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Institutional Excellence Project

Progress Report No 1

Submitted to

John Monagle

Project Manager

United States Agency for International Development
Islamabad

National Management Consultants (Pvt) Ltd.,



1.0 INTRODUCTION

USAID entrusted National Management Consultants the task of providing assistance in; reviewing the completed university and institutional assessments of research capabilities, assessment of selected university and institutions, examining research capabilities, strengths, constraints, and opportunities with respect to potential cooperation with industry, analyzing major faculty research strengths and faculty attitudes examining potential research interaction or linkages with industries. Surveying industries (small and large) in the same technological areas as the assessed universities, analyzing which industries might benefit from applied research conducted by the selected universities, assisting in the identification of specific problems within a selected industry which the industrial leader/manager desires to have the university help assist or remedy, facilitating discussions between industry managers and selected university researchers and assist in the writing of proposals describing the university/industry interaction of applied research, including personnel, schedule, costs, expected results, monitoring process, and technology transfer process. Conducting study on university-industry relationships and to propose measures on strengthening the mechanism of this relationship so as to bring about a technological improvement.

The methodology adopted was to do survey and review the assessments already conducted of all selected universities and centers of excellence located in different areas of Pakistan, where these industry-university relationship can be developed and flourish. The most promising areas, and strengths have been identified which can be utilized by the commercial sector to boost the industrial productivity and efficiency. A number of visits were conducted which bore very fruitful results. A brief description of the progress made during first month is as follows.

2.0 Center of Excellence in Geology

UNIVERSITY OF PESHAWAR

Centre of Excellence in Geology, Peshawar (NCEG) was established in 1974. It was established in the same premises as of Geology Department of the Peshawar University, where it still functions but has been growing steadily in terms of enrollment of students and increase in the members of the faculty. The faculty has developed many international linkages with research centers of Europe and US, Canada and are actively involved in research mostly of Pakistan's geological resources and developments. The department is working in active collaboration with different universities, but has not worked with any industry on any applied research, other than providing some laboratory testing services. It has great potential to provide assistance to industries and related government organizations which are being tapped through this IEP project. The center was visited by Dr John Monagle, Hamid Hasan couple of times and assessment of its research potential and area of interest was carried out. Visits were also arranged for interested industrial personnel to discuss possibilities of collaborative applied research. The following participated in the meeting; Dr. Qasim Jan, S. Hameed Ullah, Dr. Saifullah Tanauli, Mohammad Asif Khan, Dr John Monagle, and Hamid Hasan Khan.

Also visits were arranged with different industries for the faculty members, who comprised of Dr. Qasim Jan and S. Hamid ullah. They met Mr. Tahir Jamal of Khawaja Glass Industries at Hasanabdal, Mr. A. H. Gardezi Assistant General Manager Pakistan Oil Fields Limited, and Mr Arif Kamal of Oil and Gas Development Corporation, Islamabad.



The capabilities of Centre of Excellence in Geology, Peshawar are in the area of conducting geological surveys, identification of different industrial raw materials from minerals and in carrying out geological investigations. In these broad areas the research topics that were discussed and finalized includes one for carrying out sedimentological studies in Hydrocarbon bearing strata of Kohat region for oil and gas development corporation and assistance to glass industry in identification of silica sand sources and also critical analysis for inclusion in finished glass sheets, with some suggestion and recommendations for the methods of quality control.

The proposal for the glass industry was finalized in consultation with Dr. John Monagle and Qasim Jan, in which Mr. Tahir Jamal from Khawaja Glass Industry also participated. Similarly proposal with Oil & Gas Development Corporation has been also finalized in consultation with Dr Qasim Jan, Dr. John Monagle which has been accepted by Mr Arif Kamal of OGDG. These proposals also include budgets for each research work along with the contribution / participation of the industrial partner.

The Centre of Excellence in Geology is well equipped and the faculty member, specifically their Director Dr Qasim Jan is very keen to work on the applied research and is desirous of having linkages with industries, making this center particularly suitable for the IEP project. The equipment in their laboratories is well maintained and staff is well trained on these. The only deficiency noticed was the power supplies for these equipment, as these require uninterrupted power supply for carrying out major analysis. The proposal received therefore seeks these UPS. The Center is also maintaining excellent linkages with international focal points and has an access to all major research institution in and out of Pakistan.

3.0 **Biology Department**

QUAID-I-AZAM UNIVERSITY, ISLAMABAD

This department was also visited, which is located in the campus of Quaid-i-Azam university. It is one of the youngest departments of the university established in 1972 but at the same time has achieved the capability to provide teaching and research facilities in a number of contemporary disciplines. Comparatively young it has a lot to offer in a number of contemporary disciplines of Biology. The graduates from this department, besides being absorbed in the teaching profession are employed by various research organizations.

Dr. John Monagle, Dr. M. A. Kazi and Mr. Hamid Hasan Khan visited the Department of Bio-Science of Quaid-i-Azam University and met with Dr. Hafeez the chairman of the Department and faculty members among whom were Dr. Zafaryab Khan, Dr. S.A. Malik and Dr. Hameed. The areas where this department has developed considerable expertise are; bio-technology and science of fermentation process. Quite a few possibilities were discussed, which subsequently converged into three major research topics, which are;

1. Bating enzymes for tannery Industries.
2. Bio-insecticides
3. use of organic waste from food/beverage industries to generate Bio-Gas or other useful products.

In these areas two draft research proposals have been received during this period, which included one for bating enzymes used by the tanning industries and Bio-insecticides for pest control.



The over all impression developed so far is that the Biology Department is well equipped and it has got the required atmosphere to carry out research work. It has got the well qualified and reasonably trained faculty and support staff.

The equipment bank is quite impressive and well maintained. The above research projects can be handled with existing equipment but few items like a pilot scale fermentator and supplies shall be required. The list of equipment with its budgetary costs is indicated on the draft proposals submitted.

These proposals are being reviewed and budgets are being discussed to arrive at reasonable project costs. In this regard follow up meetings were held between the faculty members and Hamid Hasan. Discussions with Murree Brewery, Ashraf Sugar Mills, Chanar Sugar Mills and Jaffar Brothers, Ciba Giegy have been initiated for possible industrial collaboration.

