Project in Development and the Environment

Strengthening Environmental Information/Education/ Communications in Jordan

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The objective of the Project in Development and the Environment (PRIDE) is to help the U.S. Agency for International Development (AID) design and implement programs that foster the agency's environmental and natural resources strategy for sustainable economic growth in the Near East and Eastern Europe.

PRIDE provides AID and participating countries with advisory assistance, training, and information services in four program areas: (1) strategic planning, (2) environmental policy analysis, (3) private sector initiatives, and (4) environmental information, education, communication, and institutional strengthening.

The project is being implemented by a consortium selected through open competition in 1991. Chemonics International is the prime contractor; subcontractors include RCG/Hagler, Bailly, Inc.; Science Applications International Corporation; Capital Systems Group, Inc.; Environomics, Inc.; Industrial Economics, Inc.; Lincoln University; and Resource Management International, Inc. In addition, AID has entered into a cooperative agreement with the World Environment Center to support implementation of PRIDE.

Strengthening Environmental Information/Education/ Communications in Jordan

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ACRONYMS

AAAS	American Association for the Advancement of Science
AID	Agency for International Development
CD ROMs	Compact Disk/Read Only Memories
CDS ISIS	(A library cataloging software from Canada)
CEHANET	Center for Environmental Health Activities Network
DE	Department of Environment
DOS	Disk Operating System
EEC	European Economic Community
EIA	Environmental Impact Assessment
EIC	National Environmental Information Center
EIS	National Environmental Information System
EPA	Environmental Protection Agency
EPAT	Environmental Policy and Training Project (AID)
ESCWA	Economic and Social Commission for Western Asia (United Nations)
GEC	General Environmental Corporation
GEC/DE	General Environmental Corporation/Department of Environment
GEF	General Environmental Fund
GOJ	Government of Jordan
HCST	Higher Council for Science and Technology
HRD	Human Resources Department
JCO	Jordan Cooperative Organization
JSCEP	Jordan Society for the Control of Environmental Pollution
JUST	Jordan University for Science and Technology
JVA	Jordan Valley Authority
MMRAE	Ministry of Municipal and Rural Affairs and Environment
MMRAE/DE	Ministry of Municipal and Rural Affairs and Environment/Department of Environment
MOA	Ministry of Agriculture
MOE	Ministry of Education
MOH	Ministry of Health
MOI	Ministry of Information
MOIT	Ministry of Industry and Trade
MOP	Ministry of Planning
MOS	Ministry of Statistics
MWI	Ministry of Water and Irrigation
NCARTT	National Center for Agriculture Research and Technology Transfer
NE	Near East
NEICC	National Environmental Information Coordination Committee
NES	National Environmental Strategy
NGO	Nongovernmental Organization
NIC	National Information Center
NIS	National Information System
OSP	Office of Serving the Public

PC	Personal Computer
PRIDE	Project in Development and the Environment (AID)
RFP	Request for Proposal
RSCN	Royal Society for the Conservation of Nature
RSS/HCST	Royal Scientific Society/Higher Council for Science and Technology
RSS	Royal Scientific Society
TOEFL	Teaching English as a Foreign Language
UNCED	United Nations Conference on Environment and Development
UNDP	United Nations Development Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNRWA	United Nations Relief and Works Administration
UOI	University of Illinois
UoJ	University of Jordan
USAID	United States Agency for International Development
USEPA	United States Environmental Protection Agency
USIS	United States Information Service
WAJ	Water Authority of Jordan
WEC	World Environment Center
WERSC	Water and Environment Research and Study Center (University of Jordan)
WHO/CEHA	World Health Organization/Center for Environmental Health Activities
WSU	Washington State University

ACKNOWLEDGEMENTS

This report would not have been possible without the generous contributions and hard work of many people. The Project in Development and the Environment (PRIDE) team was especially impressed with the high level of interest among many groups in Jordan in further developing environmental information systems, education/communication campaigns, technical/professional training programs, and organizational development activities. The team, working with our counterparts, quickly identified organizations in government, Nongovernmental Organizations (NGOs), research institutions, private sector agencies, and academic institutions that are involved in Jordan's environmental program. On several occasions representatives from all these groups came together for brainstorming sessions.

The official hosts for the team were the Ministry of Municipal and Rural Affairs and Environment (MMRAE) Department of Environment (DE) and the Jordan Society for the Control of Environmental Pollution (JSCEP). Suleiman E. Hanbali, JSCEP executive director, served as host for the weekly brainstorming meetings. Dr. Saqer Salem, secretary-general of JSCEP, chaired the brainstorming meetings. Dr. Saleh Al-Share', DE director, hosted a series of meetings in MMRAE and accompanied the team to several outside meetings. The official counterparts for the team, who made arrangements and accompanied the team, were Ramzi Al-Bataineh and Ra'ed Abu Hasan from MMRAE/DE; and Munir Adgham and Mohammad Khair Ababneh from JSCEP. It is impossible to list all the other organizations and individuals who contributed to this needs assessment. They represented government, NGOs, universities, broadcast services, private sector agencies, and many others. A list of the meetings held and people met is in Annex I.

This activity was funded through the PRIDE core budget supported by the Near East (NE) Bureau, United States Agency for International Development (USAID)/Washington. The arrangements and coordination in Jordan was handled by USAID/Jordan. Dr. Carl Dutto, Abdullah Ahmad, and Eman Zaboura (one of the first Jordanians to enroll in the new Environmental Management MSc. program at the University of Jordan) in the USAID Office of Water, Environment and Agribusiness, provided excellent guidance and support to the team. Thomas Oliver, USAID mission director, and others in the mission reviewed the team's findings and provided excellent suggestions.

Backstopping was provided by the NE Bureau-Gilbert Jackson, environmental coordinator, and Paul des Rosiers, acting PRIDE project officer, Dwight Walker, PRIDE project officer, who approved this activity and checked this report. The administrative backstopping for the team was provided by Alaa Shoreibah, PRIDE project assistant. This report was edited by Paula Hirschoff and formatted by Kerima Mered. Even though these three worked quietly behind the scenes, their efforts were vital to the success of this activity.

This needs assessment was the first of its kind. It is to be replicated in other countries. Therefore, a special thanks is accorded to all who contributed. And finally, we

want to thank the readers who will take the ideas and suggestions contained in the report and convert them to successful environmental information, education, and communications programs in Jordan. We wish you the best of luck in that endeavor.

EXECUTIVE SUMMARY

In Jordan senior officials and many interested groups are increasingly aware that they live in a fragile environment that must be protected. During the past year, a Jordanian National Environmental Strategy has been adopted outlining areas-water, industry, wildlife, agriculture-where attention must be focused. It will take the participation and cooperation of people and concerned institutions to address critical environmental protection issues. Developing an action program requires access to information on environmental problems. People and groups must be stimulated to participate, and institutions strengthened to address critical concerns. The National Environmental Strategy (NES), as with most similar documents in other countries, makes passing references to the need for environmental information, education, and communications activities, but contains no overall plan on how to activate them. This review by the Project in Development and the Environment (PRIDE) team, working with many Jordanian groups, is one step toward creating a road map to activate these important elements of a national environmental program.

The four-person team spent three weeks in Jordan working with governmental and nongovernmental agencies who are concerned with protecting the environment. The purpose of the mission was to help these agencies begin developing an action plan to strengthen environmental information systems, education/communication/awareness programs, technical/professional training programs, and organizational development activities. The recommendations contained in the report emerged from detailed discussions with numerous groups and individuals and three general brainstorming sessions involving more than 20 officials. The participants include officials from Nongovernmental Organizations (NGOs), the private sector, Government of Jordan (GOJ) line ministries, Department of Environment (DE), Ministry of Information (MOI), the scientific community, and universities.

