



U.S. AGENCY FOR INTERNATIONAL DEVELOPMENT

USAID Evaluation Special Study Report No. 77

Center for Development and Evaluation

April 1998

Scientific Cooperation And Peace Building

*A Case Study of USAID's Middle East
Regional Cooperation Program*

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Regional Cooperation Program*

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U.S. Agency for International Development**

April 1998

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Acknowledgments

Several colleagues helped in the preparation of this case study. Irving Rosenthal served as a “friend, philosopher, and guide” throughout this effort. He wrote the first draft of chapter 2. Josette Lewis, coordinator of the Middle East Regional Cooperation (MERC) Program, has been exceptionally helpful. Karl Feld, of USAID’s Center for Development Information and Evaluation, expended considerable effort in digging up documents, publications, and other material. He also contacted people and institutions in Egypt, Israel, and Jordan and coordinated our interview schedule. Robin Silver wrote chapter 3 after completing a systematic review of MERC Program Final Evalua-

tions. She also assisted me in editing the entire report. Susan Merrill, the director of CDIE’s Program and Operations Assessment Division, has been extremely supportive of this effort.

I am grateful to all of these colleagues for their support, but I am still more grateful to more than a hundred scientists, administrators, and other prominent individuals whom the field team met during our trip to the Middle East. Without exception, they were most generous with their time and support. They shared information, ideas, and insights about the nature and effects of MERC projects, helping to shape our thinking on the subject.

—KRISHNA KUMAR
Center for Development Information and
Evaluation

Summary

THE MIDDLE EAST REGIONAL Cooperation Program (MERC) is an initiative unique to USAID—unique in that its objective is not only to promote development but also to advance peace among neighbors in conflict. The program underwrites scientific and technical cooperative projects between Israel and its Arab neighbors. Underlying the program is the premise that the joint pursuit of science and technology will create an intellectual climate and institutional structures conducive to supporting the peace process.

Congress has funded the program since its inception in 1979: \$5 million a year until 1990 and \$7 million a year thereafter. USAID administers these funds as grants to U.S. intermediary institutions. Cooperation between participating Middle Eastern organizations has always been mediated through collaborating institutions. MERC has supported a wide range of projects in health, education, agriculture, mariculture, and water and the environment. Most of the early projects involved scientists from Egypt, Israel, and the United States; later, other countries, including the Palestine Authority, have taken part as well.

In May 1997, USAID's Center for Development Information and Evaluation undertook a study of the program to examine its contribution to peace building. CDIE sent a two-person team to Egypt, Israel, Jordan, and the Palestine Authority to interview MERC researchers, officials of concerned universities and research institutions, and expert informants. Drawing

from its interviews and an extensive review of the literature, the team prepared this report.

The MERC Program and Peace Building

MERC has contributed to peace building in three ways:

First, the Egyptian and Israeli scientists who came into contact with each other were clearly affected by the experience. Encounters, which began hesitantly, blossomed, in many cases, into close professional and then personal relationships. For most Egyptian and Israeli scientists, MERC conferences or workshops were the first chance to meet one another in a peaceful environment and discover shared values.

Second, MERC projects promoted cooperation between Egyptian and Israeli institutions. Before the program, the very notion of such cooperation was considered “unrealistic,” if not politically dangerous. In Egypt, individuals and institutions alike opposed it. In Israel, mainstream scientific communities were skeptical, the government indifferent.

Egyptian and Israeli institutions did not sign formal bilateral or even trilateral (with the United States) cooperative agreements for early MERC projects. Rather, Egyptian and Israeli institutions entered into separate agreements with the same U.S. institution. Cooperation between participating Middle Eastern organi-

zations was always mediated through U.S. intermediary institutions. Once the initial ice was broken and the political climate improved, there was less need for Israeli and Egyptian institutions to hide behind such informal arrangements. They entered into both trilateral (with a U.S. partner) and multilateral (with or without a U.S. partner) agreements. A survey of MERC projects shows that more than 50 organizations in Israel, the Arab states, and the United States are or have been involved in trilateral and multilateral cooperative relationships.

The government officials, scientists, and other experts interviewed in Egypt and Israel indicated that, absent MERC or a similar program with guaranteed funding and the U.S. imprimatur, scientific collaborative projects would not have materialized. MERC grants provided an inducement to reluctant scientists and concerned institutions to enter into cooperative arrangements despite the obvious political risks and hostile environment. There are also indications the MERC program is helping to develop new institutional infrastructures for scientific cooperation between Israel and other Middle Eastern countries.

Third, the visible and positive effects of teamwork have helped generate and nurture constituencies with a stake in continuing such cooperation, and that has helped contribute, indirectly, to peace building. Such constituencies include progressive farmers interested in obtaining new technologies, research institutions and scientists who participate in cooperative projects, and businessmen involved in international trade of agricultural commodities and equipment.

Limitations of Cooperation in MERC Projects

The overall effect of the MERC projects on peace building has been limited for two reasons.

First, cooperation has been limited in most MERC projects. Many of the studies undertaken were “parallel” investigations, rather than collaborations. That is, the scientists worked independently on similar, though not identical, research problems in their own countries. A consequence has been that opportunities for individual and institutional cooperation were limited. In many MERC projects, cooperative activities were often confined to participation in annual or biannual meetings and workshops, some technical advice, and occasional site visits.

Second, an elitist bias generally filtered out lower level scientists and administrators from attending regional conclaves. That allowed in most cases only a national coordinator, principal investigators, and perhaps a sprinkling of scientists to meet with their counterparts. MERC was no exception to this tendency in well-funded international research projects.

Factors Affecting Program Performance

The following factors affected the performance of the MERC program, with implications for peace-building efforts.

1. The pervasive climate of mutual distrust and hostility between Arab states and Israel has been the most significant element. General bureaucratic inertia and political opposition

to scientific cooperation have hampered project progress and viability, both during periods of political tension and, to a lesser extent, during periods of relative peace.

2. A government's commitment to and support for cooperative projects has been critical. When a government considered a MERC project to be of prime national interest—producing tangible economic benefits and consonant with the current political agenda—the roadblocks created by an unfavorable political climate have been surmounted.
3. Asymmetries in the institutional infrastructure for science—level of development, amount of academic freedom, extent of government involvement—have influenced project design, implementation, and output. Sometimes these disparities strained cooperation. At the beginning of the program, Israeli scientists were reluctant to engage in collaborative research, with a common design and methodology, partly in light of these differences.
4. U.S. intermediary institutions required scientific expertise, managerial skills, and political sensitivity to administer MERC projects in often unfavorable political environments. When the intermediary lacked these capacities, the projects suffered, and opportunities for cooperation were reduced.
5. Many projects encountered difficulties with allocation of resources, systematization of accounting procedures, procurement of materials, and unclear or impracticable divisions of authority and management.

Policy Lessons for Future Programs in Conflict Resolution

- 1. The effects of scientific cooperation on peace building are discernable at three levels: individual, institutional, and national.** MERC has contributed to peace building between Israel and Egypt by generating positive images among participating scientists from the hostile countries, promoting institutional collaboration, and creating constituencies with a vested interest in scientific cooperation.
- 2. The overall effect of scientific cooperation on peace building tends to be quite limited.** First, the political context continues to affect the nature and frequency of scientific interactions. Second, only relatively few scientists are apt to be involved in actual collaboration. Third, changes of attitude in a small cohort of scientists do not affect the foreign policy of the concerned countries.
- 3. In addition to conforming to the norms of “good science,” cooperative science projects should pursue an agenda that broadens support for peace building.** Good science is a necessary, but not sufficient, condition for peace building. In conflict situations, scientific cooperation projects should meet other requirements as well. In MERC, for example, it was found that, as far as possible, projects should concentrate on problems perceived to be of prime national concern by the participating governments. As a corollary, projects that

produce visible, positive results have a better chance of winning government approval.

4. Two prerequisites must precede scientific cooperation projects. A political settlement is the primary prerequisite to scientific cooperation. Scientific cooperation cannot be undertaken in times of military conflict or extreme political hostilities. The second prerequisite is a third party that has friendly relations with the hostile countries. With MERC, State Department and USAID support provided legitimacy to the idea of scientific cooperation. USAID provided substantial grants to induce resource-starved scientists and institutions to cooperate with one another.

5. Different modalities of cooperation need to be appraised and pursued. To solve the same problem, projects in scientific research (as opposed to those in technical assistance) generally concentrate on collaborative research based on one design and using a common methodology and theoretical framework. The MERC experience demonstrates that such joint collaborative research is often not politically feasible during the early stages, when considerable distrust exists and hostilities prevail among the scientists and their institutions. MERC projects used different modalities of cooperative research. For example, scientists at first undertook parallel research, in which separate teams work more or less independently on different, but related, topics. Later, when some trust had been established, the scientists initiated more collaborative joint research.

6. Conflict situations often pose major problems for project participants. Solutions to these problems should be developed during the planning stage. Because of continuing political tension, cooperating scientists in MERC projects faced two sets of problems. First, the threat of personal and professional ostracism loomed large. Second, as a result of political resistance to their efforts, the scientists encountered problems in exchanging information, visiting cooperating institutions, and inviting their counterparts for site visits. Project design in conflict situations should allow for these problems and provide practical remedies.

7. Multilateral scientific initiatives are better situated to overcome political obstacles than bilateral projects. In conflict situations, multilateral research projects are more acceptable politically than bilateral ones. Many recent MERC projects involve three and even four countries, giving them a regional character.