4.0 Electrical Engineering Department

UNIVERSITY OF ENGINEERING & TECHNOLOGY, LAHORE

It is the oldest and largest of the four major engineering schools in Pakistan. The UET electrical engineering department is a principal institution in Pakistan's technological development and the only one authorized to grant the PH.D degree. Its contribution is of major importance for the economic development of Pakistan through its graduate and post graduate programs.

The Electrical Engineering was visited by Dr. Junaid Ahmad, Dr. John Monagle, where meeting was held with Dr. Durrani (Chairman), Mohammad Zubair, Dr.Chughtai, Dr. Aftab.

The strength of electrical engineering department of UET is in their teaching staff where number of them have done their doctorate degrees from abroad and have acquired experience areas in microprocessing applications, power engineering and computers.

Number of possibilities were discussed, which included the following;

1. Design and Development of an Expert Logic controller for data acquisition and process control
2. Microprocessor based Multi refiring Energy and Tariff water meter.
3. Low cost industrial Inaction with data logging capability
4. A Railways transcheduling system
5. A diagnostic system based on the pressure pulse in the radial activities.
6. Design of a supervisory. Process control system based on natural Network Technology.

The topics that have immediate applications in industry microprocessor controlled UPS, multiplexers, digital energy matters, industrial motor controllers and industrial instrumentation/control systems.



Extensive industrial contacts were made, which included meetings with Syed Bhais (Energy Meter Manufacturer), M/s Descon, Multiline Engineers, Escort group, Fine Control Systems, Carrier Telephone Industries, ICI Chemicals, and SABRO. The interest shown till now is in area of microprocessor controlled UPS, multiplexers, digital energy meters, industrial motor controllers and industrial instrumentation/control systems by M/s Descon, Multiline Engineers, Escort group.

The draft proposals have been prepared by the electrical engineering department of UET for some of the topics and are still working on finalizing the above proposals. The budgets indicated on their initial proposals are also tentative and these shall be finalized by end of this month. Initial meetings were held with the following;

Col. M.A. Khaliq	Managing Director	Multiline Engineers (Pvt) Limited, Lahore.
Mahmood Ahmad	Managing Director	Syed Bhais (Pvt) Limited, Lahore.
Dr. Kazi Ain Uddin	Sr Ex. Director	Escorts Group of Companies. Lahore.
Ghulam Kafeel Majal	Manager Marketing	Descon Manufacturing (Pvt) Limited, Lahore.
Zahid H. Chaudary	Planning & Contracts Manager	ICI Pakistan Limited, Lahore.

The department has got young and qualified faculty of which some are very enthusiastic about IEP project, but it lacks in its equipment side. They are in need of new and fast computers and other accessories. Similarly some testing equipment/probes are also required, which they have indicated in their initial proposals. It is planned that three proposals shall be finalized in collaboration with M/s Descon, Multiline Engineers, and Escort group of Lahore by end of November 1991.

5.0 Center for Advancement of Molecular Biology PUNJAB UNIVERSITY, LAHORE

The center was visited by Dr. John Monagle, Mr. Hamid Hasan, Afzal Malik and met the following faculty members; Dr. S. Razaquddin, Dr. Amin Akhtar, Dr. Anjum Sohail, Ms. Esthar Khan and Mrs. Shaheen N. Khan.

The center has been recently moved into their new building, which was very impressive and the laboratories are excellently equipped and well maintained. The center is keeping close linkages with international research institutions in microbiology field, but has never worked with any industry. The Director of CAMBS is a very dynamic person, and showed keen interest to participate in this IEP project and was enthusiastic about working with industry. Number of possibilities were discussed and few promising projects were finalized which included development of diagnostic kits for detecting ER/PR from Human Breast, Uterus, Ovary and Prostate Biopsies and Bio-insecticide for the control of linseed rests of cotton.

The industries that were approached and identified as potential partners for CAMBS included Punjab Drug House, Wellcome Laboratories Limited, Wythe Laboratories, F. M. Rabi and Company, Jaffar Brothers Limited, and Ciba Giegly Limited. Initial meetings were held with the following;



Dr. Mahmood Alam	Medical director	Punjab Drug House, Lahore.
Brig(Rtd) M Naeem	Executive Director	Wythe Laboratories, Lahore.
Mr. Mumtaz Ahmad	Director	F. M. Rabi & Company, Lahore.
Dr. Mansoor Ahmad	Head Insecticide	Jaffar Brothers Limited, Karachi.
Tariq Alauddin	Plant Manager	Cieba Giegy (Farms Chemicals), Karachi

The discussions are taking place between Punjab Drug House for the diagnostic kits for detecting ER/PR from Human Breast, Uterus, Ovary and Prostate Biopsies. The proposal is also in its initial stages and shall be finalized in the next two weeks.

The center maintains the best laboratories in the field of molecular biology in Pakistan, and is involved in number of academic research assignments. To undertake the above two assignments they will mostly require consumable but some equipment like green house etc. The details of equipments shall be finalized as soon the project proposals are finalized with the collaborating industries.

6.0 HEJ Research Institute of Chemistry UNIVERSITY OF KARACHI

The Hussein Ebrahim Jamal Research Institute of Chemistry was established in 1966 in chemistry building of Karachi University. Renowned scientist Dr. Salimuzzaman Siddiqui was its first head, who developed a team of scientists, which included Dr. Atta-ur Rehman the present director of the institute. The institute continued to expand through major research studies and collaborative work with other international research centers.

The HEJ Research Institute was visited by Dr. John Monagle, Dr. Junaid Ahmad in the beginning, who explained the objectives of IEP project to the Dr. Atta ur Rehman, Dr Zatar H Zaidi and other staff of the institute. Subsequently number of research proposals were received which included; investigation of medicinal plants for anti-diabetic activities, development of new methods for the preparation of guggulupid formulation from commiphora mukul, preparation of glycyrrhizine and deglycyrrhizinated extracts of liquorice, development and pilot plant production of medical diagnostic kits and studies on the furnace oil repercussions on gas turbine installation at gas turbine power station, Kot Addu.

