

PD-AAN-799

UNCLASSIFIED
CLASSIFICATION

PROJECT EVALUATION SUMMARY (PES) - PART I

Report Symbol U-447

1. PROJECT TITLE Scientists and Engineers in Economic Development (SEED)	2. PROJECT NUMBER 931-0962	3. MISSION/AID/W OFFICE
	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) Final Evaluation <input type="checkbox"/> REGULAR EVALUATION <input type="checkbox"/> SPECIAL EVALUATION	

5. KEY PROJECT IMPLEMENTATION DATES			6. ESTIMATED PROJECT FUNDING		7. PERIOD COVERED BY EVALUATION	
A. First PRO-AG or Equivalent FY <u>71</u>	B. Final Obligation Expected FY <u>78</u>	C. Final Input Delivery FY <u>83</u>	A. Total \$ <u>2,000,000</u>	B. U.S. \$ <u>2,000,000</u>	From (month/yr.) <u>November 1977</u>	To (month/yr.) <u>February 1983</u>
					Date of Evaluation Review <u>March 1983</u>	

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
None		

9. INVENTORY OF DOCUMENTS TO BE REVISED PER ABOVE DECISIONS			10. ALTERNATIVE DECISIONS ON FUTURE OF PROJECT		
<input type="checkbox"/> Project Paper	<input type="checkbox"/> Implementation Plan e.g., CPI Network	<input type="checkbox"/> Other (Specify) _____	A. <input type="checkbox"/> Continue Project Without Change		
<input type="checkbox"/> Financial Plan	<input type="checkbox"/> PIO/T	_____	B. <input type="checkbox"/> Change Project Design and/or		
<input type="checkbox"/> Logical Framework	<input type="checkbox"/> PIO/C	<input type="checkbox"/> Other (Specify) _____	<input type="checkbox"/> Change Implementation Plan		
<input type="checkbox"/> Project Agreement	<input type="checkbox"/> PIO/P	_____	<input checked="" type="checkbox"/> Project transferred NSF		
			C. <input type="checkbox"/> Discontinue Project		

11. PROJECT OFFICER AND HOST COUNTRY OR OTHER RANKING PARTICIPANTS AS APPROPRIATE (Names and Titles)		12. Mission/AID/W Office Director Approval	
Ruth Flynn, S&T/FNR - Project Manager John Daly, SCI - Evaluation Team Member Frank Campbell, S&T/PO - Evaluation Team Chairman Carol Ganz, NSF, Evaluation Team Member Gerald Edwards, NSF, Evaluation Team Member		Signature <i>William M. Feldman</i>	
		Typed Name William M. Feldman, S&T/FNR	
		Date <u>11/30/83</u>	

PROJECT EVALUATION SUMMARY (PES - Part II)
Project No. 931-0962
Scientists and Engineers in Economic Development (SEED)

PROJECT BACKGROUND:

The \$2 million SEED project was approved in October 1971 and implemented through a Participating Agency Service Agreement (PASA) with the National Science Foundation (NSF). SEED, designed and managed by AID's Office of Science and Technology (OST), began as a two-year experimental project primarily to test the effectiveness of individual U.S.-university scientists and engineers cooperating with foreign counterparts in developing countries on research and education projects. As a result of an evaluation in 1975, the project's goal was revised to include enhancing the capabilities of LDC university science and engineering programs to contribute to the solution of development problems. In 1978, NSF assumed 50 percent funding responsibility and in 1980 assumed full responsibility by incorporating SEED into its new project, "The Science for Development Program."

During the life of this project, 229 grants were awarded to U.S. scientists and engineers to conduct development-related research or to teach (or both) in over 50 countries around the world. NSF and AID selected SEED grantees based on the relevance of their proposed activity to the practical development needs of the host country or region, evidence of local interest and support by the host institution, technical soundness of their plan, and the prospects of continued activity following the term of support.