Following this executive summary, the report is divided into five parts. Section I, which summarizes the findings and recommendations, is designed for policy makers. Sections II-V are the detailed reports by each team member summarizing findings and providing recommendations for strengthening the programs. These four sections are designed for the people who will develop the environmental information system, design and produce environmental awareness campaigns, conduct technical/professional training, and design organizational development programs.

On the following pages we present an outline of recommendations for the Jordanian organizations concerned with environmental programs and suggestions on how donors might support these programs. Donor assistance to government agencies would be provided through the Ministry of Planning (MOP).

I. Organizational Development

A. Enact the environmental legislation.

B. Establish participatory mechanisms for formulating by-laws and regulations/standards.

C. Implement a policy of allowing freedom of access to environmental monitoring information, including information on polluters.

D. Encourage more involvement of NGOs, educational and scientific institutions, private sector, and others in implementing the National Environment Strategy.

E. Strengthen and focus the roles/responsibilities of DE/GEC and create:

1. Project and External Liaison Unit
2. Environmental Information Center
3. Office for Serving the Public[1]

F. Key environmental agencies--government and nongovernmental--should conduct organizational development strategic planning exercises to prepare for strengthening their capabilities and capacities.

G. Opportunities for donor support:

1. Help establish participatory mechanisms to formulate by-laws and environmental regulations/standards.

2. Help prepare an action plan to implement National Environment Strategy with identification of institutional roles and responsibilities for implementation.

3. Conduct organizational development strategic planning exercises in key environmentally related groups (public, NGO and private sector) to focus roles and responsibilities, prioritize program focus, and prepare plans to strengthen institutions.

4. Help prepare a comprehensive organizational development plan for DE/GEC.

5. Establish a DE/GEC Project and External Liaison Unit and strengthen management capacity in DE.

6. Conduct seminars to help policy makers and senior managers (public and private sectors) understand Jordan's environmental concerns.

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[1] This is a direct translation from an Arabic phrase proposed by the MMRAE/DE staff.

7. Conduct workshops to develop an action plan to implementing the National Environment strategy.

8. Establish a Donor Environmental Coordinating Committee.

II. Environmental Information Systems

A. Establish a National Environmental Information Cooperation Committee.

B. Prepare a plan for establishing a National Information System.

C. Establish a National Environmental Information Center.

D. Produce biannually a State of Environment Report Card.

E. Build up capacity to train users of the Environmental Information Center.

F. Opportunities for donor support to:

1. Establish National Environmental Information Cooperation Committee.

2. Prepare Plan for the National Environmental Information System.

3. Establish National Environmental Information Center.

4. Produce a State of Environment Report Card.

5. Train users of the National Environmental Information Center.

6. Procure technical literature/data (including CD-ROMs, access to electronic data bases, etc.) for key environmentally related groups.

III Environmental Education/Communications

A. Transform the Higher Committee for Environmental Information into the National Cooperation Committee for Environment Communications.

B. Establish a National Cooperation Committee for School Environmental Awareness Programs.

C. Create in DE/GEC an Office of Serving the Public to gather information and organizes education/awareness programs.

D. Establish a training focal point for environmental communications.

E. Conduct environmental knowledge/attitude/practice (K/A/P) studies.

F. Opportunities for donor support to:

1. Train trainers in environmental awareness campaign design and implementation.

2. Support public, NGO, and private sector groups to design, produce, and disseminate environmental awareness campaigns.

3. Train concerned groups on how to produce environmental awareness kits for schools.

4. Help create the DE/GEC office of Serving the Public.

5. Strengthen capacity to conduct K/A/P studies.

6. Train mass media workers and other opinion leader groups in environmental concerns.

7. Establish a small grants program for environmental education/communication experimental initiatives and pilot programs (including action research) for NGOs, private sector, universities, government agencies, and other groups.

IV. Technical/Professional Education

A. Strengthen existing environmental academic programs and introduce new environmentally related courses in management, law, health, communications, and other appropriate fields.

B. Encourage environmentally related organizations to appoint human resources development (HRD) coordinators and increase in-service training of their staffs; and conduct training needs assessments, based upon organizational development strategic plans.

C. Increase the capacity to conduct in-service training in the environmental field:

1. Establish National Environmental HRD/Training Cooperation Committee

2. Publish Annual Directory of Training Opportunities in Environment

D. Establish training center in DE/GEC serve in-house training needs and outside clients of DE/GEC.

E. Identify a training institution to become the focal point for training environmental impact assessments (EIAs), industrial plant audits, and similar in activities.

F. Opportunities for Donor Support

1. Establish additional twinning arrangements between academic institutions in the environmental field.

2. Help establish a National Environmental HRD/Training Cooperation Activities Committee and publish Annual Directory of Environmental Training Opportunities for Jordanians.

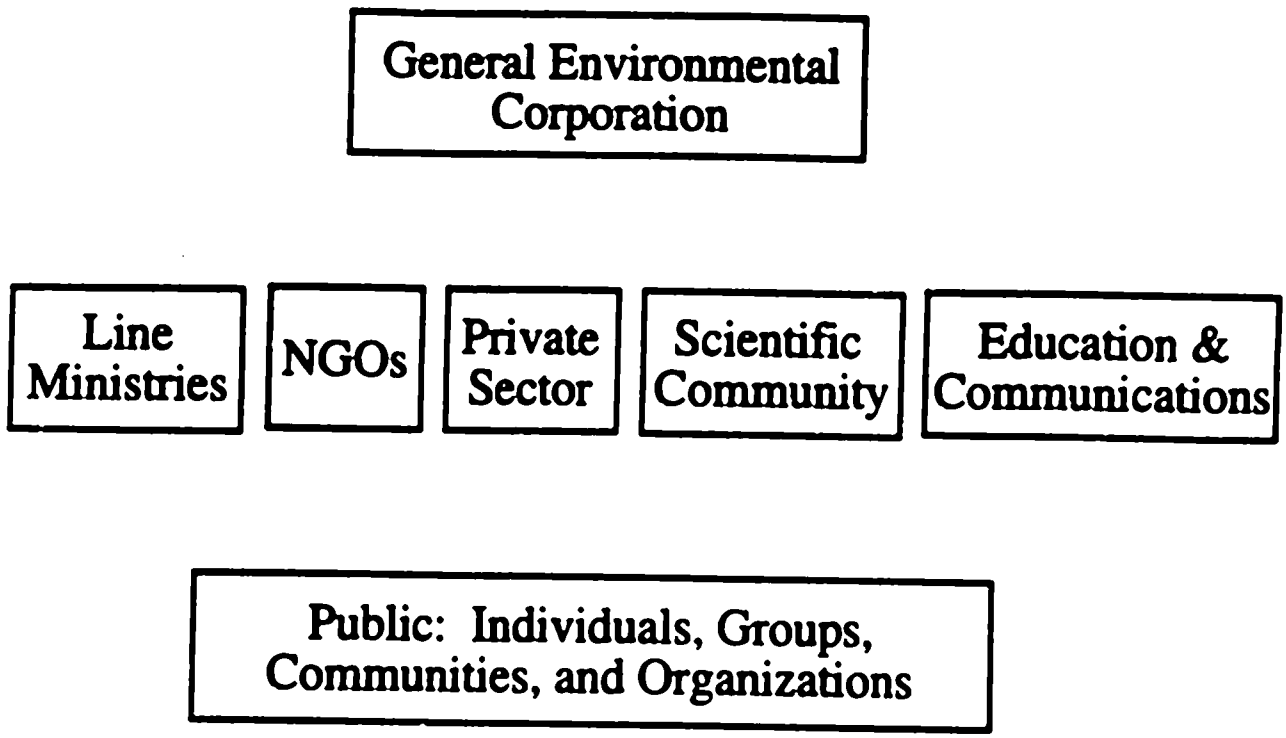
3. Train trainers in environmentally related subjects.

4. Help establish training center in DE/GEC.

5. Create training capacity in jordan to conduct training in environmental impact assessments, industrial plant audits, and similar activities.