8. Donor agencies should use caution in promoting scientific cooperation as a tool for peace building. In light of the obstacles, prerequisites, and other lessons highlighted above, donor agencies should be cautious in replicating scientific cooperation programs and in selecting the contexts for implementing them.

1 ~

Introduction

THE MIDDLE EAST REGIONAL COOPERATION Program (MERC) is a unique undertaking for the U.S. Agency for International Development. That is because it seeks not only to promote economic or social development but also to advance peace among neighbors in conflict. Launched in 1979 as an outgrowth of the 1978 Camp David Peace Accords, the program supports scientific and technical cooperative projects between Israel and its Arab neighbors. Its premise is that the joint pursuit of science and technology by Israeli and Arab scientists will create an intellectual climate and institutional structures conducive to supporting the peace process. The program's architects held that science is a universal enterprise and that scientists share a common language and methodology that can transcend national boundaries.

Congress funded the program at \$5 million a year from its inception until 1990 and has funded it at \$7 million a year since. USAID has administered these funds as a grant program. MERC has supported a wide range of projects in health, education, agriculture, mariculture, and water and the environment. Most of the early projects involved scientists from Egypt, Israel, and the United States; since the Norwegian-sponsored 1993 talks known as Oslo I, other Middle Eastern countries, includ-

ing the Palestine Authority, have taken part as well. Although some projects address scientific research exclusively, most also have components in technical assistance, training, and institution building.

USAID has evaluated MERC projects, examining their management, budgetary allocations, and effectiveness. The evaluations have also assessed the projects' technical and scientific accomplishments and shortcomings. The results indicate that, given the turbulent political conditions and asymmetries in the scientific institutional infrastructures of Israel and Arab countries, many of the projects have done reasonably well in achieving their objectives. They have contributed to the advancement of science by generating new, applicable knowledge. The projects have also helped augment scientific institutional capacity. Moreover, many projects have laid the basis for tangible economic benefits.

With the cooperation of the Global Bureau, which now manages MERC, USAID's Center for Development Information and Evaluation (CDIE) undertook a study of the program. Three features of the study should be mentioned here. First, it was designed not as a typical program evaluation but as a case

study to illuminate certain aspects of scientific cooperation between societies with a history of conflictive relations and the implications of such cooperation for peace building. Second, the unit of analysis was not the individual projects but the program as a whole. And third, the study sought to draw policy and program lessons for MERC as well as any new programs USAID might design for other postconflict situations.

The case study answers the following questions:

1. What has been the nature and thrust of MERC? What criteria has USAID used to select and fund cooperative projects? How have criteria evolved over time?
2. What modalities for scientific cooperation have projects used? What have been their relative strengths and shortcomings?
3. What have been the scientific and technical achievements—and shortcomings—of MERC projects?
4. What effects have MERC projects had on peace building in Egypt and Israel? At what levels have these effects been most significant?
5. Which factors have influenced performance?
6. What lessons can USAID learn from the MERC experience about managing scientific cooperation programs designed to support peace between societies in conflict?

The case study centers primarily on two countries—Israel and Egypt—that remain the

major recipients of MERC funds. The experiences of other recipients, including the Palestine Authority, have been taken into consideration.

Research Strategy

In May 1997, CDIE sent a two-person team to Egypt, Israel, Jordan, and the Palestine Authority to conduct interviews with MERC researchers, expert informants, and officials of the concerned universities and research institutions. The team met with more than a hundred people, visited the sites of several MERC projects, and reviewed the reports and documents. Drawing from its interviews and an extensive review of the literature, the team prepared a preliminary report. This draft was shared with elected officials and experts from USAID, intermediary institutions, and cooperating institutions to elicit their comments and suggestions. In light of the responses received, the authors revised the report.

How the Report Is Organized

This report is organized in six short chapters. Chapter 2 traces the evolution of the program, its management, and the changing criteria for funding projects in scientific cooperation. Chapter 3 describes scientific and technical accomplishments of MERC projects, whereas chapter 4 analyzes the effects of the program on peace building. Chapter 5 examines the factors affecting performance and implementation. Chapter 6 presents selected policy lessons for like programs in other conflictive situations.

2 ~

Evolution, Present Status, and Management

THE CAMP DAVID PEACE ACCORDS OF 1978 paved the way for scientific and economic cooperation between Egypt and Israel. The accords were a watershed in Arab–Israeli relations. For the first time, an Arab state had agreed to Israeli preferences for a bilateral, as opposed to multilateral, peace process. The peacetime accords offered Egyptian recognition of Israeli sovereignty in exchange for Israeli return of the Sinai Desert to Egypt. As envisioned by supporters of the accords, both Egypt and Israel would enjoy the fruits of peace, as normalization generated bilateral trade agreements, transfers of technologies, cultural exchanges, and an exchange of ambassadors.

Congress established the Middle East Regional Cooperation (MERC) program soon after the accords were ratified. Congressman Henry Waxman (D–Calif.), of the subcommittee on Europe and the Middle East, sponsored an amendment to the 1979 Foreign Assistance Bill. The amendment set aside \$5 million of the foreign USAID budget for activities to promote Arab–Israeli cooperation. The authorization language states:

It is the sense of the Congress that, in order to continue to build the structure of peace in the Middle East, the United States should finance, and where appropriate participate in, cooperative projects of a scientific and technological nature involving Israel and Egypt and other Middle East countries wishing to participate. These cooperative projects should include projects in the fields of agriculture, health, energy, the environment, education, water resources, and the social sciences.

The International Security Assistance appropriation act for fiscal year 1979 provided the actual funds and offered the following additional guidance:

It is the sense of the Congress that programs which stress regional development or regional scientific and technical cooperation between Israel and its Arab neighbors can contribute in an important way to the mutual understanding that must serve as the basis for permanent peace in the Middle East. Of the

amount authorized to be appropriated to carry out this chapter for fiscal year 1979, not less than \$5,000,000 shall be available only to fund regional programs which stress development or scientific cooperation between Israel and its Arab neighbors or programs which would be used for Arab–Israeli cooperation once normalization of relations between Israel and the Arab nations occurs.

MERC’s mandate to foster cooperation between Israel and its Arab neighbors has remained the same (except for an increase in the annual appropriation to \$7 million in 1990). From 1979 to 1993, however, most MERC programs had two participants: Egypt and Israel. The peace process did not gain momentum until Oslo I and the mutual recognition pact between Israel and the PLO in May 1993. Soon after, in October 1994, Israel and Jordan completed their treaty. Much of it dealt with economic development and resource use.

These two events had an enormous effect on the proposals submitted for review by MERC. First, Arab states such as Jordan, Lebanon, Morocco, and Tunisia took steps to join Egypt and Israel in preparing proposals for new projects. The Palestinians also participated in MERC projects. An interim agreement between Israel and Palestine in September 1995 broached critical topics of water resources and economic cooperation, increasing the potential for Palestinian engagement. Political changes in the region enabled MERC to expand its efforts in accord with its original mandate.

USAID’s 1997 congressional presentation reflected this expansion:

In order to solidify the emerging peace process in the Middle East, it will be important for Israelis and Arabs to become comfortable with working together at every level (policymakers, technical experts, etc.) on a wide variety of issues. The MERC Program, which began after the conclusion of the Camp David accords in 1979 as a congressionally mandated program, is designed to promote mutually beneficial technical cooperation between experts in Israel and its Arab neighbors (initially limited to Egypt). In recent years, the cooperation has expanded to include Jordan, the Palestinians, and Morocco. MERC-supported projects promote and strengthen Israeli–Arab ties by demonstrating that peaceful cooperation can yield tangible benefits for those involved. . . .

USAID Management Of MERC

Within USAID, the Global Bureau has overall management responsibility for MERC. Earlier, its Office of Science, Technology, and Communication administered it. The responsibility was transferred to the Office of Agriculture and Food Security in September 1996 when new management staff were assigned. In July 1997 management responsibility was transferred to the Economic Growth Center. The Global Bureau is now revising the MERC project guidelines and criteria, introducing new implementation procedures, and considering new support arrangements.

Because MERC is a grant program, once a grant has been made, USAID staff rarely in-

tervene in its management. Consequently, most MERC projects have little contact with USAID in Washington. Communications with the staff of American Embassies or USAID Missions in the field have been minimal.

Project Selection Criteria

Scientists and research institutions submit project proposals to USAID/Washington for review and selection. The USAID/Washington office managing MERC has refined project selection criteria to reflect the changing situation in the Middle East.

The original criteria, as developed from the congressional mandate, emphasized scientific research in sectors such as agriculture and mariculture. Although the mandate recognized the program's potential in fostering relations between Israel and other states, the reality was that Egypt was the principle Arab participant in the early years. Selected projects would contribute directly to the scientific infrastructure of the participating states but would have a less direct connection to the peace process itself.

Revised guidelines put greater stress on fostering collaborative research efforts involving regional networks of scientists and institutions. Projects were not meant to develop just scientific knowledge, but also local institutional capacity and initiative. To do this, the guidelines now call for smaller projects that can accommodate expansion in the number of participating states and institutions, as well as in new sectors. The guidelines emphasize applied technology with more immediate results. This way, projects work more in concert with the demands of regional economic development and the objectives of the peace process.

The latest MERC guidelines, issued in December 1994, highlight the following criteria:

- *Visibility and impact of the project on the Mideast peace process.* Projects should help participants realize joint goals (in areas such as resource management), reinforce institutional linkages, and smooth normalization.
- *Innovative nature of the research.* MERC projects should provide funds for the development and testing of cutting-edge technologies.
- *Technical merit and workability of the proposal methodology.* The research design should be easily implemented to achieve the stated results.
- *Active collaboration among institutions and individuals.* The project structure should facilitate networking and data sharing.
- *Effects on the socioeconomic development of the Middle East.* Projects should be judged on contribution to economic development in the region as a unit, not in one particular state.
- *Manageability of the project with regard to local skills, physical facilities, and financial resources.* Rather than relying on American institutions for coordination, projects should promote reliance on regional or local institutions with the necessary managerial capacities and financial resources.