The SEED project tested the hypothesis that LDC university scientists could be influenced by U.S. university scientists to direct research activities toward identifying and solving development problems and that the aggregate of these activities could have a significant development impact. Often U.S. scientists would visit LDC research institutions only to advance their own research interests, but OST believed that an increasing number of U.S. university scientists and engineers had become interested in the problems of development. While these scientists (particularly the younger scientists) might not want to participate in established institutional programs supported by AID and other organizations, they had much to offer in terms of competence and motivation--they were precisely the people who would want to maintain linkages on an individual basis once they had been established. The SEED project began as an attempt to harness this latent resource and direct it to activities that were coupled to development.

When the project began, it was believed that, aside from an occasional foundation grant, there was no mechanism to provide the mini-funds required to enable the U.S./LDC researchers to participate in individually collaborative development. SEED encouraged U.S. university scientists and engineers on sabbatical leave for an academic year to conduct research of interest to developing countries. Specifically, small travel and subsistence grants (not more than \$15,000) were given to supplement the reduced salaries of U.S. university scientists while on leave.

The experimental character of SEED should be recognized. The use of competitive small grants to U.S. scientists to promote development of LDC scientific capacity was novel and untested in 1971. It was assumed that scientific relations between the United States and a developing country should move along a continuous upward path as the LDC's scientific infrastructure was strengthened until arriving at the type of relationship that prevails between the United States and the technically advanced countries. Thus, the SEED project was started knowing a significant improvement in LDC research capability would not happen overnight but would require a long, sustained effort.

13. SUMMARY OF FINAL EVALUATION

In June 1980, the scope-of-work for a final evaluation of this project was approved. The evaluation cost approximately \$50,000 of AID project funds and approximately \$80,000 of NSF evaluation funds. Over a two-year period, data was gathered, analyzed, printed, and distributed.

The purpose of the SEED evaluation was to give a final account of inputs, outputs and goal achievement; to document lessons learned; and to provide AID Missions and Bureaus with information helpful for future design of science and technology projects. NSF also needed to evaluate similar projects funded and carried out by its Division of International Programs (NSF/INT). Therefore, a joint AID/NSF evaluation team agreed on the elements of a SEED evaluation that would serve the needs of both AID and NSF.

When objective/subjective evaluation data are combined to obtain a composite measure of performance (overall productivity), the evaluation team concludes that the SEED program achieved its objectives and that improvement of foreign research capability was one of the most important positive outcomes of SEED activities.

14. EVALUATION METHODOLOGY

A comparison was made between SEED scientists and other U.S. scientists engaged in international activities working in the same countries as SEED scientists but supported by NSF's Division of International Programs. Data for the comparison was obtained through: (a) Survey questionnaires for U.S. scientists who participated in SEED and for the comparison group of U.S. scientists, with an analysis of the survey provided by the Operational Studies and Analysis (OSA) Division of NSF; (b) Interviews with host country participants by the NSF project manager and program analyst, with results analyzed by OSA; and (c) Reviews by NSF and consultants of SEED grant summaries and final reports, international travel reports, publications produced by SEED scientists and comparison group scientists, and program documentation.

A more detailed description of the methods used for this evaluation, including its scope, techniques of data collection, analysis and data sources, agencies and individuals involved who participated and contributed is contained in the documents attached, which are:

- Evaluative Study of the Scientists and Engineers in Economic Development Program - Survey Report for NSF, by the Institute for Survey Research, Temple University, March 1982. (Attachment 1)
- A Bibliometric Evaluation of the NSF/AID Scientists and Engineers in Economic Development (SEED) Program - Report to the National Science Foundation, Division of International Programs, June 30, 1983, by the Institute for Scientific Information. (Attachment 2)
- Guide to the Scientists and Engineers in Economic Development Program by the National Science Foundation, Sept. 1982. (Attachment 3)
- Assessment of the Scientific Quality and Utility of Reports produced by the International Institute for Applied Systems Analysis, dated August 1978. (Attachment 4)
- The AID Evaluation Scope of Work, approved June 1980. (Attachment 5)

In addition to describing the results of AID and NSF efforts in international scientific cooperation, the above cited reports are intended for use in the art of estimating the benefits derived from such scientific activity.

