

### ANNUAL ACTIVITY REPORT

Lead Institution: Northwestern University

Principal Investigator: Donald Frey, Atul Wad

Project Title: "Science and Technology Partnership for Industrial Competitiveness"

Agreement No.: PCE-503-A-00-2042-00

Report Date: 30 October 1994

Time Period Covered: October 1, 1994 - September 30, 1995

#### OBJECTIVE I

In accordance with the workplan, research activities were phased out during year 3 and the data, conclusions and recommendations of the research were incorporated in the design of activities conducted under Objectives II and III. All research materials have been submitted to the UDLP office of USAID in previous activity reports.

Members of the UADY UDLP presented a summary of the findings of Objective I research at the 22nd National Conference of ANFEI, the Mexican National Association of Engineering Schools during the third quarter.

The research agenda established by this UDLP program has continued at UADY through collaborations with Centro de Investigaciones Regionales, Universidad Autonoma Metropolitana and in graduate studies in the UADY school of economics. UDLP linkage participants have also continued to draw on this work in their research. Examples include "Technology Assessment in the Fisheries Industry" by Ing. Alan Garcia of UADY, and "La Cultura Emprendadora en Mexico" by Dr. Donald Frey of NU and Dr. Atul Wad of IIE.

#### OBJECTIVE II

##### **Activity A:** "Maintenance of the UADY Technology Management Library Facility"

New subscriptions and subscription renewals were made throughout year 3. The UDLP selected and acquired 20 new books and 6 new journal subscriptions. On-line access to databases and the Internet we also established to support the information gathering for technology commercialization activities conducted under Activity B of Objective III. Ing. Alan Garcia of UADY attended a multimedia and internet training program at Northwestern University's Office of Academic Computing and Network Services (ACNS), focusing on library automation. Using this training, Ing. Garcia has established a home page for the

new Technology Management course developed under activity C. ACNS has provided UADY with an address on a Northwestern server for 2 years at no cost, which will be used to enhance communications between UDLP participants. UDLP participants have also developed on-line access orientation presentations for undergraduates at UADY.

#### **Activity B: Exchange of Selected Faculty**

The UADY exchange participant was Ing. Alan Garcia of the Chemical Engineering Faculty, who visited Chicago in June. The NU participant was Rustam Lalkaka, IIE Associate and former Director of the United Nations Fund for Science and Technology for Development, who went to Merida in May.

Mr. Lalkaka conducted assessments of technology commercialization projects, met with the manager of the Merida business incubator, and made presentations to the Technological Institute of Merida on "Mechanisms for Support of Small and Medium Businesses, and to UADY faculty on competitive strategy. He also met with the Director of the Scientific Research Institute of Yucatan to explore new research thrusts to serve local industry and new mechanisms for linking research outputs to industry.

Ing. Garcia's exchange involved computer network training described above, and work with IIE on the design of the UDLP workplan for year 4. Ing. Garcia also had several interactions with staff and tenants of the Small Business Incubator of the Northwestern University/Evanston Research Park. He met with James Currie, manager of the incubator, and attended a dinner for tenants and staff. Ing. Garcia also presented a plan for accessing a UNIDO program which supports investment feasibility studies, which will be pursued under Objective III during year 4.

#### **Activity C: Improve and Expand UADY Technology Management Curriculum**

Under the UDLP, one UADY faculty member, Jose de la Cruz, received training in "The Creation of Technology-Based Enterprises" from the Center for Technological Innovation at UNAM. New teaching cases and course materials were prepared for the diplomado course developed under activity D below. These cases emphasize the marketing of technology, which was identified as a weakness in the Technology Management course conducted in year 2.

#### **Activity D: Develop a M.Sc. program in Technology Management**

During year 3, the UDLP designed a new UADY diplomado course in Technology Management. This course was approved by UADY administration in January, 1995, and the first course was offered in October, 1995. It is a 12 month course taught by a team of UADY faculty including UDLP participants Hernan Cruz, Octavio Garcia and Alan Garcia. A preliminary design for a Master of Science program in this field was also submitted to UADY administration. Student surveys on Technology Management were conducted, and the data were used as inputs into the design of the diplomado and the new master's

program proposal. Faculty from the Department of Chemistry at UNAM have collaborated with UADY on the development of a similar curriculum for their department.