The industries that were approached and identified as potential partners for HEJ Research Institute included F. M. Rabi and Company, Hamdard Laboratories, Ehsan ullah Laboratories and Cieba Giegy Limited. Initial meetings were held with the following;

Mr. Mumtaz Ahmad	Director	F. M. Rabi & Company, Lahore.
Tariq Alauddin	Plant Manager	Cieba Giegy (Farms Chemicals), Karachi.
Dr. Hafiz M. Ilyas	Managing Director	Hamdard Laboratories (Waqf), Karachi
Dr. Saiyed Ehsanullah		Dr. Ehsanullah Lab (Pvt) Limited, Karachi.



Subsequently meeting was held at HEJ Research Institute, Karachi which was participated by Dr John Monagle, Dr Junaid Ahmad, Hamid Hasan, Dilshad Khaleeq with Dr. Hafiz M. Ilyas, Dr. Zafar H Zaidi, Dr. Att ur Rehman and Dr Saiyed Ehsanullah. The research topics in the meeting were the diagnostic kits development and pilot plant studies for its production and investigation of medicinal plants for anti-diabetic activities followed by studies on other medicinal plants. The initial discussions took place with Hamdard Laboratories and Dr. Ehsanullah Labs, but discussion are taking place with other industries also.

The draft proposals have been prepared by the HEJ Research Institute, which are being refined and redrafted into standard format which is being followed for other research proposals also.

The HEJ Research Institute maintains one of best laboratories in the field of chemistry of natural products in Pakistan and is involved in number of international research assignments. To undertake the above two assignments they are mostly looking into budgets for consumable, laboratory wares, and salaries of research fellows. The details of budget shall be finalized as soon the project proposals are finalized with the collaborating industries.

Institutional Excellence Project

Progress Report No 2

Submitted to

John Monagle

Project Manager

United States Agency for International Development

Islamabad

National Management Consultants (Pvt) Ltd.

PROGRESS REPORT NO 2

1.0 Introduction

This report is being submitted for the period 7th November 1991 to 7th December 1991. During this period all the departments and centers were pursued to prepare proposals for which further meetings with industries were conducted. Also few more research proposals from industry side were conveyed to departments to study and propose any research plan that they could come up with. A detail survey of all relevant industries have been carried out, which will be completed during this month. This will provide relevant data to universities, who can use for their continuing work of applied research in future. The following are brief activity reports for each department and their research proposals;

2.0 Center of Excellence in Geology

University of Peshawar.

The proposals submitted have been finalized and accepted by the sponsoring industry. It is now under process with USAID, and as soon the funding is made available to the Center of Excellence in Geology, the research work will be initiated. The research proposals include a proposal for the glass industry which has been finalized in with Mr. Tahir Jamal from Khawaja Glass industry on identification and characterization of Quality of Silica Sand Resources for Glass Making. In this project field work in the districts of NWFP and North Punjab will be executed by the field parties to form a data based on mineral content texture, chemicals and other elements of interest. Following the analysis of the data collected in the first 9 months the promising areas will be surveyed for silica sand deposits. In addition to this the Center will help Khawaja Glass in the area of studying inclusions in sheet glass during manufacturing. One of the major quality control problems in glass manufacturing is inclusions of various types of imperfections such as bubbles and nodules which in finished goods appear as flaws rendering the product unacceptable. Khawaja Glass has asked for study to be carried out to identify the source of these inclusions and suggest possible remedies. Generally the inclusions results from these sources; Raw material, Flux and Industrial Fire bricks. Due to these inclusions lot of wastage are incurred resulting in losses to the company s overall financial position due to these defects.

Similarly Center of Excellence in Geology will review analytical process at Khawaja Glass which requires improvement in their chemical analyses of raw materials and determination of its purity. An important factor is the time required for the analyses, to enable use of reports for quality control

purposes. This project aims at comparing different quality control methods used for analyses of raw materials, to suggest possible improvements and reduce time required for the analysis. Also NCEG will compare instrumental and classical methods of mineral analyses used by KGC and to suggest possible use of different instrumental methods in the overall analytical process.

The other proposal with Oil & Gas Development Corporation has been also finalized in consultation with Dr Qasim Jan, Dr. John Monagle which has been accepted by Mr Arif Kamal of OGDC. This project involves sedimentology studies in potential hydrocarbon bearing strata around Kohat region.

These proposals also include budgets for each research work along with the contribution / participation of the industrial partner.

The Centre of Excellence in Geology is well equipped and the faculty member, specifically their Director Dr Qasim Jan is very keen to work on the applied research and is desirous of having linkages with industries, making this center particularly suitable for the IEP project. The equipment in their laboratories is well maintained and staff is well trained on these. The only deficiency noticed was the power supplies for these equipment, as these require un-interrupted power supply for carrying out major analysis. The proposal received therefore seeks these UPs. The Center is also maintaining excellent linkages with international focal points and has an access to all major research institution in and out of Pakistan.

3.0 Department of Chemistry

Gomal University, D.I.Khan

There have been three proposals from Department of Chemistry, Gomal University, on two of which meeting with the industry has been conducted. The proposals received till now includes:

- a) Commercial exploitation of Azadirachtin rich neem extract from Azadirachtin indica and other natural insecticides.
- b) Commercial exploitation of Taxol. A potent anti-cancer drug.

The first proposal envisages commercial exploitation of azadirachtin-rich neem extracts from azadirachta indica and other natural insecticides. It is believed that the protection of crops as they are the major source of food has been of utmost importance and different methods have been adopted all over the world to fight off the natural enemies (Pests). Neem tree or Margosa (Azadirachia Indica) is indigenous to

Pakistan, with its natural insect repellent qualities has come under the researchers scrutiny. Countries all over the world have adopted methods to extract and use neem derivatives as repellents and different neem products as natural insecticides have been floating in the market. Similarly this project shall strive to make use of neem derivatives and methods shall be developed for extraction and other processes adopted to develop a new product.

Concentrate powders will be prepared from the seeds using a number of solvent system. Their insecticidal repellent qualities will be verified by experimentation procedures at different laboratories. The most active fraction will be identified and semi-pilot plant studies will be undertaken to standardize the extraction procedures. Structural and spectral structure will be undertaken to standardize the product. Finally large scale extraction of the Azadiractin-rich product at the Kurram Chemical Company for commercial purpose will be done.

The other proposal that has been received is regarding commercial exploitation of taxol. Taxol is one of the drugs which has been discovered and extracted from Taxus species plants after great research. It is a potent inhibitor of invading cancer cells.