15. EXTERNAL FACTORS

The "new directions" mandate of AID, contained in the 1973 Foreign Assistance Act, directed AID programs to basic human needs and required redirection of the then two-year old SEED project. The SEED program was excluded from "middle income" or "AID graduate countries." Such countries typically have a modest scientific infrastructure in place; whereas, the scientific infrastructure of poorer countries needs strengthening before research can contribute significantly to development.

AID also excluded from the SEED program countries that qualified for "Security Supporting Assistance." The modest size of individual grants, together with the complexities of administering the program, meant that using funds from two separate sources was impractical.

16. INPUTS

There were no major problems regarding inputs. AID provided total funds as planned in the Project Papers and subsequent revisions, with incremental funding timed to maintain the momentum of the program. NSF provided management and financial support as called for in the project paper and LDC institutions contributed financial/logistical support as did cooperating U.S. universities.

The U.S. scientists participating in SEED (50 percent) complained that the quality of scientific resources, such as materials, computers, instruments, or other research facilities, was lower in the LDCs than in the United States. They also believed that burdensome administrative requirements were placed on the project by foreign government agencies.

17/18. OUTPUTS/PURPOSE

Outputs necessary for project purpose achievement were realized. SEED scientists strengthened LDC/U.S. scientific linkage, assisted foreign institutions, and conducted development-related research. For example (by the end of the project), of 194 U.S. scientists, 178 (92%) established contact with new colleagues and 170 (88%) continued their professional contact with those new colleagues after completing their sabbatical.

The end-of-project status also called for changes in practices in at least 50 institutions. The attached Survey Report indicates that the most important objectives of over half the SEED scientists were to (1) improve the curriculum of courses offered by a foreign institution, (2) improve the relevance of the scientific research in a foreign country to its economic or social goals, and (3) improve the research capability of a foreign science institution. About 80 percent believed that they accomplished objective (1) and about 60 percent believed that they accomplished objectives (2) and (3).

While the primary objective of SEED scientists was to strengthen relationships between foreign and U.S. institutions and to assist foreign institutions—not to advance their own research, 71 percent of U.S. SEED participants produced written products. Examples of SEED research being used are identified or suggested in the attached "Guide to the Scientists and Engineers in Economic Development Program." (Attachment 3) This guide is intended to promote the use of SEED project results and further the understanding of the role of science and engineering in development, so it has been distributed to AID Missions and Regional Bureaus. The likelihood that SEED program results will be used in LDCs depends in large part on how the S&T Bureau, AID Missions and Regional Bureaus use these evaluation findings in their project planning and design activities.

19. GOAL/SUBGOAL

The general goal of the SEED program was to enhance the capability of LDC university science and engineering programs to contribute to the solution of development problems.^{1/} In the questionnaire to SEED participants asking respondents to select the objectives that they considered important, 61 percent selected "to improve the relevance of scientific research in a foreign country to its economic or social goals" and "to improve the research capabilities of a foreign science institution" (Table 5.1 of the Survey Report, Attachment 1). Sixty-two percent indicated the relevance of

^{1/} PROP-Scientists and Engineers in Economic Development (SEED), Revision of March 13, 1975 and SEED Program Evaluation Plan, (NSF Document, December 17, 1976)

scientific research had increased and 60 percent indicated that the research capability of a foreign science institution had improved, as well as more general capability improvements.

Subgoals to which the project contributed were the dissemination of knowledge to a foreign science community, improvement of the curriculum or courses offered by a foreign science institution, and strengthening relationships between U.S. and foreign scientific institutions. SEED participants indicated in the survey that the subgoals as well as the overall goal of the SEED program had been achieved (See Table 6.3 of the Survey Report, Attachment 1).