### OBJECTIVE III

**Activity A:** Develop training programs for company seminars and executive training workshops

Under the UDLP, a seminar on Environmental Regulations in Mexico was held at UADY in November, 1994, attended by 25 local executives and researchers. Also in November, the UDLP delivered a one-day seminar on "Quality Assurance: A Competitive Strategy in Globalization" attended by 59 participants from local companies and the academic community. In the third quarter, UADY and NU delivered a two-day joint seminar on Technology Management at UADY for local manufacturers and research institutes and UADY students. A seminar on business plan development scheduled for the second quarter was canceled due to the Mexico's economic difficulties during this period; however, 4 seminars were conducted during year 3, in accordance with the workplan.

**Activity B:** Develop Technology Commercialization Capability within UADY

Three technology-based business projects developed at UADY and 4 projects suggested by NU linkage participants were selected as cases for technology commercialization during years 3 and 4. Initial assessments of technical and business requirements for each have been developed and refined during the course of the year. This refinement will continue in year 4.

#### Progress Toward Completion of Objectives

All major activity objectives for year 3 were accomplished by the NU and UADY linkage participants. Among the most significant outcomes were the establishment of a new, full year graduate course in Technology Management at UADY, the launching of actual technology-based business projects with a significant role for UADY faculty and students, and the successful automation of the UADY Technology Management Library.

#### Barriers

Some difficulties have been encountered in the identification and assessment of high potential business projects being conducted under Objective III, particularly in the area of agro-processing. The research conducted on business potential in the region revealed that value-added processing of local agricultural products including honey, fruits, vegetables and chilis was extremely promising, however difficulties have been encountered in identifying reliable sources of large volumes of these raw materials at competitive prices. Existing local channels are underdeveloped, with many farmers selling their own product at the retail level to local customers. There are few mechanisms for consolidating supply into wholesale volumes to obtain industrial volumes at low

prices. During year 4, the UDLP participants will examine the local distribution system more closely to identify possible strategies for strengthen this system. In this context, we have selected Dr. Kenneth Rolnicki, a professor of marketing at Northwestern's Kellogg School and an expert in distribution systems and market channels, as the NU exchange participant for year 4.

No significant barriers were encountered in the performance of Objective II activities. Library development is proceeding on schedule, the exchanges were rescheduled during year 3 to accommodate participants' schedules, but this did not cause any alteration in the workplan. The establishment of the 12-month course in Technology Management at UADY was instituted ahead of schedule. One UADY seminar was canceled in year three, but the projected number of business seminars were held. No barriers to implementing Objective II activities are anticipated in year 4.

### Sustainability of the Linkage

The sustainability of the linkage has been enhanced by both NU and UADY participants by involving more individuals and organizations in linkage activities. NU has brought in the Northwestern University/Evanston Research Park through the Institute for International Entrepreneurship, Dr. William Galetto, an expert in agro-processing for the food industry, and initiated discussions with Universidad del Mayab, a private university in Merida interested in collaborating with NU to develop an entrepreneurship curriculum within its engineering department. UADY established a new relationship with Universidad Autonoma de Mexico through its UDLP curriculum development work and has established a formal relationship with PRAINTEC, a technical assistance organization affiliated with the Chemical Engineering School. Each of these linkages will be further developed during year 4.

### Quantitative Outputs of the Linkage

The quantitative outputs of the linkage in year 3 are as follows:

- 1, 1-week visit by Rustam Lalkaka to UADY
- 1, 3-week visit by Ing. Alan Garcia of UADY to NU and the Northwestern University Research Park
- 2 teaching cases for classroom use at UADY
- 1 research paper on technology assessment in fisheries
- 1 position paper on entrepreneurship in Mexico
- 1 presentation of linkage research at the National Conference of the Mexican National Association of Engineering Schools

- 4 intensive workshops for the academic, research and business communities in Merida
- 20 new book purchases and 6 new journal subscriptions for the UADY Technology Management Library
- On-line access to databases and the Internet for the UADY Technology Management Library, plus a link to the NU Internet server
- 1 new, 12-month diplomado course in Technology Management at the UADY Chemical Engineering School
- 2 special presentations by NU linkage participants to the Technological Institute of Merida and the companies of the Merida small business incubator
- Participation of 1 UADY linkage member in an UNAM technology-based business development training program
- Design of a Master of Science program in Technology Management
- Identification of 7 business development projects for implementation during year 4.