- *Potential for sustainability in local institutional capability and the ability to attract future resources.* Local institutions that coordinate MERC projects should be better able to continue project work once USAID funding ends, seeking resources from other donor agencies, or even becoming self-sustaining.
- *Consistency with overall USAID strategic objectives.*

Role of U.S. Intermediary Institutions

MERC legislation notes that “where appropriate” a U.S. intermediary might “participate in” the cooperative project. However, every MERC grant, except Education for Peace, has been made to a U.S. institution. It is this U.S. intermediary that then allocates resources and provides direction and guidance to the Mideastern participants. The U.S. intermediary institution is awarded a percentage of the grant funds—in some cases up to a third of the total—for the services it provides.

To date, American intermediary institutions have included universities with reputations in applied technologies, such as the Harvard University School of Public Health, Texas A&M, and Virginia Polytechnic Institute. Federal institutions, such as the National Institutes of Health, the National Institute of Infectious Diseases, the Department of Agriculture, and the U.S. Geological Survey have also often acted as intermediaries. Finally, non-governmental organizations (NGOs), such as the San Diego State University Foundation and the American Near East Refugee Aid, have

managed projects in their respective fields of experience. Of the 18 American intermediary institutions participating in active or start-up MERC projects, U.S. government departments and agencies (7) and American universities or associated research foundations (9) continue to dominate.

MERC Project Funding

Table 1 lists all MERC projects. Analysis of the data presented in the table indicates three general conclusions.

First, the agricultural sector, followed by the mariculture and health sectors, received the most money. Out of \$73 million, more than \$29 million, or 40 percent, has gone to agriculture. If we include mariculture and livestock, the percentage rises to nearly 60 percent.

Second, over the past few years, MERC has been diversifying its projects. It has funded projects in the environment, in water resources, and in direct peace building. It has supported two innovative projects, EcoPeace and Education for Peace. EcoPeace takes on institution building in the environmental sector; Education for Peace promotes conflict resolution through the educational system.

Third, the average size of the project grant has declined. Initially, the projects were large. Agriculture or mariculture projects, with multiple subprojects or phases, received \$3–\$7 million in MERC funding. For example, phase I of the Cooperative Marine Technology Program received \$6,933,000, and the first Cooperative Arid Lands Agriculture project,

\$6,362,000. More recent projects in resource management, environment, health, and water are much smaller in scope and size, including some under \$500,000. The Elimination of Childhood Lead Poisoning project, for example, is funded at \$189,000.

Name	Amount (US\$000)	Dates		Sector
		Authori- zation date	Project assistance completion date	
Cooperative Marine Technology I/II	6,933	8/80	9/86	M
Cooperative Arid Lands Agriculture I/II	6,362	5/90	3/95	A
Trinational Agricultural Technical Exchange and Coop	3,686	7/84	7/91	A
Cooperative Marine Technology III	6,362	8/85	4/93	M
Vector-Borne Diseases	5,538	7/89	6/93	H
Integrated Agroindustrial Development—Maryut I	2,655	6/89	11/92	A
Trinational Nubaseed Development	3,439	12/88	9/93	A
Regional Infectious Disease Research—NAS/IOM	4,293	9/89	9/96	H
Trinational Animal Health Research	3,403	7/90	6/95	L
Wastewater Reuse-Shared Mountain Aquifer	1,010	7/90	5/93	E
Cooperative Marine Technology IV	2,964	10/92	3/97	M
Integrated Agroindustrial Development—Maryut II	5,964	8/92	7/97	A
Morocco Cooperative Agricultural Development II	4,599	9/92	6/97	A
Tropical Disease Research—NIH/NIAID	3,000	9/93	9/97	H
Crop Devastation by Parasitic Weeds	3,000	9/93	9/97	A
Saltwater Intrusion Monitoring	423	7/94	2/97	E
Wastewater Reuse/Shared Mountain Aquifer	847	7/94	12/97	E
Jordan-Israel-West Bank Arthropod Control	2,754	7/94	9/00	H
Education for Peace	433	9/95	9/97	D
Regional Environmental Network—EcoPeace	492	9/95	3/97	D
Regional Water Data Banks	1,100	8/95	8/98	E
Aqaba Regional Marine Peace Park	150	8/96	9/97	E
Dead Sea Transboundary Park	150	9/95	9/97	E
Animal Disease and Zoonoses Control	2,307	5/97	5/00	L
Elimination of Childhood Lead Poisoning	189	5/97	5/99	H
Neoplastic and Immunosuppressive Poultry Diseases	1,189	5/97	5/00	L
International Coral Reef Initiative Conference	128	5/97	5/98	E
Dead Sea Rift in Jordan and Israel	197	5/97	5/98	E
Total	73,567			
A—agriculture, D—democratization, E—environment, H—health, L—livestock M—mariculture				

3



Scientific Accomplishments And Shortcomings

MERC GRANTS FURNISHED OPPORTUNITIES for scientific and technical achievement and the establishment of a scientific infrastructure to sustain future development efforts. To what extent did MERC projects take advantage of the opportunity, achieve their goals, and meet expectations? The analysis that follows provides an answer to that question in a representative, rather than a comprehensive, manner.

Agricultural and Livestock Sector Projects

MERC projects in agriculture (nearly \$30 million from fiscal 1979 through fiscal 1997) sought new technologies to address the problems that plague agriculture in the region. Mutual interests prompted Egyptian and Israeli participation. Egypt was anxious to increase the efficiency of food production and bring new lands into production. Its arable land was deteriorating and increasingly saline, a result of poor drainage, overused land and water, and

the construction of the Aswan Dam. Israel, too, faced a declining amount of land under cultivation and shortages of freshwater. Both countries pursued solutions in new technologies: crops that flourish in highly saline soils or improved methods of reclaiming arid lands for agriculture.

The Cooperative Arid Lands Agriculture Research project looked into possible technologies for using saline water for irrigation, for producing fodder, and for enhancing the genetic makeup of local goat breeds. In Egypt and Israel, program scientists worked to develop melons and tomatoes that could be grown with saline water. This involved many studies on salt tolerance and the effects of salt on fruit quality. The Egyptian team produced a salt-tolerant cultivar, the Edkawy tomato, while the Israelis found better methods of processing tomatoes with saline water. Scientists also worked to genetically enhance local goat breeds. They succeeded in cross-breeding the Barki goats of the western desert with the Dam-

ascus goat for better animal weight and milk production. By 1990 most herds had been crossed with the Damascus breed, a benefit for Bedouin herders. Increasing production of fodder was another goal of the program.

Identifying and testing appropriate land management techniques was the work of the Trinational Agricultural Technology Exchange and Cooperation project. Participating scientists adopted an integrated approach, testing innovative Israeli and Egyptian technologies for crop water use and cropping systems, soil nutrition, and pest control. Experiments with

solarization (covering moistened land with tarps during the summer months) succeeded in removing soilborne pests for better crop yields. The program also had a livestock component. In both Egypt and Israel, scientists tested and refined new kinds of feeds and new systems for calf rearing. The Israelis also developed a technology for reducing the effects of “heat stress” on milk production. Seventy percent of Israeli dairies have adopted it.

Like the cooperative arid lands project mentioned earlier, the Trinational Nubaseed Development project extended understanding

Agriculture Initiatives: Mixed Reviews

The [Trinational Animal Health Research] project promoted scientific research capacity building and, consequently, the scientific level of expertise, in-country, has been elevated. This resulted in a new level of service available to the public and to the producer.

—*Final Evaluation Report, 1995*
Trinational Animal Health Research

An exciting breakthrough in salt-tolerant forage shrubs, using *Medicago arborea*, was made by Egyptian scientists with plant material obtained from Syria. Egyptian program participants made seeds of this species available to Israeli participants who otherwise probably could not have obtained them and were apparently unaware of the value of the species.

—*Final Evaluation Report, 1990*

Cooperative Arid Lands Agriculture Research Project staff were unaware of the kinds of data they should be prepared to provide. . . . Benchmark surveys of the initial conditions of the target areas for the new varieties were not conducted. This lack of accurately collected and reliable data, particularly in Egypt where the bulk of project activities are conducted, resulted in difficult-to-assemble and barely adequate data for evaluation.

—*Final Evaluation Report, 1992*
Trinational Nubaseed Development

of agricultural production on arid lands in Egypt and Israel. Its purpose was threefold: 1) develop varieties of fruits and vegetables for production in desert environments; 2) establish an experimental farm in Nubariya, in Egypt, to test new technologies (that is, irrigation methods transferred from Israel); and 3) establish a training program in Israel for Egyptian farmers and agronomists. The experimental farm exceeded original project targets for the planting of fruit orchards and new vegetable crops. The tomato and watermelon varieties did particularly well. A lack of equipment, though, prevented a new nursery from functioning adequately.

The Nubaseed project encouraged technology transfer in three ways: 1) it established Israeli and Egyptian training programs for farmers, 2) it transferred new horticultural and irrigation technologies, and 3) it divided the labor such that new hybrid varieties developed in Israel would be tested at the Nubaseed site in Egypt. Similarly, the Integrated Agricultural Development project encouraged the transfer of technologies between Egypt and Israel, in addition to renovating the agricultural station in Maryut, in Egypt. In particular, cool-season vegetable production under plastic greenhouses and in tunnels proved viable for arid lands.