The drawback is that large quantities of bark from trees yield very little Taxol. No systematic studies have been undertaken to isolate Taxol from Taxus wallichiana found in the regions of Pakistan. Using known procedures is a simple matter but the problem lies in the identification of the source which would give the highest yield of Taxol. For that all parts of the plant would be collected separately and screened for the presence of Taxol. Fraction giving highest yield will be selected for large scale extraction at Kurram Chemical Company after verification at the university laboratory.

The above two proposals were circulated to different industries and some response has been received. The proposals have also been reviewed by the industry and us, and department has been asked to revise the proposals on the basis of these comments. The industries which have shown interest are Kurram Chemicals, Rawalpindi and Kurshi Laboratories at Lahore. These proposals will be finalized during this month.

4.0 Biology Department, Quaid-i-Azam University

This department has submitted three proposals, on two of which industrial contacts have been established. The last proposal is on the bio-insecticides, which has also been proposed by CAMBS, Lahore. The industries which have shown interest are

located in Karachi namely Cleba Giegy and Jaffar Brothers, with which meeting has been arranged with CAMBS at Lahore. It is proposed to hold a workshop, where the industry and both CAMBS and Qauid-i-Azam University can participate and finalize there proposals. The budgets for these research proposals have been compiled, which will be finalized once the work plan is decided among both the departments.

The first proposal is on production of bating enzyme from bacteria sources. Bating is termed to is a process in the manufacturing of leather where all impurities attached to the hide are removed to give it a soft texture. Basically bating solutions are enzymes obtained from three sources. Pancreatic bates are obtained from pancreatic glands of the slaughtered animals. Bacterial bates are obtained from bacteria and fungus enzymes are obtained from growing fungus on a suitable medium. In Pakistan tanning industries are using pancreatic bates one of the popular brand is called (opropon) which is imported from other countries. Bacterial bates can be effective to some extent as pancreatic bates, specifically in terms of its cost economics for which Qauid-i-Azam University is proposing a research work is in developing the enzymes from the bacterial sources. If this research succeeds, resulting production of bacterial bates within the country a lot of foreign exchange will be saved presently spent on the imported enzymes.

An inoculum will be prepared by growing bacteria on the medium with gelatin, casein hydrolysate glycerol. At the end of 24 hours number of bacteria will be determined. Several factors like inoculum size, media, temperature etc.. will be studied to get optimum results. At different stages like pilot scale tests concentration of crude enzymes temp etc..will be studied for the efficiency of enzyme. A crude prepared, the resultant of all the tests and experiments will be applied in the leather manufacturing industries with the consent of the concerned authorities to analyze the effects of the enzyme substituting for pancreatic enzymes.

The other proposal is for development of bio-insecticide in the control of insect pests of cotton. The increased trend for the use of chemical pesticides is because of the farmer's choice of increased harvest output and his increased productivity but these create lot of problems, among them are harmful effects on humans and all other life forms, a development of immunity by the pest to the use of insecticide, and other complexities which necessitate a development of some other means of crop protection against pests. Bio-Insecticides have emerged as useful alternatives. These are natural products made by micro organisms existing in nature without any resistance to them. These are harmless to other non-target animal and insect species. Also with increased use of chemical insecticides, insect pest control at the moment has been threatened by the increased resistance of the pest to these chemical pesticides. With this in mind scientists all over the

world are trying to resort to natural ways of pest control. Similarly scientists in Pakistan are also doing research work to develop insecticides from nature. At the present pests of cotton a major export of the country are the target of research as cotton is extremely sensitive and prone to insect attacks.

These two proposals have been circulated to different industries, on which encouraging response has been received from two companies, M/s Biotechnology and Cieba Giegy.

5.0 Electrical Engineering Department,
University of Engineering & Technology, Lahore.

Three proposals have been selected, which have been discussed and industries have shown interest to utilize these. In fact two of the proposals were given by the industry to department for developing product, which have great commercial prospects. The proposals have been reviewed by the industry and us, comments have been communicated to department to finalize them.

The first proposal is on microprocessor based multi-metering energy and tariff meter. A microprocessor based system designed for the KWH measurement has been necessitated to provide details on the energy use so as to avoid unnecessary use of electricity through a energy and tariff meter which records and gives information on use of energy at different times of the day. With the development and production of such a meter which is the main objective of the proposal, a better product could be provided to the users of energy, thus improving over all workings.

A prototype system will be designed by the department and after verification of the results under the scrutiny of the industry personnel a working model based on micro-computer chips will be designed. The industrial partner M/s ESCORT group is actively participating in developing this proposal and in next month it will be finalized.

The other proposal that got developed is on development of a microprocessor based inverter control for AC drives using pwm technique. The device will be useful for controlling AC drive in almost all industries, thus ensuring unnecessary wear and tear of motors that mostly takes place with the improper control of AC drives. The controllers at the present being produced by different manufactures are manually driven. These manually driven controllers have inherent disadvantage regarding efficiency, reliability and wear/tear. But once these are converted to a microprocessor which will control various parameters such as stop / forward / reverse / increase / decrease speed control etc.. As a result the machines will run in a more efficient manner with the increase in the life of motors, minimization of wear and tear of machines etc....

Initially the department will prepare a model based on microcomputer system and after verification of results by the M/s DESCON, who is collaborating on this project, the prototype working model will be developed.

The third proposal that was received from the department was regarding development of an uninterrupted power supply unit. This has become necessary for the various devices installed in different concerns for their proper functioning. With the disruption in power supply a whole lot of factors arise thus impeding the continuous working of machines and industries and ultimately the country. There has been many fold increase in demand of UPs with type of load shedding being forced. The application of UPs, in case of load shedding have increased to cover all commercial utilization of power including lighting. All commercial firms now have requirement of UPs, that can provide power for one or two hours for their computers, and other electronic gadgetry.

A model based on microcomputer system will be designed and ultimately a prototype model based on micro-computer chips will be developed. M/s Multilines will be involved in the development and production of such a UPS a continuous supply will be ensured for the machines affecting the different industries in a most beneficial way.

Presently efforts are underway to finalize these proposals alongwith their budgets and requirements. Further meetings are also planned with the industries concerned.