#### Impact on the Internationalization of NU

The work conducted in year 3 of the linkage has enabled us to bring in faculty from the NU business school and sociology department. A new linkage between NU and Universidad del Mayab is also under discussion, which would increase the focus of NU on the southern Mexican region. In addition, the linkage has provided a foundation for the Institute for International Entrepreneurship to gain support from the State of Illinois for assisting local small manufacturers to pursue export marketing opportunities in Mexico.

#### Impact on Partner's Capability to Meet Its Societal Development Needs

UADY's ability to contribute to the economic and societal needs of the local community have been advanced in several ways. The new diplomado program in Technology Management will provide critically important training for graduate students in engineering who will become managers of value-added businesses in the region. The survey data collected in year 3 have given UADY a framework for developing other training and educational programs which are responsive to the local community. No such surveys had been conducted prior to the efforts of the linkage team. The work on business projects initiated in year 3 represent some of the first attempts by UADY to conduct systematic technical assistance interventions for local businesses.

UNIVERSITY DEVELOPMENT LINKAGES PROJECT

Recipient: Northwestern University  
 Agreement Number: PCE-5063-A-00-2042-00  
 Date Prepared: 10/19/95  
 Semiannual Report No.: 6  
 Number of Objectives: 3 Award Year: 92

SEMIANNUAL EXPENDITURES	Objective: Total of all 3							
	Semiannual Report No.: 6							
	Previous Six Month Period (corrected figures)				Current Six Month Period (best available figs. *)			
	Begin	10/01/94	End	03/31/95	Begin	04/01/95	End	09/30/95
Cost Element	A.I.D.	Recipient/ Others (Non-Fed)	Recipient/ Others (Federal)	Total	A.I.D.	Recipient/ Others (Non-Fed)	Recipient/ Others (Federal)	Total
Salaries & Wages	14,718	3,772	0	18,490	0	21,756	0	21,756
Fringe Benefits	2,649	680	0	3,329	0	5,151	0	5,151
Indirect Costs	0	12,632	0	12,632	0	14,486	0	14,486
Consultants	0	0	0	0	0	0	0	0
Travel, Transportation & Per Diem	6,290	11,252	0	17,542	9,880	3,593	0	13,473
Nonexpendable Equipment	0	0	0	0	0	0	0	0
Participant Training	0	0	0	0	0	0	0	0
Other Direct Costs	994	1,173	0	2,167	9,936	0	0	9,936
Subagreements (U.S. Institutions)	0	0	0	0	0	0	0	0
Subagreements (Dev. Country)	6,043	10,000	0	16,043	21,184	0	0	21,184
<b>TOTAL</b>	<b>\$30,694</b>	<b>\$39,509</b>	<b>\$0</b>	<b>\$70,203</b>	<b>\$41,000</b>	<b>\$44,985</b>	<b>\$0</b>	<b>\$85,985</b>

\* NOTE: The best available figures for the current six month period are for the guidance of the A.I.D. project officer only.  
 This represents accurate expenditures for the first five months with an estimate made for the sixth month.  
 Accurate figures for this period will be provided on the next semiannual expenditure report.

Signature: Michael Daniels

Name/Title: Michael Daniels, <sup>Director</sup> Manager, ASRSP

Date: 10/19/95

## UNIVERSITY DEVELOPMENT LINKAGES PROJECT

Recipient: Northwestern University  
 Agreement Number: PCE-5063-A-00-2042-00  
 Date Prepared: 10/19/95

SEMIANNUAL EXPENDITURES  Cost Element	Objective:1 of 3 Name:Develop a joint research capability between Northwestern University and UADY Semiannual Report No.: 6							
	Previous Six Month Period (corrected figures)				Current Six Month Period (best available figs. *)			
	Begin 10/01/94		End 03/31/95		Begin 04/01/95		End 09/30/95	
	A.I.D.	Recipient/ Others (Non-Fed)	Recipient/ Others (Federal)	Total	A.I.D.	Recipient/ Others (Non-Fed)	Recipient/ Others (Federal)	Total
Salaries & Wages	0	0	0	0	0	0	0	0
Fringe Benefits	0	0	0	0	0	0	0	0
Indirect Costs	0	0	0	0	0	0	0	0
Consultants	0	0	0	0	0	0	0	0
Travel, Transportation & Per Diem	0	0	0	0	0	0	0	0
Nonexpendable Equipment	0	0	0	0	0	0	0	0
Participant Training	0	0	0	0	0	0	0	0
Other Direct Costs	0	0	0	0	0	0	0	0
Subagreements (U.S. Institutions)	0	0	0	0	0	0	0	0
Subagreements (Dev. Country)	0	0	0	0	0	0	0	0
<b>SUBTOTAL</b>	<b>\$2,807</b>	<b>\$10,024</b>	<b>\$0</b>	<b>12,831</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>0</b>

\* NOTE: The best available figures for the current six month period are for the guidance of the A.I.D. project officer only.