Veterinary projects such as the Trinational Animal Health Research Project (\$6,899,000 for the sector) were designed to seek ways to curb the rates of death and disease among herds and help livestock adapt to arid lands. The project expanded scientific infrastructure for studying livestock health in both Egypt and Israel by installing new laboratories to specialize in grazing and farm animals. As a result, Egyptian and Israeli scientists improved the

exchange of data and technologies. Studies of neonatal calves in Egypt and Israel, as well as subprojects in brucellosis and foot-and-mouth disease, produced new methods of prevention, detection, and disease control.

Many of the projects had three, four, or even five subprojects. Even the most successful ran into difficulties. For example, while the Nubaseed project succeeded in establishing an agricultural station to test and adapt new methods and crops, inadequate data collection hindered analysis and reporting. MERC projects also suffered from conflicting research agendas and research preferences. The aforementioned trinational agriculture program, for example, was designed to test methods of technology exchange and dissemination. However, in the dairy production subproject, the Israelis emphasized new methodologies for achieving greater efficiency while the Egyptians worked to develop more economic feeds. These different agendas made transfer of technology less likely. Similarly, different preferences—to advance theory or to apply basic research—also hindered the transfer of technologies. In the trinational agriculture program project's large water-use and cropping systems subproject, Israeli scientists investigated highly technical aspects while their Egyptian colleagues were conducting farm-oriented research.

Despite these differences in procedure and conflicts in approach and priorities, MERC projects aided both the Israelis and the Egyptians in finding solutions to their problems. By inaugurating new ventures in crops, soils, and irrigation research and by expanding institutional capacity, particularly in Egypt, the projects promoted sustainable development in the sector.

Health Sector Projects

MERC grants in public health (\$15,774,000 during fiscal 1979 through fiscal 1997) supported projects that studied the region's infectious diseases. The projects were similar in several ways. They furnished the necessary infrastructure (laboratories, equipment, trained personnel) to study infectious diseases, their causes, prevalence in certain populations, and mode of transmission and then recommended systems for prevention and treatment. Working in tandem with central governments, local authorities, or individual communities, the projects emphasized disease containment.

Subprojects in participating countries generally studied local manifestations of each dis-

ease or separate research questions. National priorities, scientific practice, and the logic of "sunk costs" (costs already incurred and not subject to variation) pushed for this division of labor. More recent projects, such as Basic and Applied Research in Tropical Diseases of the Middle East, included a larger number of participants, such as Jordan, Lebanon, Morocco, Palestine (West Bank and Gaza), and Tunisia, when opportunities arose.

In the Middle East Regional Infectious Diseases project, researchers in Egypt, Israel, and later Gaza conducted a longitudinal study of viral hepatitis and liver disease and a broad study of chronic diarrheal disease in children. Viral hepatitis is widespread in the region, particularly in Egypt, where the rate is at least five

Accomplishments on the Health Front

The level of awareness of the disease [leishmaniasis] throughout [Lebanon] is relatively low but is improving as a result of contacts made with local officials and health care professionals, as a result of the "propaganda" campaigns carried out in villages and communities where suspected cases were reported.

—*Final Evaluation Report, 1996*
Basic and Applied Research in Tropical Diseases of the Middle East

The prevalence rates of all forms of hepatitis in the Kalama village, found through the pilot study, were remarkably higher than health officials had suspected, indicating a public health situation of considerable magnitude.

—*Final Evaluation Report, 1996*
Middle East Regional Infectious Diseases

The work [Israeli leishmaniasis module] is from the 21st century. . . . One accomplishment is the development of a stained-bait technique to study dispersal of sand flies.

—*Final Evaluation Report, 1991*
Epidemiology and Control of Vectorborne Diseases in the Middle East

times that of the United States. It is a major cause of liver disease throughout the region. In Israel, where a growing population of African-born Israelis suffer from a rate of disease akin to that of the Egyptians, it is of increasing concern. The chronic diarrheal study, in Israel, isolated the pathogens that cause the disease. The study examined how environment, nutrition, socioeconomic status, and relative health of the immune system affect vulnerability to the disease. The viral hepatitis study had wide-ranging consequences; all three participants succeeded in documenting its prevalence and demonstrating the importance of screening blood donations, which had not been done before in Palestine. The Israeli evidence supported the need for mass immunization for hepatitis-A, even though the rate of family transmission is low.

Projects investigated several vectorborne diseases and the pest populations that carry them. Scientists from Israel, Jordan, and Palestine participated in a project named Environmental Solutions to Problems Caused by Arthropods. The scientists evaluated seasonal changes, over time and space, in the distribution of houseflies and mosquitos. Methods for trapping flies need refinement. These pests attack crops and spread malaria, gastroenteric diseases, and viral encephalitis. They also compromise the environment. Researchers found that Israeli and Jordanian agricultural practices cause fly infestations and create conditions for mosquito breeding. They located breeding grounds in Gaza, Israel, and Jordan. They also found the biocontrol agent Bti can destroy mosquito larvae. This project had immediate utility and application for participating scientists.

Two final projects sought a greater understanding of several vectorborne tropical diseases, particularly leishmaniasis, filariasis, and ricketts. Only Israel and Egypt took part in the earlier project, Epidemiology and Control of Vectorborne Diseases in the Middle East. This project charted the prevalence of such diseases, appraised new diagnostic methods, and isolated the determinants of outbreaks. The second project, Basic and Applied Research in Tropical Diseases of the Middle East, used knowledge from the first project to concentrate on treatment and control programs at the regional level. The project was expanded to include Jordan, Lebanon, Morocco, and Tunisia. Objectives were tailored to suit the needs of these countries. With the exception of the Tunisian subprojects, the teams made significant progress in developing new forms of diagnosis and treatment and forming liaisons with state agencies for future implementation.

Environmental Sector Projects

Middle East Regional Cooperation Program grants underwrote several environmental projects totaling nearly \$5.5 million from fiscal 1979 through fiscal 1997. * The earliest measured the effects of pollution in the region. Each project surveyed the extent of the problem, constructed models to predict future changes, and proposed sound methods of limiting the damage.

*This figure includes the allocation for the EcoPeace program elsewhere listed as a democratization project.

Two projects addressed aquifer overuse and exposure to pollutants and saltwater. Recent increases in domestic, industrial, and agricultural demand for water have subjected aquifers to excessive and unregulated groundwater pumping. In the Monitoring and Modeling of Saltwater Intrusion in Gaza and Morocco project, scientists studied the process by which salt water surges into aquifers whose fresh water has been pumped out faster than it can be naturally refilled. Water quality in the coastal areas of Morocco and Gaza has declined as a result, creating problems for all users. Scientists in Israel, Morocco, and Palestine set up systems to monitor aquifers and well use. Then they constructed models to project trends in aquifer salinization. The objective was to transfer modeling systems and information to a local agency for future water resource management. The Moroccans were better prepared to

do so. This project accomplished its objective. And it had the added benefit of uncovering the important fact that waste water, not salt water, poses the primary threat to aquifers.

Another initiative was the Wastewater Recycling and Reuse project. It explored how irrigation with waste water, and the discharge of domestic and industrial waste water near recharge areas, affected the quality of a mountain aquifer shared by Israel and Palestine. Scientists in the region were concerned that pollutants had already contaminated both wells and large segments of the aquifer system. After analyzing the problem, preparing databases, and constructing models of the groundwater system, they attempted to classify certain areas as “environmentally sensitive or not.” Researchers also ran risk assessments for wastewater reuse in agriculture and drafted scien-

Assessing Wastewater ‘Quality’

All in all, the Suez pond systems . . . are highly effective in consistently producing waste water to a very high standard. The . . . charts from project research reports indicate the levels of reduction for total coliforms, fecal coliforms, and bacteria.

—*Final Evaluation Report, 1993*

Technological and Environmental Health Aspects of Wastewater for Irrigation

The project has carried out a risk assessment analysis which determines the statistical risk of disease under various wastewater reuse qualities. The project staff have conducted various experiments involving irrigation with waste water of various qualities and have utilized data based on cholera and other epidemics stemming from human ingestion of wastewater-irrigated vegetables. . . . The data suggest that the World Health Organization standards for wastewater reuse for irrigation of vegetables are satisfactory...

—*Final Evaluation Report, 1993*

Wastewater Recycling and Reuse

tifically tested standards for wastewater reuse. Overall, the project sought to provide a mechanism for Israel and Palestine to jointly manage the aquifer.

Because irrigation with waste water is prevalent in the region, a project called Technological and Environmental Health Aspects of Wastewater for Irrigation examined one particular approach to wastewater treatment: the use of stabilization ponds. Researchers compared different pond technologies and micro-organism removal methods in Egypt and Israel. The project looked at three possible applications of pond technology: 1) treating domestic waste water for potential use in agriculture and aquaculture, 2) reusing treated wastewater for commercial fish production, and 3) later using fish-pond water for land reclamation. Project scientists demonstrated that properly treated waste water (in accordance with World Health Organization standards) could be used for agriculture and possibly aquaculture, with further enhancements. The project also ensured the continuation of the main project site, the Suez Experimental Station. It is now incorporated into Egypt's National Institute of Oceanography and Fisheries as a facility for research, demonstration, and training.