The primary groups that should be active in designing and implementing Jordan's environmental program are shown on the following page.

Exhibit 1. Jordan's Environmental System



SECTION I
SUMMARY OF RECOMMENDATIONS FOR POLICY MAKERS

A. Introduction

Since the United Nations Conference on Environment and Development (UNCED), a major effort has been launched worldwide to expand and strengthen environmental programs. The UNCED declaration stressed the importance of making environmental information freely available to interested groups and individuals; enlisting the participation of people and organizations in environmental programs; and strengthening the institutional capabilities and capacities of a wide range of organizations to more effectively operate environmentally related programs. In Jordan, senior government officials, Nongovernmental Organizations (NGOs), and other groups are increasingly aware that environmental concerns must be addressed. During the past year, Jordan's National Environmental Strategy (NES) has been adopted. Now is the time to implement it.

This review addresses four important components in implementing successful national environmental programs--information, education, communications, and organizational development. Technical and monitoring **information** is the glue that holds together an environmental program and enables all concerned groups to develop activities to address priority environmental concerns. Environmental **education**, including professional training, builds human resource capabilities that are required for institutions to operate successful environmental programs. Environmental **communications** goes beyond the traditional awareness efforts by focusing on how to get people and institutions to change their behavior. The information, education, and communications components are the heart of successful implementation of environmental programs. The fourth component, **organizational development**, sharpens the focus of an organization and strengthens its capacity to carry out an effective program.

One task of the United States Agency for International Development (USAID) Project in Development and Environment (PRIDE) is to help concerned organizations in at least three Near East countries develop action plans to strengthen their environmental information, education, and communications programs. A team of four people spent three weeks in Jordan, hosted by the Ministry of Municipal and Rural Affairs and Environment (MMRAE) Department of Environment (DE) and the Jordan Society for the Control of Environmental Pollution (JSCEP). The team also worked closely with other officials in government agencies, NGOs, educational institutions, scientific organizations, and the private sector. The findings and recommendations in this report emerged from the generous contributions made by many groups who are involved in Jordan's environmental program.

The report is divided into five major sections. This section summarizes the recommendations and is designed for policy makers in the Government of Jordan (GOJ), NGOs, universities, scientific organizations, and the private sector. Sections II-V give details of the team's findings and recommendations for groups who will be developing the information/education/communication programs.

B. Organizational Development

B1. Overview of Current Situation and Needs

Jordan is fortunate to have many groups concerned with improving the environmental situation in the Kingdom. It is also fortunate to have two significant NGOs-the Jordan Society for the Control of Environmental Pollution (JSCEP) and the Royal Society for the Conservation of Nature (RSCN)-that are very active in promoting environmental programs in their areas of specialization. (JSCEP is concerned with "brown" issues and the RSCN with "green" issues.) Their efforts are complemented by good environmental programs initiated in several universities (particularly Jordan University, Yarmouk University, and Jordan University for Science and Technology (JUST)), scientific organizations conducting environmentally related research (Royal Scientific Society, Higher Council for Science and Technology, and universities), line ministries performing environmental monitoring tasks (Ministry of Water and Irrigation (MWI), Ministry of Health (MOH), Ministry of Agriculture (MOA)), and a supportive mass media establishment. These groups' active involvement in addressing environmental concerns makes Jordan unique in the region.

Jordan's environmental system currently has two weaknesses. The consensus of the people with whom the team talked was that the DE is weaker than most other organizations concerned with environmental protection. Therefore, DE cannot provide strong leadership among the groups concerned with environmental issues, nor serve as a focal point within the government for environmental programs. This concern must be addressed as soon as possible through enactment of legislation providing DE with a clear mandate and additional resources to operate an effective program. Outside assistance from the donor community is urgently needed to help strengthen and focus DE roles and responsibilities.

The second weak area in the environmental system is the private sector's low level of participation in Jordan's environmental programs. In this case, participation means reducing pollution through clean technologies and other means, as well as establishing a private sector environmental service industry. It appears that many industries are not aware of pollution prevention technologies and the advantages of clean technologies.

Jordan has allowed many groups to freely participate in the environmental program. The team feels it is extremely important to continue this "open system" in the environmental sector where government, NGOs, educational institutions, scientific organizations, and the private sector work together, each with the freedom to develop its own programs. Policies must allow NGOs and other groups to maintain independence to promote environmental concerns to policy makers, governmental agencies, the private sector, and other groups. Without this system of "checks and bounds" among the various groups, Jordan's environmental program cannot succeed. It is also very important to establish policies and mechanisms to ensure full participation of government agencies, the scientific community, NGOs, local interest groups, and the private sector in formulating future regulations and standards to be adopted by GOJ.

The pending environmental legislation calls for transforming the DE into a semi-

autonomous General Environmental Corporation (GEC) with enhanced roles and responsibilities. The team feels, and most interviewees agree, that it is essential to have a carefully focused strong central environmental agency. This agency can enhance and support the activities of other government agencies, NGOs, educational/training institutions, research organizations, and the private sector. The central focus of the new GEC should be on providing leadership in the environmental sector, especially within government, and serving as a facilitator to strengthen the environmental system as a whole, thus encouraging active participation by NGOs, the private sector, other ministries, educational institutions, mass media, and the scientific community.

Since there is a consensus on the need to strengthen the DE in its transition to GEC, this report directs considerable recommendations to the task. This does not mean that no support should be given to other groups in the system. The team emphasizes that major support is needed for NGOs, educational/training institutions, research organizations, and other ministries. The team believes that much more strategic planning and organizational development planning must be done for all key groups-governmental and nongovernmental-involved in Jordan's environmental program to clarify roles and strengthen institutional capacities.

B2. Recommendations for Jordanian Institutions

B2a. Pass the Environmental Law

A draft law establishing the GEC is with the Legislative Board in the Prime Minister's Office. If that review is successful, the draft law will be presented to the Cabinet and then to Parliament. This legislation has been pending since 1981. It is important to adopt suitable legislation so that development of a strong central environmental agency to provide leadership for the Kingdom can begin. Most interviewees want the law to be passed despite its flaws.

B2b. Establish Participatory Mechanisms to formulate By-Laws and Regulations/Standards

The legislation being processed is an enabling law creating the GEC. It contains few specifics on GEC roles, functions, and relationships with other governmental and nongovernmental bodies. It does not spell out environmental regulations and standards or methods of enforcement. It contains no reference to how information, education, and communication programs will be organized or carried out. Therefore, after enactment of this legislation, by-laws and regulations/standards must be formulated and processed.

Based on the experience of the United States Environmental Protection Agency (USEPA), it is strongly recommended that mechanisms be established to encourage wide public participation in formulating these by-laws and regulations/standards. This can be through a combination of public hearings, advisory committees, and surveys/studies. It must include the groups most affected (industry, farmers, local communities), special interest groups (NGOs, local groups, chamber of industries), and other ministries involved in monitoring and regulating activities (Health, Water and Irrigation, Industries, Agriculture).

The team has recommended creation of a special unit in DE/GEC-the Participation/ Information Gathering Unit under the Office of Serving the Public (OSP).

B2c. Implement Policy of Allowing Freedom of Access to Environmental Monitoring Information, Including information on Polluters

The team found that considerable effort is being spent by line ministries, the Royal Scientific Society (RSS), universities, private sector groups, NGOs, and other groups monitoring aspects of Jordan's environmental program. However, every group the team interviewed admitted that it cannot access most of this monitoring information. In some cases the problem relates to bureaucratic sluggishness. Other cases involve a fear that the information could reflect badly on the offender. In still other cases the mechanisms (computerization, etc.) are not in place to process and disseminate monitoring data/information. It is important that policies be put in place and resources provided to promote the free flow of monitoring data. All groups-government agencies, NGOs, research groups, universities, private sector, local communities, etc.-must be able to access this data. Without free access to environmental information policy, Jordan's environmental program cannot succeed, because concerned groups cannot be confident that they are addressing vital environmental concerns.