6.0 Center of Advancement of Molecular Biology, Funjab University, Lahore.

Two proposal have short listed, of which one has been discussed in great length with the industry, who has accepted the proposal and is going ahead with the research work. The second proposal is regarding the bio-insecticide, which has been discussed in para 4.0 above. The meetings with industry has resulted in few more areas, where CAMBS can help the insecticide industry. The budget is under discussion and shall be finalized during this month.

The first proposal that was received concerns development of diagnostic kits for detecting ER/PR from human breast, uterus, ovary and prostrate of biopsies. The most common cancer among woman is of the breast (usually is due to steroid sex hormonal imbalance) which is operated upon without any other diagnostic steps taken to verify the available results which brings about a lot of post operative complications, otherwise avoidable. These post operative complications can be avoided through diagnostic tools which estimate human steroid sex hormone receptor levels thus identifying the real cause of the disease. The patient can be cured by subjecting to anti-hormone therapies and thus rescued from surgery.

The development of diagnostic kits for determining Estrogen and progesterone receptors from human breast tissues is the main objective of the research studies. The receptor protein extracted from biopsy specimens will be used for estrogen and progesterone receptor analyses through competitive binding of the receptor to the ligand. Depending upon the ligand binding assay, tumor specimens will be grouped as ER-/PR- , ER-/PR+, ER+/PR+, ER+/PR- and endocrine therapy will be suggested to the patient.

The Punjab Drug House is closely involved in the development of this proposal and in next few weeks the proposal is going to take its final shape.

The second proposal that has been received from CAMBs is on bio-insecticides in control of insect/pests of cotton. The use of chemical pesticides is rising, which no doubt is improving the productivity of crops, but is negatively effecting the environments and causing harmful effects on humans and all other life. It is also leading to development of immunity by the pest to the use of insecticide, and other complexities which necessitate a development of some other means of crop protection against pests. Bio-Insecticides have shown great potential as powerful alternatives. These are natural products made by micro organisms existing in nature without any resistance to them. They are harmless to other non-target species. Insect pest control at the moment is threatened by the increased resistance of the pest to chemical pesticides. With this in mind scientists all over the world are trying to resort to natural ways of pest control. Similarly researchers at CAMBs are also doing research work to develop insecticides from nature. At the present pests of cotton a major export of the country are the target of research as cotton is extremely sensitive and prone to insect attacks.

The researchers at CAMBs will make a search in local environments for *Bacillus thuringiensis* which are capable of producing biological pesticides and their characterization by conventional staining techniques, phase contrast microscopy and protein profiles. Establish rearing and maintenance of cotton bollworms in the laboratory on artificial diets. Initial bio-assays to establish potency against these target vectors.

The industrial part shall be taken care by M/s Ciaba Giegy, who have shown interest to be involved in this research and also take potential use in manufacturing and marketing the developed product. The initial meeting has taken place and few more meetings to settle technical matter are planned.

On same line Biology Department of Quaid-e-Azam University has also submitted an proposal, both of which shall be finalized in the proposed workshop.

7.0 HEJ Research Institute of Chemistry
University of Karachi

Three proposals are in the final stage, where meeting with industry has resulted in depth evaluation of the initial proposals. The budgets are yet to be finalized, which will be done after detailed methodology of collaborative work with Quaid-i-Azam University on two of the proposals is prepared. This activity shall be carried out in a proposed workshop, where researcher from both the departments will finalize their proposals, and necessary discussions with the industry are carried out to meet the desired industrial objectives.

The first proposal that has received very good industrial response is on investigation of medicinal plant for anti-diabetic activity. Various remedies are available to the people of the region but most of them resort to herbal treatment. This is an age old method of treating diseases through nature. Countries using this method of treatment include China, India, Pakistan, South America and Africa. In this project plants having curative qualities will be thoroughly subjected to experimentation and extracts will be made which will be applied on animals examining sugar lowering effects. Plants which appear to be safe will be further experimented upon for the isolation of bio-active components responsible for the hypoglycemic activity. M/s Hamdarad Laboratories has shown great interest in this research and is participating on the project. This work shall be carried out by Dr. Att-ur-Rehman as Principal Investigator and assisted by few co-investigators.

The other proposal is on development and pilot plant production of medical diagnostic kits. The diagnostic kits produced abroad at the moment being imported and utilized at different labs of the country to detect alteration in the biochemical processes of the body are essential for diagnoses of disease and the evaluation of the given therapy. The imports of the kits is a drain on the country's foreign exchange resources whereas the technical know-how for the manufacturing of these kits is available in the country they can be developed locally.

The kits after being made at the institute in collaboration with M/s Ehsan ullah Laboratories will be given to two different labs of Karachi for verification of its activity. Antibodies developed after experimentation on animals and isolation and characterization of the same will be carried out.

On the same pattern, Biology Department of Quaid-i-Azam University is also proposing a project of developing Diagnostic kits. It is proposed that a workshop session is carried out, where the researchers from both departments and industries involved discuss and finalize this project.



The other proposal that is under consideration is on bating enzymes. The Bating process in the manufacturing of leather is carried out where all impurities attached to the hide are removed giving a soft texture. Bating materials are enzymes obtained from three sources. Pancreatic bates are obtained from pancreatic glands of the slaughtered animals. Bacterial bates are obtained from bacteria and fungus enzymes are obtained from growing fungus on a suitable medium. At present the industries are using pancreatic bates which is imported from other countries. HEJ did research on bacterial bates, which were developed locally, which proved to some extent less effective than pancreatic bates,

It is now proposed to develop process of isolating the enzymes from pancreatic glands of slaughtered animals. Several factors like inoculum size, media, temperature etc.. will be studied to get optimum results. At different stages like pilot scale tests concentration of crude enzymes temp etc..will be studied for the efficiency of enzyme. A crude prepared, the resultant of all the tests and experiments will be applied in the leather manufacturing industries with the consent of the concerned authorities to analyze the effects of the enzyme. Also different blends of this enzymes with the bacterial enzymes. The multinational firm of BASF has shown some interest and some meeting are planned to finalize this proposal.

On the same pattern, Biology Department of Qauid-i-Azam University is also proposing a project of developing bating enzymes. It is proposed that a workshop session is carried out, where the researchers from both departments and industries involved discuss and finalize this project.

8.0 Budget and other Details

The following details have been prepared, which is attached as annexure;

Annexure I	List of Proposals
Annexure II	List of Industries Visited
Annexure III	List of Expenses & Budgets
Annexure IV	List of Equipment
Annexure V	Copies of Proposals
Annexure VI	Market Assessment of Diagnostic Kits, proposed by HEJ and Qauid-i-Azam University.