One project did not support scientific research as such but rather institution building. EcoPeace, a regional nongovernmental organization, was established as an umbrella organization whose mandate is to “build a broader constituency and deeper ties among the local and national environmental NGOs.” The organization required funds to expand its operations and increase capacity. EcoPeace accom-

plished the two goals outlined in this project: institution building and an inventory of regional development projects. The group guaranteed its own viability by strengthening regional operations and opening a central office. It initiated outreach for new members and established better networks for information sharing. In turn, EcoPeace provided institutional support to local NGOs and produced a plan of future activities.

Maricultural Sector Projects

MERC funded four phases of the Cooperative Marine Technology program (\$16,259,000) from fiscal 1979 through fiscal 1997. Although there was some overlap in research, they were four distinct projects.

CMT-I addressed Egypt's and Israel's lack of capacity to conduct theoretical and applied studies in oceanographic science. This phase aimed mainly to erect a scientific apparatus—that is, to construct and equip new facilities and assemble and train staff. The “anchor project,” charting the biological productivity of the southeastern Mediterranean, necessitated the purchase and reequipping of boats to perform offshore research. This first effort at data collection set the baseline for future projects. Moreover, it alerted researchers to the drastically low levels of nutrients in the area, one explanation of low food productivity.

CMT-I also examined coastal erosion along the Nile littoral cell, with the purpose of fostering regional coastal management. A later project, CMT-III followed up on this initiative. It constructed a model to predict changes

in erosion, evaluate the effects of proposed coastal structures on erosion, and look at sediment flows. While the Egyptians made significant progress on these objectives, the Israelis attempted to understand “larger processes” before constructing a model. These differences in approach and preferences—applied versus theoretical—were not uncommon in MERC.

Another facet of the Cooperative Marine Technology program was the opportunity for learning. This was evident in two lakes management projects. During CMT-I, the Egyptians concentrated their research on how changes in salinity had altered Lake Manzalah. The Israelis, for their part, sought to reduce levels of algae in Lake Kinneret and understand a decline in the fish harvest. The Israelis found solutions to both problems by increasing the population of blue tilapia. But the Egyptians,

with little equipment, were able only to conduct basic surveys of Lake Manzalah. Lacking a common motivation, the two investigations could do little to assist each other.

By CMT-III, the lakes management sub-project had evolved. Investigating the effects of lake ecosystems on fisheries and water-quality management, researchers in Egypt and Israel studied similar phenomena in Lake Kinneret and Lake Qarun. The result was better science. They shared data (on bacteria, plankton, salinity, water quality, and pesticides and parasites in fish) and analyses. Their collaborative work led to recommendations that the Egyptian government move fisheries elsewhere and treat all water entering Lake Qarun.

All the phases had one or more sub-projects on aquaculture: fish breeding, fish

Mariculture: Of Fish and Sand

The techniques developed under the phase III-A activities in Egypt and Israel for controlling reproductive processes in several species of commercially attractive marine fish, apart from the obvious commercial production advantages, represent a very important strategic advantage in research. This is so because most of the fish studied usually reproduce once a year and successful research in the past was highly dependent on a successful natural spawn.

—*Final Evaluation Report, 1993*
Cooperative Marine Technology-III

In Israel, work under the shoreline activity led to the introduction into Israeli law of the concept of shoreline sand as a commercial commodity. Under this new concept, local port authorities and private developers can no longer use coastal sand indiscriminately and without regard to the effects of their removal on other portions of the shoreline.

—*Final Evaluation Report, 1993*
Cooperative Marine Technology-III

nutrition, commercial production of particular breeds. At the outset, in CMT-I, the quality of infrastructure hampered Egyptian research. However, after training and infrastructure development, Egyptian scientists were able to cooperate extensively in CMT-III on nutrition for fish in brackish water and the production of mullet. By CMT-IV, both Egyptians and Israelis participated equally in studies on sea-food safety and aquaculture decontamination techniques.

The Cooperative Marine Technology program, as a whole, did receive some criticisms. The evaluation team noted unevenness in the level of science (better in CMT-III than in CMT-IV). Scientists interviewed suggested that the subprojects could have addressed more critical problems. Problems with data collection hampered research. For example, one CMT-IV subproject was to examine the marine ecosystem off the Egyptian Coast. The goal was to determine the cause of declining fish harvests there since the building of the Aswan dam. To meet project targets, scientists needed to produce a complex food-web analysis, which

required hydroacoustic assessments of the area. But each component of the Egyptian-Israeli team was forced to purchase different, inappropriate, non-user-friendly, and incompatible equipment, making collaboration almost impossible. Furthermore, data interpretation remained uncertain as some researchers may have mistaken background noise for fish.

Most of the CMT subprojects achieved their objectives. The program provided the apparatus for continued research and established mechanisms for joint coastal and lake management.

The discussion above demonstrates that the Middle East Regional Cooperation Program made important contributions to scientific and economic development in Egypt and Israel. With accomplishments in each sector, MERC projects promoted sustainable development in three ways. First, they supported advances in innovative, applied technologies. Second, they helped strengthen the infrastructure for research. And third, they fostered transfers of technology beyond national boundaries.

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The MERC Program and Peace Building

THE MIDDLE EAST REGIONAL COOPERATION Program was designed and implemented primarily as a program of scientific, and not political, cooperation. Neither Congress, which earmarked funds for it, nor USAID, which managed it, expected the program to directly transform the complex political interactions between Israel and its neighbors. Rather, they expected that the engagement of experts from these countries in common scientific and technical pursuits would produce tangible benefits to these societies, demonstrating the value of mutual cooperation. By creating and facilitating contacts at the individual and institutional levels, the program would help to strengthen constituencies for peace.

These premises, which underpin the MERC program, have not been critically examined by USAID, the State Department, or the participating Middle East or U.S. institutions. Little attempt has been made to gather data and information on the subject. First, it was considered unwise to gather systematic information, lest it give the impression to participants that the purpose of the program is political. Second, the effects of the program

on peace tend to be indirect and even elusive; they are difficult to conceptualize, much less put into operation. So we know little about how, overall, the program affected peace building.

The evaluation team discussed the subject with participating scientists, administrators, and scholars. The team's open-ended discussions indicated that although MERC does make a contribution, its effects are modest. Certain general conclusions about forms of emerging cooperation and new pathways toward normalization did emerge as a result of these interviews and reviews of project documents. These are discussed below.

Positive Images and Perceptions

Participating scientists were clearly affected by the experience. The initial encounters began with considerable hesitation, if not overt hostility. But they blossomed, in many cases, into close professional and then personal relationships. Many of the researchers regularly called their present and past counterparts, ex-

changed gifts, arranged for family visits, and phoned one another, even in the aftermath of unpleasant political incidents.

Such relationships have led to the dissipation of long-held stereotypes and negative images and perceptions of peoples from the antagonistic countries. For most Egyptian or Israeli scientists, MERC conferences or workshops constituted the first opportunity to meet in a peaceful environment. One theme recurred in the team's interviews: the contacts drastically changed negative images of the "other"—first, of colleagues, and later, of their compatriots. Many scientists and technical counterparts found they have the same yearning for peace and coexistence. The scientists were acutely aware of the need for consolidating peace in the Middle East.

Despite their concern for peace, there is little evidence the scientists tried to influence directly the foreign policies of their governments. An overwhelming majority of the scientists interviewed defined their mission as doing science and not peace. As a result, they had little or no involvement in politics. Only a few played any advocacy role to promote peace in the region. And fewer still were asked by their governments to give policy advice on foreign affairs. Thus their influence on foreign policies seems marginal, at best.

Promoting Institutional Cooperation

There is little doubt that the MERC program has promoted institutional cooperation

Transforming Stereotypes

Israelis saw us as terrorists, and we invariably saw them as oppressors who have taken our lands and continue to deny us our legitimate rights. But our gradual engagement eroded these stereotypes. When I gave a lecture at [an Israeli] university, the hall was packed to the full. My lecture was attended by professors, scientists, students, and senior university officials.

—*Palestinian scientist*

As one who participated in all three wars with Arabs, I must confess that I see them differently than I did in the past. My contacts with Egyptian scientists have changed my whole thinking. They are nice, friendly people who want peace as much as we do. I hope that our leaders realize that.

—*Israeli agricultural specialist*

When I first met . . . in the first meeting, I was rather formal, not very friendly. Nor was he. But we have now become good friends. I now realize that both Israelis and Egyptians have much in common.

—*Egyptian scientist*

between scientific institutions in Egypt and Israel, in agriculture as well as in other fields. In general, cooperation evolved, from indirect to direct contact and from mediated endeavors (by a U.S. intermediary) to genuine, direct, collaborative projects.

Evolution of Modalities For Cooperation

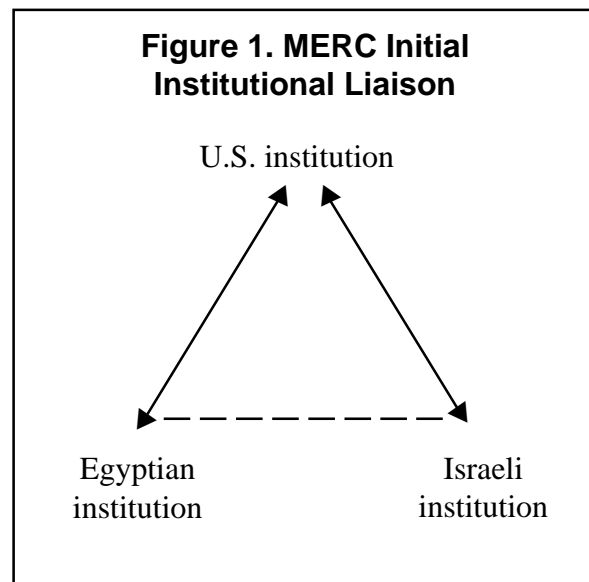
No scientific cooperation existed between Israel and Egypt before the MERC program. The very notion of such cooperation was considered “unrealistic” if not utopian. In Egypt, public sentiment was against it and many professional organizations and syndicates opposed it. Nor did the universities favor it. The situation was only slightly better in Israel, where mainstream scientific communities doubted the prospects for meaningful scientific interactions with Egypt. The government was indifferent, though not hostile. In such circumstances, cooperative projects were a trailblazing institutional innovation.