20. BENEFICIARIES

The direct beneficiaries of the SEED project have been host country scientists and engineers, and the results of specific research does reach specific beneficiaries, such as Frank A. Erikson's research in the Dominican Republic. Erikson developed the design for a distribution system to make fertilizer available to small farms, thus benefiting the small farmer.

A detailed guide containing the names and addresses of principal SEED investigators, their foreign hosts, participant countries, and abstracts of accomplishments, which identify the nature of benefits and/or suggest the beneficiaries, is included in Attachment 3.

21. UNPLANNED EFFECTS

The evaluation team is not aware of any unplanned effects.

22. LESSONS LEARNED

- That U.S. scientists and engineers collaborating with foreign counterparts on development-related research effectively improves LDC university science and engineering capability to contribute to the solution of development problems.
- That cost sharing by individual U.S. scientists, the scientist's home institution, the host institution, AID, and another U.S. Government Agency is feasible.
- The small grant approach has provided short-to-medium-term collaboration at a cost of about 25 percent of that for similarly qualified contract or direct-hire employees.^{2/}
- That the SEED project design required considerable AID management time. However, frequent changes of project management both in AID and NSF over the life-of-project (six changes in AID) has not negatively affected ultimate goal/purpose achievement. However, negative effects did occur such as difficulty in finding and compiling data for the final evaluation and lost

^{2/} From Action Memo for the Deputy Administrator from AA/PPC dated October 31, 1975.

opportunities during implementation to distribute research results to those involved in development planning at a time when the research results would be of maximum use.

- . That U.S. scientists have sufficient interest in LDC problems and are willing to turn their research/teaching efforts toward the solution of development problems.
- . That LDC insitutions will participate in financing small research/teaching projects through salaries, honoraria, logistical support, etc. Further, LDC universities will support faculty participation in development-oriented projects and permit reorienting science and engineering curricula.
- . That the SEED grant mechanism is effective in stimulating linkages between U.S. and LDC universities and that, where this occurs, there is mutual benefit to LDC institutions and U.S. institutions as well as to the grantees.
- . That AID Missions need to be better informed during implementation about project objectives, procedures and benefits to Mission and host country so that needs can be considered continually, not just at the PID and project approval stage.

23. SPECIAL COMMENTS OR REMARKS

Presently the Office of the Science Advisor (SCI) funds a highly competitive research grants program that provides opportunities for both LDC and U.S. scientists to submit their most innovative ideas for AID support. Competitive proposals undergo internal and external peer review and are specifically evaluated for scientific merit, relevance to development, innovative characteristics, and capacity building aspects. The lessons learned from the SEED project are pertinent to the Science Advisor's research program and to similar AID S&T efforts.

It appears that the SEED project may be especially valuable as a precedent in implementing programs in conjunction with the new Agency interest and approaches to research. The Administrator has stressed the need to support research on common themes in developing countries and to build institutional capacity. The SCI program, although limited to relatively long-term innovative research, has unearthed a considerable demand in LDCs for support of modest, short-term adaptive research projects. The SEED project has demonstrated the potential for cooperation between AID and NSF professional staffs, the ability of the NSF to organize efficient and timely peer review processes for scientific projects relevant to LDCs, and the willingness of the U.S. scientific community to devote effort and resources to collaboration with and assistance to developing country colleagues.

It is recommended that AID and NSF consider a cooperative project to build on the successes of the SEED project and on the new interest in overseas research. The project would fund a competitive small grants program of research. AID Missions would solicit research proposals from LDCs, and the NSF would solicit proposals from U.S. scientists on common themes to be selected by mutual agreement between the two agencies. NSF would organize and manage the peer review for all proposals and would work with cognizant AID Offices to jointly monitor the funded research projects. AID Missions and Regional Bureaus would fund the successful LDC proposals, and NSF would fund the successful U.S. proposals, with a small amount of funding from the S&T Bureau to be used as needed. Small amounts of funding would also be available to provide technical assistance to certain deserving LDC scientists to improve their proposals and to fund meetings of researchers working on the common themes. A concept paper suggesting such a project is attached (See Attachment 6).