B2d. Encourage NGOs, Educational and Scientific Institutions, Private Sector, and Others to be more involved in Implementing the NES

While Jordan is unique in having the strong participation of two NGOs and other groups, greater participation is needed. The base exists, but these organizations need to be strengthened and other groups encouraged to participate. Public awareness or concern for environmental protection is minimal. Also, the private sector is not participating nor is it aware of the advantages of introducing clean technologies.

B2e. Strengthen and Focus Roles/Responsibilities of DE/GEC

As mentioned above, DE is the weakest link in the environmental system. There needs to be a strong focal point within GOJ for environmental protection which can also encourage nongovernmental groups to actively address Jordan's environmental concerns. Enacting the new environmental legislation will not automatically strengthen DE. Work must be started as soon as possible in formulating an organizational development plan to clearly specify roles and responsibilities of DE and other concerned groups, linkages to other groups, priority programs to operate, human rescurce needs, training and equipment required, and a revised organizational structure. This can be done through a strategic planning or similar process with the help of external management consultants (from the Institute of Public Administration, universities, or foreign firms).

B2f. Establish New Units in DE/GEC

The DE staff currently consists of approximately 25 people, mostly engineers and technical specialists. The new GEC program will require new programs and a different mix

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of expertise. Based on the draft legislation and findings of this study, several new units must be added to the existing DE structure. Section II of this report includes suggested organizational charts for GEC, which include the following units:

B2f(1). The Policy and Legislative Development Unit will provide leadership in developing national environmental policies, formulating regulations and standards, and drafting new legislation. This unit will work closely with the proposed Participation/ Information Gathering Unit and the Technical and Information Division.

B2f(2). The Project and External Liaison Unit will work with all units and outside groups to develop proposals for environmental projects that could be funded by GEC, other GOJ units, the private sector, or international donors. This unit will be the official liaison with other GOJ agencies, NGOs, private sector, and through the Ministry of Planning (MOP), with international organizations, donor agencies, etc. The official communications for donor projects will be through the MOP. This unit, however, will ensure that DE/GEC units comply with donor requirements and that they report in a timely manner.

B2f(3). The Environmental Information Center (EIC) will be the focal point for environmentally related monitoring data and information needed by GEC and other groups to carry out their environmental responsibilities.

B2f(4). The Participation/Information Gathering Unit will ensure maximum participation of all concerned groups in formulating and implementing environmental legislation, by-laws, regulations, and standards. The Environmental Protection Agency (EPA) introduced this function after roughly 10 years of operation and it is now required for all new environmental programs in the United States. As explained above, this unit will organize and conduct public hearings, operate advisory committees, have surveys and studies conducted, and carry out other activities that ensure maximum participation in decision making and feedback from all concerned groups.

B2f(5). The Communications/Education Unit will educate target groups on new GOJ environmental programs and regulations/standards and encourage them to participate in new programs. This unit will work closely with private sector groups, the mass media, schools and universities, NGOs, local communities, and other groups. It will develop communications campaigns for the Kingdom's environmental priorities that other groups are not addressing.

B2f(6). The Training/Human Resources Development Center will perform the dual function of organizing training for GEC staff and outside clientele. This unit will follow up on the work of the Communication/Education Unit to conduct training of officials in the target groups (such as industry, local government agencies, farmers' associations) on how to comply with new programs and regulations/standards.

B2f(7). The Public Information Unit will serve as the "early alert service" to inform other groups about GEC activities, including new programs, regulations, and standards through the mass media and other communication channels. The Communications/Education

Unit will follow up with programs that aim to change behavior of target groups.

B2g. Key Environmental Agencies-Governmental and Nongovernmental-Conduct Organizational Development Strategic Planning Exercises

The team was impressed with the number of government, NGO, educational, and research organizations active in Jordan's environmental program. However, upon further investigating each organization, we found that their financial and human resources are limited. On the one hand, their achievement with such limited resources is impressive. On the other hand, little attention seems to be given to clearly identifying their unique focus, particularly in relationship to other organizations. Official sharing of resources or coordination of programs also seems limited.

It is absolutely essential that these key organizations focus on management issues, define precisely their unique roles and functions, and then concentrate on developing programs in that area. It is recommended that the key organizational groups-public, NGO, private-be encouraged to conduct strategic planning exercises to create organizational development plans and be assisted in the management development field. Strategic planning should help identify roles and responsibilities, identify priority programs, formulate an organizational development plan, and determine how to cooperate with other organizations to achieve goals and targets.

B3. Opportunities for Donor Assistance

B3a. Help Establish Participatory Mechanisms to Formulate By-Laws and Regulations/Standards

When Parliament passes the environmental legislation, by-laws and regulations/standards will have to be formulated and processed. At this stage, specific functions and responsibilities of GEC and other organizations will have to be determined-monitoring, enforcement, etc. It is recommended that an outside legal advisor experienced in similar settings be brought in to help facilitate this process. Technical expertise in setting standards may also be required. A consultant experienced in developing organizational development plans will be required to map out the structure, staffing, and technical assistance needed for DE/GEC (this work should begin before passing the legislation). These consultants should have practical experience in setting up mechanisms to enlist participation of all concerned groups in formulating by-laws and regulations/standards.

B3b. Help Prepare Action Plan to Implement NES

The NES involved some 150 Jordanian officials working with a wide variety of organizations. It contributed substantially to creating greater awareness of Jordan's environmental concerns among high governmental and nongovernmental officials. The next step is critical: Develop an action plan to implement the strategy. This will involve identifying priority programs, determining who will implement them, and deciding what funds and human resources will be required and who will provide them. This action plan

will have to be formulated utilizing a wide variety of expertise representing many groups-governmental, scientific, academic, NGOs, and private sector. Donor agencies can help provide advisory assistance and funding to facilitate the process.

B3c. Provide Assistance to Key Environmentally Related Organizations (Public, NGO, Private Sector) to Conduct Environmental Strategic Planning Exercises

This could be a combination of outside consultants working with a Jordanian management school or the Institute of Public Administration which would be available to help interested groups organize and conduct strategic planning exercises. These organizational development plans should identify priority programs and requirements for staff, facilities, equipment, and budget. They could also be used to seek outside support.

B3d. Help Prepare a Comprehensive Organizational Development Plan for DE/GEC

High priority must be given to helping DE do a strategic planning exercise to prepare for creating GEC and building its capacity to perform its role in the NES. An institutional development specialist is required to work with DE and other concerned groups-public, NGO, and private-to determine GEC roles and functions under the new law, priority programs for which it is responsible, and the required organizational structure, staffing (including job descriptions), training, equipment and supplies, and other resources. There should also be inputs from an outside legal specialist and technical expert to help formulate by-laws and regulations/standards which also affect GEC organizational structure and functions.

B3e. Provide Funds and Technical Assistance to Establish in DE/GEC a Project and External Liaison and Other Units

A donor should be approached for assistance in establishing a unit to help GEC and other environmentally concerned organizations prepare project proposals, maintain liaison with the MOP, ensure effective linkages with other groups (ministries, NGOs, private sector, research organizations, etc.), and oversee implementation of projects funded by GOJ and/or donors. One technique would be to have a donor bring back to Jordan for a year an overseas Jordanian experienced with international donor agencies. This Jordanian would identify and train the staff, put in place the operating mechanisms, and help GEC prepare the initial set of environmental projects. This type of project is currently underway in Egypt where the United Nations Development Programme (UNDP) has helped the Egyptian Environmental Affairs Agency create an International Cooperation Unit.

Donor support should also be sought to create other units identified above, if recommended by the organizational development plan, and to strengthen the DE/GEC management system.

B3f. Help Establish Seminars to Increase Policy Makers' and Senior Managers' Understanding of Jordan's Environmental Concerns

In the process of implementing the National Environment Strategy, a series of seminars and other events should be organized to increase policy makers' and senior managers' understanding of environmental concerns, priority needs, and possible actions for them and their organizations.