It is telling that Egyptian and Israeli institutions did not sign formal bilateral or even trilateral (including the United States) cooperative agreements for early MERC projects. Rather, Egyptian and Israeli institutions entered into separate agreements with the same U.S. institutions. Cooperation between the participating organizations of the two countries was primarily mediated through U.S. intermediary institutions, as indicated in figure 1.

The first MERC project, Cooperative Marine Technology-I provides a good example. In this project, two separate agreements were signed: one between the New Jersey

Marine Science Consortium and the Oceanographic and, in Israel, the Limnological Research Institute and the other between the New Jersey group and the Egyptian National Institute of Oceanography and Fisheries. The meetings of the participating institutions were organized by the New Jersey consortium and were held in the United States or a third country acceptable to both Israelis and Egyptians. Often communications by Israelis and Egyptians were addressed to the U.S. institution, which then sent it to the participating institutions. The first health project, Epidemiology and Control of Arthropod-borne Diseases, relied on the same type of arrangements. In the first era of the MERC program, only the Cooperative Arid Land Agricultural Research Program could be labeled a truly trilateral endeavor, as all parties signed the agreement.

In the highly volatile environment of the early 1980s, such arrangements were often a political necessity to protect the participating scientists and their organizations from extrem-



ists, particularly in Egypt. They shielded scientists from possible political criticisms. Egyptian scientists in CMT-I, for example, insisted they only had a bilateral agreement with a U.S. institution—not a trilateral relationship that included Israeli institutions. When questioned by critics, they would argue that although they themselves did not favor institutional cooperation with Israel, they were not in a position to prevent U.S. institutions from entering into separate cooperative agreements with the Israelis.

In practice, the absence of formal agreements did not pose major obstacles to institutional cooperation. Scientists from participating institutions could share their data and findings, attend workshops and meetings, and undertake collaborative research activities.

Once the ice was broken and the political climate improved, there was less need for cooperating institutions to hide behind such informal arrangements. They entered into trilat-

Making Institutional Interactions Routine

An additional level of the impact towards peace is the growth in experience between the two governments and their marine science agencies. Through contacts of the leaders who accomplished real work together on the steering committee, through the real outcomes achieved by the principle investigators and researchers, and through addressing important issues with some or great success, there is a sense that these interactions are becoming normal, expected, and worthwhile.

—*Final Evaluation Report, 1997*
Cooperative Marine Technology-IV

It was apparent to the evaluation team that not only was there a desire on the part of each and every participant to continue the collaborative relationship, but, in fact, many of the scientists had already taken steps to ensure that the collaborative efforts would continue into the future. Joint proposal planning sessions had occurred prior to the arrival of the team in the region. . . . There is great enthusiasm to develop this activity into an even more regional concept by endorsing the inclusion of other country participants in the follow-on activities.

—*Final Evaluation Report, 1995*
Trinational Animal Health Research

The activities carried out by EcoPeace represent a substantial contribution to regional cooperation and collaboration. Almost without exception every activity was found to involve extensive collaboration between Israelis and Arabs.

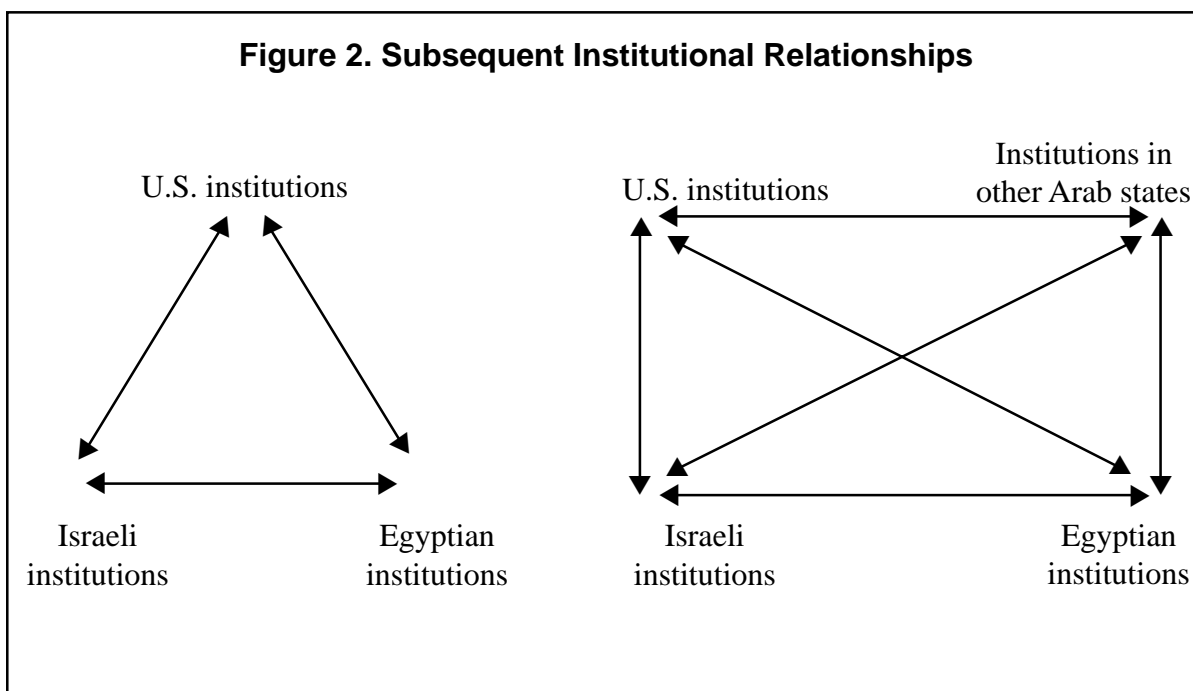
—*Final Evaluation Report, 1996*
EcoPeace

eral (involving the United States) and multi-lateral (with or without the United States) agreements as presented in figure 2. A survey of current MERC projects shows that more than 50 organizational entities in Israel, the Arab states, and the United States are or have been involved in ongoing trilateral and multilateral relationships.

In their interviews with the CDIE field team, government officials, scientists, and other experts in Israel and Egypt indicated that without MERC or a similar program with guaranteed funding and the imprimatur of the United States, collaborative projects would not have materialized between their institutions. MERC grants provided an inducement to reluctant scientists and concerned institutions to enter into cooperative arrangements despite the obvious political risks and a hostile environment.

Institutionalizing Cooperation

MERC projects have also helped institutionalize scientific cooperation activities, though on a small scale, between selected Egyptian and Israeli educational and research organizations. Because of the ongoing and past MERC projects, these institutions have now established procedures, organizational structures and, more important, networks for collaborative pursuits. As a result, they do not depend as much on the U.S. intermediaries as they did in the past. For example, in the Cooperative Marine Technology–IV project, the U.S. partner played a diminished intermediary role. The lakes management subproject had no U.S. research partner at all. Moreover, the organizations have been able to seek funds from other bilateral and multilateral donor agencies for their joint projects.



The fruits of such institutionalization are most visible in agriculture. Over the past few years, Israeli institutions established training programs for thousands of Egyptian farmers. Hundreds of farmers have visited agricultural fairs held in Israel. Institutional cooperation has aided an easy two-way flow in agricultural technology. Not surprisingly, trade in agriculture has also grown.

A recent independent study conducted by two eminent Israeli scholars attributes this cooperation to the joint research and demonstration projects supported by MERC:

[On the basis of] our research, interviews, and first-hand knowledge, we believe that without the initial, critical joint research projects conducted by scientists from both sides, it is unlikely that continuing government and private efforts (including the particularly popular and successful large-scale training program) would have been initiated. The training program was firmly based on the existing elaborate network of relationships between the two Ministries of Agriculture and on the goodwill that had been created between them. Such relationships did not exist at the beginning of the collaborative programs and have slowly developed as a function of interpersonal relationships of scientists working together. (Keynan and Shohan 1997)

There are also indications that MERC is helping to develop institutional infrastructures for scientific cooperation between Israel and other Middle Eastern countries. MERC's

highly successful Trilateral Animal Health Research project generated the formation, in 1996, of a Regional Veterinary Oversight Council. On it are the chief veterinary officers of Egypt, Israel, Jordan, and the Palestinian Authority. The council will initiate and coordinate regional veterinary projects. MERC also funded the nongovernmental organization EcoPeace, which has begun to play an important role in bringing about regional cooperation to solve environmental problems. The new generation of MERC projects likewise concentrates more on regional concerns.

Constituencies for Cooperation

As indicated in chapter 3, the scientific and economic benefits of MERC projects have been important for both Egypt and Israel. Cooperation has enhanced the research capacities of agricultural institutions. It has generated a body of knowledge that is being used to increase agricultural production and productivity, benefiting farming populations. These positive results have helped generate and nurture constituencies that have a stake in continuing agricultural cooperation between Egypt and Israel. The cooperation can contribute, if indirectly, to peace building.

In Egypt, constituencies for cooperation include research institutions and scientists who participate in cooperative projects, businesspeople involved in international trade of agricultural commodities and equipment, and progressive farmers interested in obtaining technology from Israel. The Egyptian Ministry of Agriculture, supported by these constituencies,

Improving Relations

People might have had doubts about the wisdom of cooperation with Israel 10 years ago but now we are convinced that it is advantageous to us. . . .

