the Province.

The development objectives of the Project are:

1. To establish a link in a well balanced infrastructure of scientific services and facilities that will support and enhance the development of Science and technology.
2. To improve the ability of the University to undertake further development work in the field of applied research and to improve the quality of the Scientific services rendered to research and educational institutions.

1. Low Cost Farm Housing for rural development.
2. Low Cost Farm Crop Storage and Animal Housing.
3. Low Cost Structures for On Farm Water Systems.
4. New Trends in designs and Innovative Techniques for rural development.
5. Low Cost Farm Structures for agricultural Industry and rural development.
6. Research for Low Cost Structures.

The objectives for the Seminar were:

To disseminate some of the latest findings of research in the field of a rural structures.

To discuss the development of research projects and methodology of research appropriate to developing countries.

To gain familiarity with the latest techniques and materials used in rural structures and how to properly use them.

The learned speakers presented thirty two most valuable papers and discussions on each of the paper were very interesting and informative.

An exhibition of agricultural implements was arranged on the campus for the benefit and leisurely view of the participants. It attracted lot of interest by the local people.

A program of the seminar & Workshop is enclosed to give a broad picture about the contributors to the seminar.

B. Immediate Objectives:

1. To assist and cooperate with the University of Peshawar to establish facilities for maintenance, repair and calibration of Scientific, medical, educational and industrial instruments and laboratory equipment used in the Province.
2. To establish facilities for the design and fabrication of apparatus and instruments required for scientific research activities and faculty work;
3. To establish and equip workshop facilities for electrical and electronic instruments, fine mechanics, optics and scientific glassblowing.
4. To assist in the training of technical manpower required to meet the above objectives through on-the-job training and training abroad.

C. Special Consideration:

In its efforts to achieve national development the Government of Pakistan is laying great emphasis on regional development. The University of Peshawar, being the only institution of higher education in the field of science and Technology, will play an important role in the development and advancement of the region. Its co-ordinating role and scientific support to the various research institutions in the Province, as well as to industrial development, is realized and must be supported.

The proposed Instrumentation Center would contribute significantly to the development of the Province in the field of science and technology and specialized training.

D. Activities:

It is envisaged that the Project will span a wide spectrum of activities in the field of instrumentation and training of instrument technicians to meet the needs of the University and neighbouring scientific and research institutions.

The activities of the Project are broadly identified as follows:

- a. Prepare instruction manuals or sheets for the proper maintenance of scientific and laboratory equipment and instruments.
- b. Organized routine maintenance and calibration of laboratory equipment and instruments;
- c. Repair instruments and equipment for the University Government Research Institutions and private users of scientific, medical, educational and industrial instruments on a non-profit basis;
- d. Provide services for the design and fabrication of simple instruments and devices needed for laboratory equipment and research activities;
- e. Provide advice on the procurement and supply of scientific instruments and equipment;
- f. Organize annual short-term courses in instrument maintenance and repair for technicians of the University and other Government and private users of instruments.

APPENDIX -

PROCEEDINGS OF THE MEETING OF THE
NATIONAL ADVISORY BOARD

A meeting of the National Advisory Board (NAB) was held on Sunday, the 15th May 1977 at 10.00 a.m. in the office of the Dean Faculty of Engineering, University of Peshawar. The following attended the meeting.

1. Dr. H. Athaullah, Dean of Engineering ... (Chairman)
2. Mr. Shah Nawaz Khan, Secretary to Government of Pakistan, Ministry of Communication, Islamabad.
3. Mr. Ghulam Kibria, Chairman, Appropriate Technology Development Organization, Islamabad.
4. Mr. M. Izharul Haq, Chief, Fuel and Power, Planning Division, Government of Pakistan, Islamabad.
5. Dr. M. Abdullah, Chairman, Electrical Engineering Department.
6. Dr. Jamal Khan, Chairman, Mechanical Engg: Department.
7. Mr. I. H. Shah, Professor Mechanical Engineering
8. Mr. S. A. H. Rizvi, Director, Basic Sciences & Humanities.
9. Mr. Rafiq Ahmad, Chairman, Agricultural Engineering.
10. Mr. M. A. Rizvi, Chairman, Mining Engineering Deptt:

The Dean welcomed the members to the first meeting of the National Advisory Board and hoped that their deliberations will be of immense value to the faculty of engineering. He then summarized the purpose and activities of the institutional program between University of Peshawar and Colorado State University.

The members expressed satisfaction over the progress achieved under the program particularly on the student exchange. They hoped that with increase in number of qualified people activities in research and higher education will be accelerated. Mr. Shah Nawaz Khan was of the view that the existing staff position was too poor and he suggested that other sources such as British Council, R.C.D., Islamic Bank and other technical assistance programs

should be tapped for securing more scholarships for higher studies abroad. Mr. Shah Nawaz also suggested that WAPDA may be approached for research grants. He also promised to see if his Ministry had some funds for studies which can be assigned to the faculty of engineering.

On the subject of new areas in engineering education, Mr. Kibria suggested that the entire engineering education system should be re-organised to meet the local need so that the engineers can participate in nation building by using local talent and local material. He further stated that the faculty should organise training programs for low-level technicians.

Mr. Shah Nawaz Khan added that teachers should have a practical bias in their teaching. Mr. Kibria assured the faculty that his organisation would support financial^l appropriate research proposals if submitted to them.

Mr. Izharul Haq emphasised the need of expanding the engineering education to the people in the field. He mentioned that the expertise available here should benefit the engineers, working, in Government and private organizations. In particular, he mentioned that the faculty should offer short courses for older engineers so that their knowledge can be updated. He gave a few topics such as power system planning, static relays, e.h.u. power lines, peak-load power plants, which in his opinion would interest electrical power engineers. Mr. Haq also stressed the importance of building a good reference library which should introduce a loan - service facility to outsiders. He also promised to look into the possibilities of extending financial support to research projects.

In order to accelerate the pace of development of engineering education in this province, the members recommended that the faculty of engineering should be raised to an engineering university. This will bring this institution at par with other engineering institutions in the country.

In the end, the Dean thanked the members and hoped that they would continue their association with this institution.