B3g. Fund National Meetings/Seminars Implementing Action Plan for NES

In implementing an action plan for the NES, donors could help organize and fund a series of workshops for the task force groups and others involved in the process.

B3h. Establish a Donor Environmental Coordinating Committee

The donor community has little involvement in Jordan's environmental program. Yet there is a growing interest at the highest levels of government and among other groups in addressing environmental concerns in the Kingdom. It is recommended that the donor community take the initiative to periodically meet to review the needs for assistance to the environmental sector, share information on what each is doing in this sector, and monitor implementation of the NES.

C. Environmental Information Systems

C1. Overview of Current Situation and Needs

Two types of environmental information systems were investigated. The most important was the collection, processing, and dissemination of environmental monitoring information. While considerable environmental monitoring is being done in Jordan, it is almost impossible for interested groups to access the information. A State of the Environment Report published three years ago contained little analytical information. A major effort is needed to establish policies to promote the free flow of environmental monitoring data (as called for in the UNCED Agenda 21) and create the mechanisms to capture, process, and widely disseminate environmental monitoring information. The team recommends that one output of the environmental information system should be a bi-annual State of the Environment Report Card summarizing vital data on the environment and making it available to policy makers, government ministries, NGOs, educational institutions, the scientific community, the private sector, local groups, and others.

The second information area investigated is technical literature/information available outside Jordan and within the country for government and nongovernmental agencies. This includes library information, laws and standards from other countries, electronic databases, Compact Disk-Read Only Memories (CD-ROMs), audio-visuals, and other forms of information. One of the team's tasks was to work with JSCEP, which served as the team's co-host, to prepare a list of books and other information materials to be procured by World Environment Center (WEC) to help establish an information center in this NGO. The team also studied other information centers in universities, GOJ ministries, and other NGOs. While considerable technical information is available, only a small amount is being shared with other groups and they make little use of it.

C2. Recommendations for Jordanian Institutions

C2a. Establish a National Environmental Information Cooperation Committee

The main report (Section III) identifies groups that should be represented on such a committee and the functions it should perform. The committee will identify key sources of environmental data/information; address legal and technical issues in accessing data/information; determine how the National Environmental Information Center (EIC) will operate and its relationship to the National Information Center (NIC) and other databases; and work with users to ensure they have needed information in the form they can most easily use. The committee could be continued once the center is established to advise and monitor the center's operations.

C2b. Prepare Plan to Establish National Environmental Information System (EIS)

Under the guidance of the National Environmental Information Coordination Committee (NEICC), and with assistance from the donor community, a plan needs to be prepared identifying the primary sources of data/information, technical standards, means of processing data, and forms for producing information for users. Wherever possible, the plan should be based on strategic plans of the key involved agencies. The plan will identify how the system will operate, including who will provide the data/information, do the processing, and use the product. The plan will also specify when the State of the Environment Report Card and other outputs will be prepared and disseminated.

C3c. Establish an EIC

Using the plan prepared, (see C2b.) and working with the NIC and other groups, an EIC needs to be established, specifically dealing with environmental data/information, for a wide variety of users. The DE/GEC will be responsible for the center; however, an information systems service group will probably handle the actual operations. The center will provide information for DE/GEC and other groups to carry out their regulatory functions and also for other GOJ agencies, NGOs, educational institutions, scientific organizations, private sector entities, local groups, and many others.

C2d. Produce Biannual State of Environment Report Card

One vital output of the EIC will be a biannual (at least initially) State of Environment Report Card containing key analytical data and other information for use by policy makers, NGOs, educational institutions, research organizations, international agencies, and other groups. This report card will be produced as the EIC is being established, providing a framework for establishing the center's operating modalities. It is envisioned that outside help will be used to design the system for producing the report card.

C2e. Build up Capacity to Train Users of the Environmental Information Center

An important function of the EIC will be to promote its services to encourage use by a wide variety of groups. The center should train people to effectively use the center and interpret the information. Users will come from GEC, NGOs, other ministries, policy making groups, universities, research organizations, the private sector, and many other groups.

C2f. Provide World Environment Center List of Books and Other Materials to be Acquired for JSCEP Information Center

WEC asked the team to work with JSCEP to identify materials that can be acquired for free or purchased in the initial stage of establishing the center. This involved helping JSCEP determine its precise needs and the environmental areas it wants to emphasize. It also involved checking other libraries and environmental information centers in Jordan to ensure that what JSCEP establishes complements other centers. Other donors should be contacted to help secure environmental data and information for their libraries.

C3. Opportunities for Donor Assistance

C3a. Provide Funds and Technical Assistance to National Environmental Information Cooperation Committee

Assistance should be given to establish the committee, provide reference materials and technical advice in information systems, and help it prepare the plan for creating the EIC.

C3b. Provide Technical Assistance to Prepare the Plan for an (EIS)

A corsultant with experience in establishing information and in working in Jordan or similar countries should work with GEC, the Cooperation Committee, NIC, and other groups to prepare an overall description of the environmental information system and a specific plan for establishing the EIC. This plan should cover sources of information, types of initial data/information to collect, processing and packaging, user needs, staffing and training, equipment, and other resources for sustaining the center's operations. Decisions will have to be made on the GEC's role as the agency that will actually operate the data processing services.

C3c. Provide Technical Assistance, Equipment, Training and Funds to establish National Environmental Information Center

The plan should serve as the framework for a donor-supported project to actually create the center, which would provide equipment (hardware and software), staff training, advisory assistance, etc.

C3d. Provide Funds and Technical Assistance to Prepare State of Environment Report Card

Special advisory assistance will probably be needed to help prepare the first State of

the Environment Report Card, drawing upon expertise from groups that have prepared these types of reports. This could be done when the information center is set up and used to help work out the operating mechanisms for collecting, processing, and packaging information. The report card should come from a database that users can draw on for additional analyses. It is also recommended that a data disk be made available with the report so that users can further analyze information in the report. The report will become a valuable tool for bringing together information from many sources and making it available to policy makers, government agencies, NGOs, educational institutions, private sector, research organizations, international agencies, etc. The report will make it possible for many groups to study the validity of the data and to determine critical gaps in monitoring data. This should greatly improve the overall environmental monitoring program in Jordan and to encourage cooperation and coordination among various groups. The report card will also serve as a record to measure progress in addressing priority environmental concerns.

C3e. Help Design and Fund Training of Users of the Information Center

It is essential to encourage use of the center and to train users on the types of information available and how to interpret them for their programs. Advisory assistance could be given to the center and the GEC or some appropriate training institution to conduct the course. User guides and teaching aids need to be developed and trainers trained.

C3f. Procure Technical Literature/Data (including CD-ROMs, access to electronic databases) for Key Environmentally Related Groups

A survey should be made of available environmental technical information/data possibly by the Information Coordination Committee. Different libraries should be designated to specialize in certain environmental areas and mechanisms developed to share information with other groups. The committee should determine where additional information is needed and let donors know.

D. Environmental Education/Communication

D1. Overview of Current Situation and Needs

Government units, NGOs, universities, and the mass media are involved in environmental awareness activity. Most activities are isolated, limited to a single institution, and loosely connected, if at all, to other awareness activities. The DE seems the most logical point for leadership to encourage collaboration among groups with environmental communication/education activities. However, the team found the department to be weak, with no staff committed to environmental awareness/communication/education programs.

Current efforts only scratch the surface of need for well-planned and skillfully delivered programs to reach Jordanians with messages that will lead to more environmentally friendly behavior to protect, conserve, and wisely use the country's limited environmental resources. The key is to change behavior of target groups for priority environmental concerns.