—Senior official in Egyptian Ministry of Agriculture

I can confidently say that MERC agricultural projects have brought us [Egyptian and Israeli scientists] together. We all have a common stake in peace.

—Israeli scientist

The continuation of the project will benefit the relationships between the two countries. Significant progress has been achieved in recent years through the mutual exchange of personnel and interaction in the field. There are indications that the continuation of these activities will enhance overall understanding between the two countries. [It] will also further reduce misunderstandings and misrepresentations which still exist.

—Final External Evaluation, 1992
Trinational Nubaseed Development

has pursued its own agenda for cooperation. In so doing it has brushed aside the concerns of the foreign policy establishments.

Limitations of Cooperation

MERC projects have contained two inherent limitations in promoting cooperation and peace building.

First, in most projects direct collaboration has been limited by the very design of the research. Most studies undertaken were “parallel” investigations, in that the scientists worked independently in their own countries on similar, but not identical, research problems. Par-

ticipants in the earlier projects did not work jointly on a research problem. They did not follow a single research design and gather and analyze data for joint publication. Given the differing considerations of needs in the countries, sometimes wide differences in their institutional capacities, and early mistrust of the “others” working in the program, this approach was sensible. But an obvious consequence has been that opportunities for individual and institutional cooperation have been limited.

In some cases cooperative activities in many MERC projects were confined to technical advice, occasional site visits, and participation in annual or biannual meetings and workshops. The case was different with agri-

cultural and mariculture projects that had research stations and training components. In such projects, more intensive interactions were required, and that led to closer individual and institutional relationships.

Second, in most projects, a national coordinator, principal investigators, and occasionally a few scientists met once or twice a year. Because joint collaborative research was limited, junior scientists did not interact with their counterparts. Interviews with scientists indicated that in most projects only 10 to 20 scientists from Israel and Egypt regularly interacted

with one another during the life of a project. Well-funded international research projects tend to have an “elitist bias.” MERC projects were no exception.

Overall, though, despite the modest size of the Middle East Regional Cooperation Program, the effort has had some positive effects on peace building. MERC projects have promoted individual contacts, if on a small scale. Initial contacts have produced professional and then personal relationships, dissolving old stereotypes and hostilities. MERC has initiated and sustained important linkages between a

Problem Areas in Scientific Cooperation

The scientific activities of the original participants of the [Middle East Rural Infectious Diseases] Project were conducted largely independently of one another, with very little evidence of true interdependent collaboration among the different research groups. . . . Cooperation among the Egyptian and Israeli participants was largely confined to joint attendance at meetings and limited exchange of samples. To date, no joint publications have resulted.

—*Final Evaluation Report, 1996*
Middle East Regional Infectious Diseases

The Wastewater Reuse Project has strengthened the ties among a relatively small group of Israeli and Egyptian researchers that first came together under the Marine Technology subproject activity. This group consists of approximately 10 Israeli and Egyptians who periodically visit each other's countries, remain in contact by telephone and fax, and meet at professional meetings and conferences.

—*Final Evaluation Report, 1993*
Technological and Environmental Health Aspects of Waste Water for Irrigation

The scope of this project has been quite narrow, concentrating on modeling of salt-water intrusion in coastal areas. Consequently the number of parties involved . . . has been quite small as has the number of personnel from governmental agencies.

—*Final Evaluation Report, 1996*
Monitoring and Modeling of Saltwater Intrusion in Gaza and Morocco

number of universities and research institutions in Egypt and Israel. These institutions now take their own initiative in expanding regional cooperation. Finally, the scientific and economic benefits generated by MERC projects in agriculture, in particular, have nurtured political constituencies. These have a stake in continued scientific cooperation—and thus in the peace process. The cumulative achievements of MERC have been aptly presented by Keynan and Shohan (1997):

Fifteen years of close agricultural cooperation . . . have made significant differences in the governmental relations between the two countries. . . . Cooperation has created a stronghold of friendship with the Egyptian Ministry of Agriculture and created at least one strong supporter of normalization between Israel and Egypt at the highest level of the Egyptian cabinet. This is no small achievement.

5 ~

Factors Affecting Performance and Outcomes

FACTORS AFFECTING THE PERFORMANCE and outcomes of MERC projects fall into two broad categories. The first category consists of factors that tend to influence the performance of all cooperative scientific research projects. These include quality of the research design, caliber of cooperating scientists, and research capacities of the participating institutions and other cooperative activities. The second category consists of environmental factors (political climate, national priorities, differences in the organization of research, availability of and access to both managerial resources and funding) that influence the performance of transnational cooperative projects. This chapter examines this second category. It highlights the ongoing political tensions and conflicts that have affected MERC.

Political Climate

The historical all-pervasive climate of mutual distrust and hostility between cooper-

ating countries has been a critical element. Its adverse effects have been felt not only during the initial negotiations for projects but also, and more important, at the project implementation stage. High political tensions derailed many projects. That caused them to miss agreed-on deadlines and promised outputs. Conversely, periods of relative peace have witnessed fewer bureaucratic hurdles and greater coordination of activities.

During political upheavals, many scientists have experienced emotional stress because of the threat of personal and social ostracism. They have worried they might be labeled as friends of the “enemy,” which might impair career advancement. This has undoubtedly affected overall morale and performance. Even in relatively more peaceful times, many Egyptian scientists have faced difficulties in obtaining visas for overseas trips, in inviting their counterparts for site visits, and (in some cases) exchanging collected project data. Consequently, scheduled foreign trips have been post-

poned or even canceled, invitations to counterparts delayed, and communications routed through the U.S. intermediary institutions. Although some of these problems have been attributed to general bureaucratic inertia, others were created by government officials and political leaders opposed to scientific cooperation with Israel.

Similar problems have befallen Palestinian and Israeli researchers working together on recent hydrological and health projects. Periodic closing of the Israeli border to Palestinian residents has delayed meetings, workshops, and data collection. With the implementation of the 1993 Peace Accords and transfer of territory to the Palestinian Authority, Israeli censors have refused to release certain materials (such as aerial photographs of the southern West Bank) to Palestinian participants or have denied Palestinian researchers access to certain hydrological data. Palestinian hydrological data collection has been sporadic since 1993, making Israeli sources all the more valuable. The political climate has profoundly affected project viability.

Government Commitment And Perceived National Interest

The governments' commitment to and support of cooperative projects has been the second most important factor. When governments considered a MERC project to be of prime national interest, the roadblocks created by a generally unfavorable political climate have been overcome, contributing to the speedy implementation of the project. Such projects have the following distinguishing characteristics: 1) they fit with the current political agenda, 2) they draw support from influential figures and constituencies, and 3) they are recognized as a source of economic benefit with immediate and widespread applications.

A major factor in the success of agricultural projects thus has been that Egypt and (to a lesser extent) Israel have viewed agricultural cooperation as vitally important. Egyptian policymakers had been long impressed with the remarkable progress made by Israel in arid and semiarid agriculture. They were keen to learn

Political Barriers to Cooperation

The medical syndicate charged with accrediting Egyptian health professionals still prohibits travel of its members to Israel. Although that provision is not enforced actively, its mere existence means that Egyptian professionals who openly travel to Israel, even under the present circumstances, may be jeopardizing their careers should the political situation change.

—*Final Evaluation Report
Middle East Regional Infectious Diseases*

from Israeli expertise and experience in protected (plastic greenhouse) agriculture, saline water irrigation systems, and cultivation of export crops. The Israelis wanted access to Egyptian varieties of wheat, cotton, and double-cropping technologies, as well as to Egyptian markets for their agricultural technologies.

Clearly, cooperation has benefited from the support of an influential supporter, Dr. Youssef Walli, deputy prime minister and minister of agriculture. He has long been convinced that agricultural cooperation with Israel is essential to modernizing Egyptian agriculture in a cost-effective manner. Consequently, the Ministry of Agriculture has consistently supported MERC agricultural projects. When its employees were reluctant to volunteer for these projects for fear of social ostracism, the ministry officially assigned them. When the necessary permission for overseas visits from participating scientists was not forthcoming from the Foreign Ministry, the deputy prime minister personally intervened. He and his senior aides have met regularly with visiting Israeli agronomists and scientists, demonstrating ministry support and commitment.

The positive economic benefits of agricultural cooperation for Egypt and Israel have justified initial expectations: increased trade, training missions, transfer of technologies. This has further strengthened the constituencies for agricultural cooperation—farmers, businessmen, exporters, agroscientists. It is reported that when the Foreign Ministry opposed further agricultural cooperation with Israel, the Ministry of Agriculture, pointing to the many Egyptian farmers enjoying economic benefits of the teamwork, overcame the resistance.

MERC projects in other sectors—marine, health, and environment—have generally not been perceived as matters of prime national interest. They have not, therefore, evoked strong support from the government, influential leaders, powerful ministries, and their clientele. Despite their practical relevance in developing these sectors, such projects have experienced political resistance and suffered many implementation problems that were not easy to overcome.

Institutional Asymmetries

Asymmetries in the institutional infrastructure for science between Israel and Egypt have also influenced the design and implementation of MERC projects.

The Israeli scientific infrastructure in certain sectors is highly developed and at par with industrial countries. Professional staff are generally well paid and well trained, and the rewards system puts a premium on research and publication. Israeli scientists also have been encouraged to establish professional liaisons with colleagues abroad. The state provides important resources and encourages research that matches its priorities and policy goals, thus the transition from low-tech agriculture to high tech. Nevertheless, the academic scientific community is relatively free from direct government interference in project implementation and progress.