Institutional Excellence Project

Progress Report No 3

20 March 1992

Submitted to

Dr. John Monagle

Project Manager

United States Agency for International Development

Islamabad

National Management Consultants (Pvt) Ltd.

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1.0 Introduction

The IEP Project on the Industrial/Institutional cooperation is in its final stage and is going at a steady pace. Some institutions have finalized the proposals with the industries some are in the finalizing stage by discussions through workshops at different cities of the country and some are in the working stage after finalization. A brief review of the Institutional/Industrial co-operation in different stages is as follows.

2.0 Center of Excellence in Geology.

Four different research projects were initiated by the Institute in collaboration with Khawaja Glass Industries and OGDC (Oil and Gas Development Corporation).

2.1 Projects Selected

- a) Identification and characterization of Silica sand resources for glass making.
- b) Inclusion studies of sheet glass.
- c) Review of analytical process at Khawaja Glass company.
- d) Sedimentological studies in potential Hydrocarbon bearing strata Kohat.

All the proposals presented by the geology department after great deliberation and discussion with Khawaja Glass Industries and OGDC have been finalized.

The second stage of the signing of MOU's with USAID has also been achieved.

The funds are being released by USAID.

The specified equipment has also been approved and procurement work remains to be started now.

PARTICULARS OF ALL THE PROJECTS.

2.2 Identification and characterization for quality of Silica sand resources for glass making.

Principal Investigator.

Dr. M. Qasim Jan, Director NCE Geology, University of Peshawar.

Industry Involved.

Khawaja Glass Industry



Contact Personnel from the Industry Mr. Khawaja Tahir (Khawaja Glass Industry).

Project status.

Proposal- Complete

Equipment Specification - complete

Total Budget US\$ 73, 500

The department intends to hold a meeting with the industry to start work on this proposal. The organization of research team is under process, which will start the field work within next month. After the starting of work on this proposal a better quality of glass can be expected which apart from boosting the industry's exports will also supplement the inflows of foreign exchange.

2.3 Inclusion studies of sheet glass.

Principal investigator Dr. M. Qasim Jan

Industry involved Khawaja glass industry.

Project status

Proposal - Complete

Equipment Specification - Complete

Industrial collaboration - settled.

Total Budget - Us\$ 96,774.00

The study shall be initiated after holding meeting with the industry this month, where the activities with the industry are coordinated. The project is aimed at controlling the quality of glass. The quality will be improved by removing various types of imperfections by identifying the sources of these inclusions

2.4 Review of analytical process at Khawaja Glass Company

Principal investigator Dr. M. Qasim Jan

Industry involved Khawaja Glass Industry.

Project status

Proposal - Complete

Equipment Specification - Complete

Industrial Collaboration - Settled.

Total Budget - Us \$ 1630.00



This project will be initiated next month after detailed review at the Khawaja Glass of their quality control procedures. The project is aimed at reducing the time period required for analyses of raw materials and determination of purity. Errors inherent in the methods applied and instruments used will be removed. In this regard as a first step a meeting is planned at the factory between the researchers and faculty members.

2.5 Sedimentological studies in potential Hydro-carbon bearing strata Kohat, Pakistan.

Principal Investigator Dr. Qasim Jan

Industry Involved OGDC (Oil and Gas Development Corporation)

Project status

Proposal - Complete

Equipment Specification- Complete

Industrial Collaboration- settled

Total budget- US\$ 27000.00

The department intends to start the field work this month, for which OGDC is facilitating the field trips and data collection. In collaboration with OGDC personnel this project apart from identifying resources for Hydrocarbon in the Eocene Kohat basin will also provide valuable data for future involvements in the field.

3.0 BIOLOGY DEPARTMENT OF QAUID-I-AZAM UNIVERSITY, ISLAMABAD.

Three projects were worked and researched upon-in collaboration with Bio-technologies Islamabad and Ciba Giegy.

3.1 PROJECTS SELECTED.

- a) Bating enzymes for tannery industries.
- b) Bio-insecticides.
- c) Diagnostic Kits for pathological laboratories.

All three projects of the university are under review by institutes pursuing the same research work as that of Quaid-I-Azam university.

Thus to facilitate research work and avoid complications arising from duplication of efforts on the projects, workshops were arranged in different institutes of the country.



The workshop on bating enzymes was in collaboration with HEJ Institute of Chemistry, University of Karachi.

The other workshop on Bio-Insecticides was in collaboration with CAMBS, university of Punjab, Lahore. The third workshop has been arranged at Islamabad in collaboration with HEJ.

Particulars of the Projects.

3.2 Bating Enzymes.

A workshop was held on bating enzymes at HEJ, Institute of Chemistry, university of Karachi on 2nd and 3rd Feb 1992. Common methodology was discussed and different co-operative measures for research were delved upon. The research direction and methods were finalized and collaborating roles of both Institutes were finalized. Both Institutes are collaborating with different industries. The Biology Department of Quaid-I-Azam university is collaborating with M/s Bio-technologies Islamabad.

Principal Investigator Dr. A. Hameed.

At the workshop Dr. Abdul Hameed represented the Biology Department.

Industry Involved. M/s Bio-technologies Islamabad.

Project status

Proposal complete

Equipment specification- Incomplete
Industrial collaboration- settled.

Total Budget US\$ 18, 844 + cost of fermentor.

Some basic work is already underway in form of collection of information, and samples from different sources. With the available research data and techniques in the Bio Department a finer quality of leather will be produced after application of these enzymes in different industries of the country.

3.3 Bio-Insecticides.

A workshop was held on Bio-insecticides at Lahore between Q.A. university and CAMBS on 22nd Jan 1992. Representatives from both the institutes and collaborating industries took part in the workshop and the research proposals were discussed at great length. The industrial cooperation and inputs were discussed and the proposal finalized.



Principal Investigator Dr. Zafar Yab Khan (Associate professor, Department of Biological Sciences, Quaid-i-Azam university, Islamabad.

Industry Involved Ciba Giegy

Project Status

Proposal- complete
Equipment specification - incomplete
Industrial collaboration- settled.