Two tracks can lead to the kind of awareness that environmental leaders in Jordan have in mind. The first is to get more benefits from the current resources through strategically planned efforts and collaboration among the active units. The second is to bring in more resources and, especially, to upgrade the skills of those who create and carry out environment communication/education programs. The techniques of communication campaigns now well-developed in North America and Europe clearly need to be adapted to Jordanian conditions

D2. Recommendations for Jordanian Institutions

D2a. Establish National Cooperation Committee by Broadening Composition and Functions of the Present Higher Committee on Environmental Information

This group should represent government, NGOs, private sector, and universities that have major stakes in environmental issues. Its roles would include defining major public awareness objectives, suggesting priorities to awareness programmers, sponsoring policy seminars, sponsoring research and evaluation as needed, and cooperating in training.

D2b. Increase Coordination of Environmental Awareness Programs that Involve Schools, Nature Clubs, and Other Youth Groups

This may call for a national coordinating committee to assure integration of interests and resources. Environmental education for children, both in school and outside, may be the single most important means of developing an environment-friendly society in Jordan.

D2c. Set up Cooperation Committee for Environmental Awareness in School Programs

This committee would encourage initiatives by NGOs, private sector entities, universities, or community colleges, and help integrate them smoothly into school programs.

D2d. Establish Organizational Focal Point for Training and Facilitating Interaction Among Groups Carrying out Environmental Communication/Education Programs

The unit could sponsor training on communication/education campaigns, serve the national cooperation committee as a clearinghouse for environmental awareness information, stimulate communication and collaboration among groups producing communication/education campaigns, and encourage development of a campaign training center by an existing Jordanian institution.

D2e. Set up an Environmental Awareness Program Unit in the Department of Environment to Work on Environmental Awareness with Other Units of Government, Schools, NGOs, Private Sector, Mass Media, and Others

Its specific responsibilities and activities-and staffing needs-would be determined in

the organizational development project proposed elsewhere to strengthen the DE.

D3. Opportunities for Donor Assistance

D3a. Provide Funds for a Train-the-Trainer Program and Workshops to Train Government and NGO Personnel Responsible for Designing and Implementing Environmental Awareness Campaigns

A first train-the-trainer effort would be the field test of PRIDE's environmental awareness campaign training/reference package.

D3b. Provide Financial Support to Aid Public, NGO, and Private Sector Groups in Designing and Implementing Environmental Awareness Campaigns

This could be in the form of technical assistance, equipment, supplies, and budgetary support.

D3c. Support Public, NGO, or Private Sector Group to Develop Programs and Materials to Increase Knowledge of Policy maker and Opinion-leader Groups About Environmental Issues

This may be especially important as groups begin to design campaigns related to controversial decisions affecting the environment.

D3d. Provide Funds and Technical Assistance to Develop Office of Serving the Public in the DE and Provide for Equipment and Train Personnel to Operate the Office

This will have to be based on the organizational development plan recommended for DE.

D3e. Provide Funds for Equipment and Technical Assistance to Create DE Environmental Awareness Program

Optimally, this would come within the Office of Serving the Public under a proposed organizational plan. If that plan is not activated soon, the environmental awareness program should be established as a new function.

D3f. Provide Funds and Technical Assistance to Strengthen Capacity of Existing Social-science and Market-research Groups to Carry out Knowledge-Attitude-Practice Studies of Major Audiences for Environmental Awareness Programs

A one-time donor investment could bring experienced researchers from Europe or North America to work with Jordanian researchers. This might lead a Jordanian institution to develop a specialty in this area for both research and training.

D3g. Provide Training and Technical Assistance to the Ministry of Education or

an NGO to Produce Environmental Kits for Use in Schools

With donor seed money to train Jordanians, it may be possible to secure continuing support within Jordan, especially from private-sector sources. The innovative Earth Generation kits from a firm in the United States provides an example. Donors could make it possible to bring kit producers (such as the Earth Generation group) to work with Jordanians to develop the process for identifying subjects, and designing, producing, and disseminating school kits.

D3h. Make Funds Available to Support Small Initiatives for Environmental Awareness

Such funds may provide seed money and planning aid, demonstrating how the initiatives can be developed and taken over by national sponsors. For example, a grant would enable the Department of Earth and Environmental Sciences, Yarmouk University, to issue a newsletter sharing its findings with various professional, technical, and policy-maker audiences in Jordan; a grant to Yarmouk University's Department of Journalism and Mass Communication and the Ministry of Information (MOI) could provide for seminars or short courses on environmental issues for mass media writers and producers; a modest grant could sponsor training on strategic planning, a skill needed in virtually all public, private, and NGO groups engaged in environmental awareness communication/education.

E. Technical/Professional Training

E1. Overview of Current Situation and Needs

The team studied two types of technical and professional training in the environmental field: (1) formal academic-university level-courses and degree programs; and (2) in-service or continuing professional education-short-term training designed to achieve specific objectives in the work place.

Academic programs are active in the environmental field in Jordan. At least three universities-University of Jordan (UoJ), Yarmouk University and JUST-are offering courses and/or degrees in environmental subjects. New degree programs are being initiated and will begin during the next school year. Within their available resources, these universities are conducting research that contributes to their teaching programs. Environmentally related subjects are also being taught in several vocational schools. The team felt that Jordan's academic program in the environmental field is a leader in the Near East region. The University of Jordan Water and Environment Research and Study Center (WERSC) has recently established, through USAID support, a twinning arrangement with Washington State University to help the center implement its new MSc program in environmental management.

It was difficult to judge the quality of the academic programs or their relevance to environmental concerns in Jordan. Recently, however, PRIDE sponsored a visit to Jordan by two University of Illinois (UoI) faculty in the Department of Civil Engineering Environmental Science Program. They said the UoJ Environmental Engineering MSc program was one of

the best they had seen outside the United States. The overall assessment leads the team to believe that the academic community should be encouraged and assisted to continue to improve the quality and relevance of their environmental teaching and research programs. This is Jordan's long-term investment in the environmental field. The team also feels that other faculties-such as management/public administration, health, law, journalism/communications-should be encouraged and helped to provide courses related to environmental concerns.

The situation with the in-service or continuing professional training program area is far different from the academic program area in the environmental field. The team's original plan was to do a preliminary assessment to determine priority technical/professional training needs. It became obvious to the team that this was not possible in such a short visit. Every group the team interviewed-public, NGO, research, etc.-said they had critical needs to strengthen their institutional capabilities. Everybody agreed that Jordan is rich with well trained people. However, many of these professionals-engineers, teachers, researchers, administrators, etc.-were not exposed to environmental issues and concerns during their formal education. Therefore, short, targeted, refresher training can significantly strengthen environmental programs in the Kingdom. The team's conclusion is that opportunity is almost unlimited for providing short-term technical/professional training in the environmental field in Jordan.

Even though demand appears great for short-term professional/technical training, it does not appear to have been translated into actual requests to training institutions for this type of training. The team was disappointed that managers/administrators in government and nongovernmental organizations have not linked the provision of training to the strengthening of their institutions

On the supply side of the short-term professional training picture, many institutions can do this type of training. The team identified at least 20 groups of training institutions in Jordan that could do environmentally related short-term training, and this is only a preliminary list. The team sensed that interest in organizing short-term professional/technical training is minimal in the environmental field. This is partly due to the lack of expressed demand and partly to the lack of both a model for the training institutions and skilled trainers in the environmental field.

The primary conclusion in the technical/professional training area is that much effort needs to be focused on expanding short-term training-stimulating a demand for this type of training and building capacity in training institutions to organize and conduct it. More work must be done with environmentally related organizations to develop strategic plans that include manpower planning and master training plans. Priority must be given to human resource development (HRD).

E2. Recommendations for Jordanian Institutions

E2a. Strengthen Existing Environmental Academic Programs and Focus on Jordanian Concerns

As a long-term investment, academic institutions should be encouraged and supported to continue expanding their environmental offerings and improve their quality and relevance to Jordan's needs. USAID is supporting a twinning arrangement between the UoJ and Washington State University (WSU) which will initially focus on environment and natural resource management. WERSC at the university is working closely with WSU to develop an M.S. degree program in Water Resource Planning and Management and a second M.S. program in Environmental Management. Yarmouk University and JUST also have environmentally related courses. These programs represent an excellent beginning, but more resources are needed for all these programs.