The Egyptian scientific infrastructure is relatively less developed. In Egyptian public sector research institutions, direct ministry project management is still evident, and scien-

tists have less independence in conducting research. Junior- and middle-level scientists are also not well paid. They take second jobs to supplement their incomes and so are not always fully able to devote themselves to research.

These differences have often gotten in the way of collaborative research. Many of the Israeli scientists were reluctant to engage in joint research based on a common design and methodology partly because of these institutional asymmetries. Consequently, the first generation of MERC projects generally involved independent, parallel—not joint—research activities.

Because professional publications have not been a major consideration in their career advancement, Egyptian scientists often lacked incentive to publish. Consequently, the number of research articles published by Israeli and Egyptian scientists in MERC projects has differed significantly.

That said, it should be noted that over the past decade Egypt has made significant progress in improving its scientific infrastruc-

ture. For example, its agricultural research has rapidly expanded, narrowing the divide between Israeli and Egyptian research capacities. This may contribute to more meaningful future interactions between the two countries.

Managerial and Political Capacities of Intermediary Institutions

As discussed in chapter 2, the U.S. intermediary institutions have had to assume a wide range of roles and responsibilities in MERC projects for two reasons. First, USAID has treated MERC as a grant program; thus the Agency has not been involved in project implementation or management. Intermediary institutions have filled this administrative void. Second, the unfavorable political environment in which these projects have been designed and implemented necessitated continual outside help and assistance. As a result, the intermediary institutions have been responsible for a wide range of activities: disbursing grants, publishing reports, negotiating with USAID, finding qualified scientists in participating coun-

Differences in Research Priorities

Perhaps the largest problem related to the technical aspect of the project is the differences in both levels and areas of research. The Egyptian scientists were interested in conducting very applied field research that will develop site-specific management information on fertilizer needs, basic agronomic practices, and crop performance on different irrigation systems. . . . The Israeli scientists were interested in conducting research, from [the] practical to [the] theoretical, that will produce publications in high-quality journals.

—*Final Evaluation Report, 1991*
Trinational Agricultural Technology Exchange and Cooperation

tries, providing technical assistance to scientists, resolving disagreements between scientists, developing a research proposal in cooperation with the parties involved, helping participating institutions obtain the necessary clearances from their governments, organizing cooperative activities such as visits and workshops.

To discharge these responsibilities, the intermediary institutions have required both scientific expertise and managerial skills and political sensitivity. When the intermediary lacked these capabilities or engaged in only limited political networking, projects suffered and the outcomes were less than satisfactory. In this regard, Egyptian scientists interviewed criticized the support provided by the U.S. intermediary involved in the Middle East Regional Infectious Diseases project.

By contrast, the San Diego State University Foundation has contributed to the success of the Cooperative Arid Lands Agriculture project and the Integrated Agroindustrial Development (Maryut) project thanks to its investment in a special management support system and effective political networking. It has nurtured its contacts in the Ministries of Agriculture in both Egypt and Israel. These actions have enabled the foundation to resolve many problems that have plagued other projects.

Financial and Management Problems

Most of the MERC projects have faced some of the following financial and management problems, though at varying levels.

1. Nearly all projects have experienced difficulties with resource flow. General bureaucratic inertia, different reporting requirements, and differences between the accounting procedures of USAID and project institutions have prevented projects from obtaining allocated resources on schedule. Some projects have found it difficult to pay staff on time and occasionally lacked funds to undertake planned activities.
2. Procurement of necessary materials has been a universal problem. USAID regulations require that research equipment and machinery be procured from the United States through a competitive bidding system. This has caused delays. In many cases projects have waited for equipment more than a year from inception. This problem has been further compounded when the intermediary institutions were not fully conversant with USAID regulations and could not provide guidance to participating institutions.
3. In Egypt, principal investigators have often lacked authority to manage the planned activities. Such authority was frequently vested in an administrative staff not always conversant with technical details and research outputs. In a few instances, principal investigators have been managers as opposed to scientists involved in ongoing research.

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Policy Lessons for Future Programs in Conflict Situations

1. The effects of scientific cooperation on peace building are discernable at three levels.

First, participating scientists from the hostile countries developed professional and then personal relationships. That helped dissipate old stereotypes and enmities among them. Scientists from the two countries began to see each other as colleagues, with a shared yearning for peace. Second, the projects helped initiate and solidify institutional linkages. For example, the participating institutions jointly prepared MERC-type collaborative research proposals for other donor agencies, further strengthening the institutional relationships between them. Finally, the projects that produced tangible benefits helped build political constituencies for cooperation. Though not always effective, these constituencies were often integral to continued support for peace building. The constituencies surrounding the Ministry of Agriculture in Egypt were the most conspicuous example.

2. The overall effect of scientific cooperation on peace building tends to be limited.

There are several reasons. First, the political context continues to affect the nature and frequency of scientific interactions. Second, only relatively few scientists are apt to be involved in collaborative pursuits, even under the best of circumstances. Despite expenditures exceeding \$100 million during the past two decades, the number of Israeli and Egyptian scientists who came into personal contact with each other has been small, not more than 100. Third, attitudinal change in a small cohort of scientists does not affect the foreign policy behavior of the concerned countries. In neither Israel nor Egypt did participating scientists become politically active. Nor did their governments call on them for policy advice concerning relations between the two countries.

3. In addition to conforming to the norms of “good science,” cooperative science projects should pursue a scientific agenda that broadens support for peace building.

Good science is a necessary but not sufficient condition for peace building. MERC’s experience suggests that in conflict situations, scientific cooperation projects should meet a few other requirements as well. Although such requirements will differ from country to country, the following three requirements are mentioned by way of illustration.

First, as far as possible, projects should address problems perceived by the participating governments to be of prime national concern. Such targeting helps gain political support for cooperation. One reason agricultural cooperation between Egypt and Israel thrived, despite continual political tensions, has been that the Egyptian Ministry of Agriculture regarded cooperation with Israel as extremely useful in solving the agrarian problems facing Egypt.

Second, as a corollary to the first, applied research projects that produce visible, positive results have a better chance of winning government approval. Moreover, if successful, they can demonstrate the benefits of scientific cooperation. None of the projects funded by MERC was designed to solve a theoretical puzzle; all concentrated on applied research, including furnishing the infrastructure to execute it. This proved to be a prudent policy. Basic research is a long-term endeavor; it does not produce the more immediate results that can rally constituencies for cooperation.

Third, the projects should be designed to bring in a large number of scientists on both sides. As mentioned, one limitation of many MERC projects has been their reliance on a few scientists. Such projects have made only a limited contribution to generating professional and institutional linkages across national boundaries. By contrast, agricultural development projects with larger training and demonstration components expanded opportunities for cooperation at all levels.

4. Two prerequisites must precede scientific cooperation projects.

First, scientific cooperation cannot be undertaken in times of military conflict or extreme political hostilities. A political settlement is the primary prerequisite to scientific cooperation. MERC was only feasible when the peace accords had been signed and all active hostilities had ceased between Egypt and Israel. Only in the wake of Oslo I and the 1994 Israeli–Jordanian treaty did it expand to other countries. Second, the involvement of a third party that has friendly relations with the hostile countries is essential. Absent USAID involvement, for example, the prospects for cooperative projects were negligible, if not nonexistent. State Department and USAID support provided legitimacy to the idea of scientific cooperation. The Agency’s substantial grants induced resource-starved scientists and institutions to cooperate with one another.

5. Different modalities of cooperation need to be appraised and pursued.

To solve the same problem, projects in scientific research (as opposed to those in technical assistance) generally concentrate on collaborative research based on one design and using a common methodology and theoretical framework. The MERC experience demonstrates that such joint collaborative research is often not politically feasible during the early stages, when distrust remains and hostilities prevail among the scientists and their institutions. MERC projects used different modalities of cooperative research.

In the postconflict setting, scientists may initially cooperate only at the design phase. Or they may undertake parallel research, in which separate teams work more or less independently on different, but related, topics. Interaction may be limited to occasional workshops. Later, when some trust has been established, cooperation has become more routine, and the benefits more widely visible, the scientists can initiate and engage in collaborative joint research.

6. Conflict situations often pose major problems for project participants. Solutions to these problems should be developed during the planning stage.

Because of continuing political tension, cooperating scientists in MERC projects faced two sets of problems. First, the threat of personal and professional ostracism loomed large, especially when tensions were high. Indeed,

many Egyptian and Palestinian scientists took considerable risks in cooperating with their Israeli counterparts. Second, as a result of political resistance to their efforts, the scientists encountered problems in exchanging information, visiting cooperating institutions, and inviting their counterparts for site visits. These obstacles delayed implementation or made deadlines difficult to meet. The obvious lesson is that project design in conflict situations should allow for these problems and prescribe practical remedies. MERC project designs, for example, have incorporated greater flexibility with deadlines, budgetary allocations, and fungibility, as well as a readiness to hold meetings in third countries.

7. Multilateral scientific initiatives are better situated to overcome political obstacles than are bilateral projects.

Many of the recent MERC projects involve three and even four countries in the Middle East, giving them a regional character. Project leaders indicated that this regional emphasis has helped win legitimization and public acceptance. It has also helped marshal the necessary political and scientific support.

8. Donor agencies should use caution in promoting scientific cooperation programs as a tool for peace building.

In light of the obstacles, prerequisites, and other lessons highlighted above, donor agencies should be extremely cautious in replicating scientific cooperation programs and in selecting the contexts for their implementation.

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