Total Budget US\$ 25, 000.00

The next step of finalizing MOU and providing the required inputs is being awaited. This research will definitely help in developing process for the production of bio-insecticides the crop output which will increase and also harmful effects produced due to previous pesticidal methods will be overcome. The crops will also increase the present inflow of foreign exchange.

3.4 DEVELOPMENT AND PRODUCTION OF MEDICAL DIAGNOSTIC KITS.

A workshop on development and production of medical diagnostic kits has yet to take place at Islamabad. this workshop will be held in collaboration with HEJ Institute of chemistry Karachi university.

Principal Investigator Dr. Zafar Yab Khan.

Industry involved Bio technologies

Project Status Project Dropped.

4.0 UNIVERSITY OF ENGINEERING AND TECHNOLOGY.

Three research projects have been delved into and different aspects have been taken account of.

4.1 Projects Selected.

- a) Microprocessor based multimetering energy and tariff meter.
- b) Development of a microprocessor based inverter control for AC^{drives} using PWN technique.
- c) Development of an uninterrupted power supply unit.

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Discussions on the proposals took place between the Institute and Industry personnel to arrive at a conclusive result. Recently the personnel of institute and Mr. Hamid Hasan Khan (Director NMC Islamabad), Mr. Afzal Malik (Director NMC Lahore) and Mr. John Monagle USAID. Equipment specifications were delved upon for the projects.

Particulars of the Projects.

4.2 Microprocessor based multi-metering energy and tariff meter.

Principal Investigator Dr. Mohammad Zubair (Associate Professor) Department of Electrical Engineering, UET, Lahore.

Industry involved ESCORT group, Davis Road, Lahore.

Projects status.

Proposal- still incomplete.
Equipment specification- Almost complete.

Total Budget:- US\$ 45,400/-

After the equipment specification have been completed which at the present are under scrutiny of the concerned officials the project will be greatly beneficial in harnessing the energy wastage.

4.3 Development of a microprocessor based inverter control for AC Drives using PWM technique.

Principal investigator Dr. Mohammad Zubair

Industry involved DESCON manufacture, Kot Lakhpat, Lahore.

Project status

Proposal- Still incomplete
Equipment specification- Almost complete.

Total Budget. US\$ 28,350/-

This project will increase the life of machines and motors which at the present are not efficient enough due to constant wear and tear.

4.4 Development of an uninterrupted power supply unit.

Principal Investigator Dr. Mohammad Zubair



Industry Involved Multiline Engineers, Kot Lakhpat, Lahore.

Project Status

Proposal- Still incomplete
Equipment specification- Almost complete.

Total Budget. US \$ 19, 000/-

With the initiation and development of this project UPS will be the vogue and industrial and other concerns will have an uninterrupted power supply.

5.0 **CAMBS (Centre of Advancement of Molecular Biology, Punjab university, Lahore.**

The research project proposals have been presented by CAMBS to the collaborating industries.

5.1 **Projects Selected**

- a) Development of Diagnostic kits for detecting from ER/PR biopsies of human breast, uterus, ovary and prostate.
- b) Bio-insecticides in the control of insect pests of cotton.

The proposal on bio-insecticides has also been submitted by Quaid-I-Azam university Biology department thus to avoid any duplication evolving due to similarities in both the proposals a workshop was held at CAMBS Lahore on 22nd, 23rd Jan, The proposal was discussed between the faculty of both the institutes and personnel from Ciba Giegy. The CAMBS research project was presented and explained by Ms. Esther, Ciba Giegy personnel advised the CAMBS faculty of the direction the project should take also explaining other aspects.

The methodology and industrial participation was finalized. Other future projects were also delved upon and proposals to be prepared by industries pondered upon.

5.2 **Development of diagnostic kits, for detecting ER/PR.**

Principal Investigator Dr. Mohammad Amin Akhtar (Assistant Professor CAMBS)

Industry Involved Punjab Drug House, Lahore.

Project status

Proposal - Completed.
Equipment Specification- Almost Complete.
Total Budget - US\$ 92, 700/-

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With the development of diagnostic kits post operation complications will be overcome. These kits will help in detecting and giving proper diagnosis of the cancerous growth avoiding unnecessary operational procedures which previously occurred due to neglect and improper diagnosis.

5.3 Bio-insecticides in the control of insect pests of cotton.

Principal Investigator Dr. Mohammad Amin Ather

Industry involved Ciba Giegy

Project Status

Proposal - Completed

Equipment Specifications - Completed

Total Budget - US\$ 115, 700/-

This project in collaboration with Bio-department Quaid-I-Azam university envisages a speedy development and production of bio-insecticides for the pests of cotton crop.

6.0 HEJ Research Institute of Chemistry-Karachi.

Three proposals were worked upon by the faculty of HEJ. R.I of chemistry. These three proposals were worked upon jointly with Hamdard Laboratories, Ehsanullah Laboratories, BASF and Bio-technology.

6.1 Projects Selected.

- a) Investigation of Medical Plant for Anti-Diabetic Activity.
- b) Development and Pilot Plant production of medical diagnostic kits.
- c) Bating Enzymes.

One of three proposals (Bating Enzymes) due to its similar research methods with the proposal on bating enzymes by Quaid-I-Azam university Biology Department was discussed at a workshop on Bating Enzymes at the HEJ university premises.

Particulars of the Projects.

6.2 Investigation of Medical Plant for Anti diabetic Activity.

This project is aimed at achieving a major breakthrough in the treatment for Diabetic patients.



Principal Investigator Dr. Atta-ur-Rehman, Director HEJ, Institute of Chemistry, Karachi.

Industry involved Hamdard Laboratories, Karachi

Project status

Proposal- Almost complete.

Equipment specification- Almost complete.

Total Budget- US \$ 75, 000.

6.3 Development and Pilot Plant production of Medical Diagnostic kits.

Principal Investigator Dr. Zafar Zaidi

Industry involved Ehsan-ullah Laboratories.

Project Status

Proposal - Complete

Equipment Specification - Incomplete

Total Budget - US\$ 126, 000/-

6.4 BATING ENZYMES.

A workshop was held on 2nd and 3rd Feb at Karachi on the university premises to discuss the facilitation and improvement of leather quality in leather producing industries. These discussions took place between the faculty members and representatives of the industry. Common grounds were tread upon concerning the proposals from the HEJ and Qaid-i-Azam Biology Department.