E2b. Establish Additional Environmental Academic Programs in Strategic Areas

While the review of academic programs was not exhaustive, the team detected some critical gaps in academic offerings.

E2b(1). Management/Administration of Environmental Programs

The team observed that most organizations in the environmental field need assistance to strengthen their management/administration. Also, managers in the private sector and public service administrators need a working understanding of environmental concerns. Therefore, the business and public administration faculties might consider introducing specific courses and/or elements of courses with environmental subjects.

E2b(2). Environmental Law

With the enactment of the new legislation and increased activity in the environmental enforcement area, the legal profession needs to become better versed in the environmental field. Therefore, law faculties should consider adding components in their courses related to environmental issues.

E2b(3). Environmental Health

Public health programs could increase the amount of environmental subject matter they include in their courses.

E2b(4). Environmental Journalism/Communications

The team discussed this possibility with the head of the Journalism Faculty at Yarmouk University. There is interest within this faculty in developing environmental courses. However, it will require more resources and faculty training to ensure that the courses are relevant.

E2b(5). Information Systems/Data Collection

Professionally trained information scientists are needed in the environmental field. To establish the EIC will require staff in the monitoring units and users of data/information.

E2c. Appoint Human Resources Development Coordinators in Environmentally Concerned Organizations

Organizations involved in environmental programs have expressed concerns about strengthening their capabilities and capacities. Therefore, it is recommended that they designate a senior official to be responsible for HRD/continuing professional training. The training must be linked to institutional development goals.

E2d. Based Upon Institutional Strategic Plans, Conduct Training Needs Assessments

The Organizational Development section above recommended that concerned institutions go through strategic planning exercises to identify priority roles and functions that will serve as a base for developing programs, staffing, etc. The HRD coordinator should encourage strategic planning exercises and then use the plans to conduct training needs assessments for all key staff. Once the tasks to be performed in a position are known, then a training needs assessment can match the current capabilities of an individual with the requirements; the training should concentrate on any gaps. The result should be master training plans. Training must focus on improving staff work performance, which in turn strengthens the institutional capability and capacity. These training needs assessments should be merged into master training plans for these institutions.

E2e. Increase Number of Continuing Professional Development Training Courses in Environmental Field

Conducting training needs assessments and developing master training plans will clarify the priority areas for short-term environmentally related training. The following actions are recommended to help in this process:

E2e(1). Establish National Environmental HRD/Training Cooperating Committee

A team from key environmental agencies and interested training institutions should be formed to provide leadership in this field. The team should identify experts who can help concerned organizations conduct training needs assessments and master training plans. They should also survey all possible training institutions to find out what training is going on and what interests there are in organizing new training in this field.

E2e(2). Publish Annual Directory of Environmental Training Opportunities

A valuable service which the Environmental HRD/Training Cooperation Committee could perform is to publish an annual list of environmental training opportunities available to Jordanians. This would include in-country training, short courses offered in-country by international organizations (such as World Health Organization/Center for Environmental Health (WHO/CEHA)), and short courses offered outside the country in which Jordanians could participate. This directory should help stimulate demand for environmental training while making training institutions aware of the interest in the environmental field. The

directory should also list the needs the key organizations have identified through their training needs assessments.

E2e(3). Establish Training Center in DE/GEC to Serve In-House Training Needs and Train Outsider Clientele of DE/GEC

It is envisioned that the DE/GEC Administrative Division would have someone to serve as the HRD coordinator to ensure that in-service training needs are addressed. There will most likely be a need for some training in-house for headquarters and field staffs, including those in the three centers and 12 governorate and sub-governorate offices. As new programs, regulations, and standards are introduced, there will be a large need to train outsider clientele-such as industrial managers and technical staffs, local government staffs, and agricultural personnel. Therefore, it is recommended that DE/GEC establish a training center to focus on areas where other training institutions are not already involved. This will probably require outside assistance initially for training staff, providing equipment, and helping to organize key courses.

E2f. Identify Training Institution to Become Focal Point for Training Environmental Impact Assessments (EIAs), Industrial Plant Audits, and Similar Activities

The team observed a widespread interest in training in the area of EIAs and related fields, such as how to conduct in-plant assessments. It appears that this type of training is not being offered in Jordan. The new legislation will require much greater use of EIAs in all sectors-industry, agriculture, and domestic. Therefore, it is recommended that one or more training institutions be identified as leads in this type of training and mechanisms be developed, probably with donor assistance, to build their institutional capability to offer EIA and related training in the future. The team feels that the UoJ WERSC could be the focal point for this type of short-term training, in addition to offering EIA training in its MSc program. The Washington State University (WSU) twinning arrangement could facilitate the development of this training.

E3. Opportunities for Donor Assistance

E3a. Establish Additional Twinning Arrangements Between Academic Institutions in the Environmental Field

The technology and program approaches in the environmental field are changing so fast that Jordanian universities need to establish effective linkages with institutions in countries where environmental programs are at the cutting edge. One example is in the field of pollution prevention which is often called "clean technologies" or "incentive based programs." The basic idea is that many environmental programs can be profitable to industry or other potential polluter groups and it is better to prevent pollution than have to clean it up after the fact. This program thrust has not been introduced in Jordan. Therefore, governmental, NGO, and private sector organizations need to become aware of opportunities in this field and to have staff who can operate these programs. Universities and the scientific

community will have to take the lead in introducing these types of programs, which can best be done through "twinning" arrangements with overseas institutions experienced in this field. Donor agencies should be encouraged to help Jordanian universities identify partners and provide seed money to facilitate these twinning arrangements which can include exchanging faculty, sharing curricula and teaching materials, transferring books and data, jointly conducting courses/seminars, and developing staff.

E3b. Provide Funds and Technical Assistance to National Environmental HRD/Training Cooperation Committee

A HRD/training consultant could be helpful in organizing the committee and guiding it in establishing a worthwhile program. This effort could also include short briefings or seminars for committee members as well as managers/administrators of the institutions they represent. The main purpose of the Cooperation Committee is to stimulate greater interest in short-term, technical/professional training in the environmental field-to create a greater demand and to increase the number of short courses being offered, particularly by Jordanian institutions.

E3c. Provide Funds to Collect Information and Publish Annual Directory of Training Opportunities for Jordanians in the Environmental Field

The same HRD/training consultant could help the task force develop mechanisms to collect information on available training and publish a directory. The directory might also summarize master training plans and other information on training needs which the training institutions could use to develop programs.

E3d. Conduct In-Country Training of Trainers Short Courses for Environmentally Related Subjects

If DR/GEC and other training institutions are to develop environmental short courses, the trainers will have to be trained to ensure they know the subject matter, have appropriate teaching materials, and can use proper teaching methods. The training of trainers should also include evaluation techniques so trainers and clientele can measure the effectiveness of the training and improve future short courses. The HRD/training consultant, working with the HRD/Training Task Force, could provide the leadership to organize these courses. Wherever possible, Jordanian expertise should be used.

E3e. Provide Technical Assistance, Training, and Equipment to Establish Training Center in DE/GEC

Considerable assistance will be needed to create an effective training center in DE/GEC as no training program or capabilities exist at present. It is recommended that a HRD/training consultant be brought to Jordan to help determine actual needs and a potential program for a training center. Working with the DE/GEC staff and other groups (such as the HRD/Training Task Force), the consultant could design a proposal to create the training center and describe resources GOJ will require and support donors will need. The next phase

will be to implement the project for creating the center, training the staff, and providing equipment.