This represents accurate expenditures for the first five months with an estimate made for the sixth month.

Accurate figures for this period will be provided on the next semiannual expenditure report.

UNIVERSITY DEVELOPMENT LINKAGES PROJECT

Recipient: Northwestern University  
 Agreement Number: PCE-5063-A-00-2042-00  
 Date Prepared: 10/19/95

SEMIANNUAL EXPENDITURES	Objective 2 of 3							
	Name: Technology Strategy and Organization Performance							
	Semiannual Report No.: 6							
	Previous Six Month Period (corrected figures)				Current Six Month Period (best available figs. *)			
Cost Element	Begin	10/01/94	End	03/31/95	Begin	04/01/95	End	09/30/95
	A.I.D.	Recipient/ Others (Non-Fed)	Recipient/ Others (Federal)	Total	A.I.D.	Recipient/ Others (Non-Fed)	Recipient/ Others (Federal)	Total
Salaries & Wages	0	5,380	0	5,380	0	10,513	0	10,513
Fringe Benefits	0	1,009	0	1,009	0	2,401	0	2,401
Indirect Costs	0	3,035	0	3,035	0	7,840	0	7,840
Consultants	0	0	0	0	0	0	0	0
Travel, Transportation & Per Diem	0	0	0	0	4,940	3,593	0	8,533
Nonexpendable Equipment	0	0	0	0	0	0	0	0
Participant Training	0	0	0	0	0	0	0	0
Other Direct Costs	0	0	0	0	4,968	0	0	4,968
Subagreements (U.S. Institutions)	0	0	0	0	0	0	0	0
Subagreements (Dev. Country)	23,472	0	0	23,472	10,592	0	0	10,592
<b>SUBTOTAL</b>	<b>\$8,569</b>	<b>\$13,433</b>	<b>\$0</b>	<b>22,002</b>	<b>\$20,500</b>	<b>\$24,347</b>	<b>\$0</b>	<b>44,847</b>

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 Accurate figures for this period will be provided on the next semiannual expenditure report.

UNIVERSITY DEVELOPMENT LINKAGES PROJECT

Recipient: Northwestern University  
 Agreement Number: PCE-5063-A-00-2042-00  
 Date Prepared: 10/19/95

SEMIANNUAL EXPENDITURES	Objective 3 of 3							
	Name Establish and expand UADY extension programs to assist local manufacturers							
	Semiannual Report No.: 6							
	Previous Six Month Period (corrected figures)				Current Six Month Period (best available figs.*)			
	Begin	10/01/94	End	03/31/95	Begin	04/01/95	End	09/30/95
Cost Element	A.I.D.	Recipient/ Others (Non-Fed)	Recipient/ Others (Federal)	Total	A.I.D.	Recipient/ Others (Non-Fed)	Recipient/ Others (Federal)	Total
Salaries & Wages	0	6,395	0	6,395	0	11,243	0	11,243
Fringe Benefits	0	1,199	0	1,199	0	2,750	0	2,750
Indirect Costs	0	3,607	0	3,607	0	6,646	0	6,646
Consultants	0	0	0	0	0	0	0	0
Travel, Transportation & Per Diem	0	0	0	0	4,940	0	0	4,940
Nonexpendable Equipment	0	0	0	0	0	0	0	0
Participant Training	0	0	0	0	0	0	0	0
Other Direct Costs	0	0	0	0	4,968	0	0	4,968
Subagreements (U.S. Institutions)	0	0	0	0	0	0	0	0
Subagreements (Dev. Country)	25,620	0	0	25,620	10,592	0	0	10,592
<b>SUBTOTAL</b>	<b>\$19,318</b>	<b>\$16,052</b>	<b>\$0</b>	<b>35,370.00</b>	<b>\$20,500</b>	<b>\$20,638</b>	<b>\$0</b>	<b>\$41,138</b>

\* NOTE: The best available figures for the current six month period are for the guidance of the A.I.D. project officer only.  
 This represents accurate expenditures for the first five months with an estimate made for the sixth month.  
 Accurate figures for this period will be provided on the next semiannual expenditure report.