The inference that bating enzymes from slaughtered animals were more effective than other sources was reached by HEJ institute. A decision on the methodology adopted by HEJ was stressed upon and to be followed by the collaborating institute.

Principal Investigator Dr. Zafar Zaidi - Professor HEJ University of Karachi.

Industry involved BASF- Karachi

Project Status.

Proposal - complete

Equipment specification - Almost complete.

Total Budget- US\$ 90, 000/-



The collaborative research with Quaid-i-Azam university Bio-department on enzymes for bating in leather industries will apart from bringing a qualitative enhancement in the production of leather will also bring in more foreign exchange due to increased export figures.

7.0 Department of Chemistry, Gomal University, D.I. Khan.

Three proposals have been presented by the university to the collaborating industries for a thorough reviewing before future plans can hatch. The industries involved are Kurram chemicals, Qurshi Dawakhana, Fauji Fertilizers and Ciba Giegy.

7.1 Names of the Projects.

- a) Commercial exploitation Azadi-ractin rich neem extract from Azadi-ractin indica and other natural insecticides.
- b) Commercial exploitation of Taxol.
A potent anti-cancer drug.
- c) Encapsulation of pesticides.

Particulars of the Project.

7.2 COMMERCIAL EXPLOITATION OF AZADI-RACTIN

Rich neem extract from Azadi-ractin indicae and other Natural Insecticides.

The development of these insecticides will bring about a revolutionary change in the pesticide industry.

Principal Investigator Dr. G.A. Miana (Vice Chancellor and Professor Deptt of Chemistry, Gomal University, D.I. Khan.)

Industry Involved. Kurram Chemical Industries.

Project Status.

Proposal - complete
Equipment Specification - incomplete.

Total Budget- US \$ 111, 100. 00.



7.3 **COMMERCIAL EXPLOITATION OF TAXOL.**

(A potent Anti-cancer drug).

This potent antibiotic of invading cancer cells if developed effectively will be a great service to mankind.

Principal Investigator Dr. G.A Miana

Industry involved Kurram Chemicals.

Project Status.

Proposal- Incomplete.

Equipment specification- Incomplete.

Total budget- Us\$ 64, 500.

7.4 **Encapsulation of Pesticides.**

This project will effectively control the wastage incurred during application of pesticides.

Principal Investigator. Dr. Mure Kaleem Baloch. (Associate Professor, Department of Chemistry, Gomal University, D. I. Khan.)

Project Status.

Proposal- Incomplete.

Equipment specification- Incomplete.

Total Budget - 135, 700.00



8.0 STATUS REPORT

No.	Project	Industry	Proposal	Budget	Equipment	MOU
CENTRE OF EXCELLENCE IN GEOLOGY						
1.	Identification and characterization of Silica sand resources for glass making.	Khawaja Glass Industry	COMPLETE	73,500	COMPLETE	SIGNED
2.	Inclusion studies of sheet glass	Khawaja Glass Industry	COMPLETE	96,774	COMPLETE	SIGNED
3.	Review of analytical process at Khawaja Glass company.	Khawaja Glass Industry	COMPLETE	1,630	COMPLETE	SIGNED
4.	Sedimentological studies in potential Hydrocarbon bearing strata Kohat.	Oil & Gas Development Corporation	COMPLETE	27,000	COMPLETE	SIGNED
Total				198,904.00		
BIOLOGY DEPARTMENT QUAID-I-AZAM UNIVERSITY, ISLAMABAD.						
1.	Bating enzymes for tannery industries.	Bio-technologies, Islamabad	COMPLETE	18,844	INCOMPLETE	
2.	Bio-insecticides.	Ciba Giegy, Karachi	COMPLETE	25,000	INCOMPLETE	
3.	Diagnostic Kits for pathological laboratories.	Bio-technologies, Islamabad	IN-COMPLETE	50,000		
Total				93,844.00		
UNIVERSITY OF ENGINEERING & TECHNOLOGY LAHORE						
1.	Microprocessor based multimetering energy and tariff meter.	ESCORTS Group, Lahore	Revised	45,400	ALMOST COMPLETE	UNDER PROCESS
2.	Development of a microprocessor based inverter control for AC drives using PWM technique.	DESCON, Lahore	Revised	28,350	INCOMPLETE	UNDER PROCESS
3.	Development of an uninterrupted power supply unit.	Multilines Engineers, Lahore	Revised	19,000	ALMOST COMPLETE	UNDER PROCESS
Total				92,750.00		

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No.	Project	Industry	Proposal	Budget	Equipment	MOU
CENTER FOR ADVANCEMENT OF MICROBIOLOGY PUNJAB UNIVERSITY						
1.	Development of Diagnostic kits for detecting from ER/PR biopsies of human breast, uterus, ovary and prostrate of biopsies.	Punjab Drug House, Lahore	COMPLETE	92,700	ALMOST COMPLETE	UNDER PROCESS
2.	Bio-insecticides in the control of insect pests of cotton.	Ciba Giegy, Karachi	COMPLETE	115,700	ALMOST COMPLETE	UNDER PROCESS
Total				208,400.00		
HEJ INSTITUTE OF CHEMISTRY KARACHI UNIVERSITY						
1.	Investigation of Medical Plant for Anti-Diabetic Activity	Hamdarad Laboratories, Karachi	ALMOST COMPLETE	75,700		
2.	Development and Pilot Plant production of Medical Diagnostic Kits	Ehsan ullah Laboratories, Karachi	ALMOST COMPLETE	106,000		
3.	Bating Enzymes for tanning Industries	BASF, Karachi		90,000		
Total				271,700.00		
DEPARTMENT OF CHEMISTRY, GOMAL UNIVERSITY D.I. KHAN						
1.	Commercial exploitation Azadiractin rich neem extract from Azadiractin indica and other natural insecticides.	Kurrum Chemicals, Rawalpindi	IN-COMPLETE	111,100	IN-COMPLETE	
2.	Commercial exploitation of Taxol, A potent anti-cancer drug..	Kurrum Chemicals, Rawalpindi	IN-COMPLETE	64,500	IN-COMPLETE	
3.	Encapsulation of Pesticides.		IN-COMPLETE		IN-COMPLETE	
Total				175,600.00		
TOTAL				1,041,198.00		

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