Concept Paper for U.S./LDC Collaborative Development Research

GOAL:

To provide LDCs with the results of collaborative applied research and increase their capability to conduct development-related research in the problem areas of agriculture, health (biomedical research), population (contraceptive development), and fuelwood production.

PURPOSE:

To support development-related applied research, teaching, and technical assistance activities of U.S./LDC scientists and institutions that will provide solutions to development problems common throughout LDC countries or regions.

OUTPUTS:

1. Small-to-medium sized and short-to-medium term applied research (190 at up to \$50,000 each)

Approximately 140 activities: USAID Mission selected and funded
25 activities: S&T Bureau selected and funded
25 activities: NSF-funded and NSF/AID selected

Activities will be selected that have a potential for yielding results of significance to development within a 5-10 year time frame, address AID's mandate to focus on needs of the poor, and maximize the technical contributions that can be made by institutionally more advanced LDCs.

Research activity funds will support (a) the participation of U.S. scientists in an applied research project in an AID-eligible developing country; (b) the participation of scientists from an AID-eligible developing country in an appropriate U.S.-based research project; or (c) a combination of these.

2. Teaching activities (140 at \$20,000 each)
140 USAID Mission approved and funded with salaries, honoraria, or logistical support provided by host country or LDC institution

Teaching activities will enable U.S. university scientists to spend an academic year (9-12 months) with an LDC counterpart, who will be able to take over the teaching responsibility when the U.S. participant leaves and establish linkages to stimulate future research activities.

9

3. Technical Assistance (25 at \$8,000 each)
25 S&T Bureau selected and funded

This activity will enable U.S. participants to spend about a month at a counterpart institution to conduct or participate in workshops, help develop research proposals, review progress of research projects, and/or review progress of curriculum development.

4. Technology Transfer Meetings (4 meetings estimated at \$50,000 each)
2 S&T Bureau selected and funded
2 NSF/AID selected, NSF-funded

This activity will permit AID and NSF to host international meetings and/or participate in international meetings to promote technology transfer, exchange research findings and use feedback for planning future activities supported by this project.

INPUTS (\$12.75 million over 5 years)

	(000)					
	<u>FY 84</u>	<u>FY 85</u>	<u>FY 86</u>	<u>FY 87</u>	<u>FY 88</u>	<u>LOP^{1/}</u>
<u>AID S&T Bureau</u>						
1. Tech. Assist @ 8K	40	40	40	40	40	200
2. Research Grants @ 50K	250	250	250	250	250	1250
3. Tech. Transfer @ 50K	--	--	50	--	50	100
4. Direct-Hire Project Mgt.						
Sub-total	290	290	340	290	340	1550
<u>USAID Missions & Reg. Bureaus</u>						
1. Research Grants @ 50K	1000	1500	1500	1500	1500	7000
2. Teaching Grants @ 20K	400	600	600	600	600	2800
3. Project-related travel request by Missions/Bureaus	---	---	---	---	---	---
Sub-total	1400	2100	2100	2100	2100	9800
<u>NSF</u>						
1. Research/Tec @ 50K	(250)	(250)	(250)	(250)	(250)	(1250)
2. Tech. Transfer @ 50K	--	(50)	--	(50)	--	(100)
3. Program Dev. & Eval. @ 50K	(50)	--	(50)	--	(50)	(50)
4. Project Implementation	---	---	---	---	---	(1400)
TOTAL AID FUNDING						11350

^{1/}The project LOP will combine all AID funding for a total of \$11.35 million. S&T Bureau will provide project design and management so that Mission and Regional Bureaus can fund up to \$9.8 million activities without having to negotiate individual contracts, PASAs, etc. It is estimated that NSF will contribute \$1.4 million in addition to AID funding for a grand total of \$12,750.

10