E3f. Help Create Training Capacity in EIAs, Industrial Plant Audits, and Similar Activities

Since there appears to be no capability among training institutions in the EIA field, some outside assistance will be needed. That assistance should focus on building Jordanian training capacity in EIA and similar fields. Therefore, a proper institutional base will have to be found in Jordan. The HRD/Training Cooperation Committee might help find an institution with which an outside group could work to develop appropriate courses, train trainers, etc. The trainers could also be sent outside for short courses.

PRIDE and the USAID-funded Environmental Policy and Training Project (EPAT) are developing a model in Egypt. The PRIDE project is bringing to Egypt a team of EIA specialists who will work with an Egyptian team to conduct one or more EIAs. EPAT will have a person on the team to develop case study materials. Following the EIA exercises, EPAT will conduct a short course in Egypt to train trainers in EIA methodology. The EPAT short course will use the case study materials and the Egyptian team. This approach might also be tried in Jordan, once an appropriate institution is identified and more is leaned about specific EIA needs and related training. The team suggests that this model be used with WSU providing the outside expertise and the UoJ WERSC serving as the base for conducting the training. The Jordan Valley Authority (JVA) secretary-general has expressed interest in having an EIA done on the valley, or on part of it. This is an area where WSU and UoJ have much experience.

SECTION II
INSTITUTIONAL DEVELOPMENT[2]

A. People's Participation and Strengthening Institutions

Many Jordanians, including senior officials, are increasingly aware that they live in a fragile environment that must be protected. A program of environmental protection requires the participation of many individuals and organizations as well as a wide a variety of institutions to provide strong leadership. The Rio Declaration on Environment and Development approved at the United Nations Conference on Environment and Development (UNCED) proclaims that:

> *Principle 1-Human beings are at the centre of concerns for sustainable development. They are entitled to a healthy and productive life in harmony with nature.*
>
> *Principle 10-Environmental issues are best handled with the participation of all concerned citizens, at the relevant level. At the national level, each individual shall have appropriate access to information concerning the environment that is held by public authorities, including information on hazardous materials and activities in their communities, and the opportunity to participate in decision-making processes. States shall facilitate and encourage public awareness and participation by making information widely available.*

In the past year, a Jordanian National Environmental Strategy (NES) has been adopted outlining areas, including water, industry, wildlife, and agriculture, for special attention. To address critical protection issues, people and concerned institutions will have to work together. To develop an action program, environmental information must flow freely; people and groups must be stimulated to participate; and institutions must be strengthened to address critical concerns. The NES, like similar documents in other countries, makes passing references to the need for environmental information, education, and communications activities, but describes no overall plan to mobilize these important programs. This review by the Project in Development and the Environment (PRIDE) team, working with many Jordanian groups, is one step toward creating a road map to these important elements of a national environmental program. Section II clarifies the roles and responsibilities of institutions and their capacity to address Jordan's environmental concerns.

This PRIDE activity worked with the Jordan Society for the Control of Environmental Pollution (JSCEP) and the Ministry of Municipal and Rural Affairs and Environment (MMRAE) Department of Environment (DE), who were co-hosts for the team. The team also worked with many other Jordanian organizations-nongovernmental organizations (NGOs), Government of Jordan (GOJ) units, universities, the scientific community, private

[2] Section II was prepared by John L. Woods, PRIDE institutional and information specialist. Dr. Woods has been involved in Jordan since 1965 and during 1992 prepared the institutional analysis section for the "National Water Management Study in Jordan."

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sector agencies, and others-who greatly contributed to the information in this report. The team's work was also linked to PRIDE's earlier work with the Ministry of Water and Irrigation (MWI) in developing a project focusing on water quality and conservation.

B. Definitions

PRIDE broadly defines environmental education and communication to encompass collecting, processing, and disseminating all types of environmental information for a wide range of clientele. The information program area involves technical information databases, management of data/information monitoring, clearinghouses, libraries, and facilitation of the flow of technical information in the environmental field. The education program area includes formal education (university degree programs, environmental education in primary and secondary schools, etc.), non-formal education and training, and the development of environmental curricula and teaching materials. The communication program area focuses on all aspects of media and face-to-face communications directed toward awareness, motivation, and behavioral change of various groups and organizations, including the general public. These information/education/communications programs can be involved in disseminating information to political and policy makers, program managers, opinion leaders, students, NGOs, mass media, the general public, and others.

Environmental information/education/communication programs have two goals: (1) to facilitate broad-based participation in environmental programs; and (2) to strengthen institutional capabilities through education/training programs to carry out effective environmental programs. That leads to the fourth component of this needs assessment, organizational development, which clarifies an organization's roles and responsibilities and strengthens its capacity to carry out an effective program.

Efforts are under way to begin implementing Jordan's approved National Environment Strategy. The timing of this needs assessment was appropriate, as information, education, and communications are vital elements in the strategy implementation.

C. Terms of Reference

The full terms of reference are included in Annex II. Following is a summary of the areas on which the team, working with many Jordanian groups, focused:

C1. Organizational Inventory

An inventory was prepared of all organizations which are or could be involved in environmental information/education/communication programs in Jordan. The key organizations were asked to help assess current programs and future opportunities, and draft recommendations for an action plan. The inventory includes a list of donor-supported projects that provide support for environmental information/education/ communication programs.

C2. Information Systems

This component looked at technical and monitoring data/information which is available in or outside of Jordan. This is environmental information that can be packaged in various ways to serve users, including policy makers, NGOs, research groups, universities, professional and technical trainers, private sector groups, and organizations that prepare public awareness campaigns.

C2a. Integrated Environmental Monitoring Information System

Some organizations in Jordan are monitoring environmental concerns, including the ministries of Health (MOH), Water and Irrigation (MWI), and Agriculture (MOA); the Royal Scientific Society (RSS); and the University of Jordan. The team looked into the possibilities of establishing an integrated environmental monitoring information system to capture this information, produce a periodic "state of the environment report card," and disseminate this information to users including policy makers, program managers, mass media, schools, private sector groups, and others. The team makes recommendations (see Section III) on the feasibility of establishing an integrated environmental monitoring information system, who should be the lead organization, and what it will require to implement.

C2b. Technical Information Systems

A general inventory was taken of other libraries/information centers in Jordan that maintain technical information in the environmental field-universities, research organizations, and governmental agencies. Technical information needs of universities, technical training centers, research organizations, private sector agencies, government agencies, and other groups were assessed to determine the overall need for technical information and the potential users. A preliminary assessment was made on where this type of information is available in Jordan and outside the country.

C3. Environmental Awareness/Education/Communication

The need is urgent to increase understanding of environmental issues in Jordan among policy makers, private sector firms, school children, government and nongovernment program managers, opinion leaders (local leaders, religious leaders, etc.), mass media personnel, and the general public. PRIDE is preparing an environmental awareness campaign training/reference package to train communications specialists and help institutions develop effective public awareness campaigns, school environmental education kits, briefings for policy makers, and other environmental awareness activities. This component is the first step in the design of this training/reference package. It is envisioned that the PRIDE project will pretest the campaign training package in Jordan with core project funding. The training package will also be used in the public awareness component of the new United States Agency for International Development (USAID) Water Quality and Conservation project, which will involve JSCEP and MWI.

Working with the JSCEP, MMRAE/DE, Royal Society for Conservation of Nature

(RSCN), Ministry of Information (MOI), MWI, mass media, Ministry of Education (MOE), Higher Council for Science and Technology, universities, and other groups, the team studied the types of environmental awareness programs currently being produced and identified organizations with special capabilities in this field. The second step was to determine generally what types of environmental awareness campaigns should be initiated: the target audiences, subjects, and groups involved in producing and disseminating the campaign. This served as a base for determining the personnel needed to plan, produce, and disseminate awareness campaigns. The team also provided recommendations (see Section IV) on conducting effective environmental awareness campaigns in Jordan, and suggested the primary agencies to involve and the outside assistance needed to implement this program.

C4. Environmental Professional/Technical Education and Training

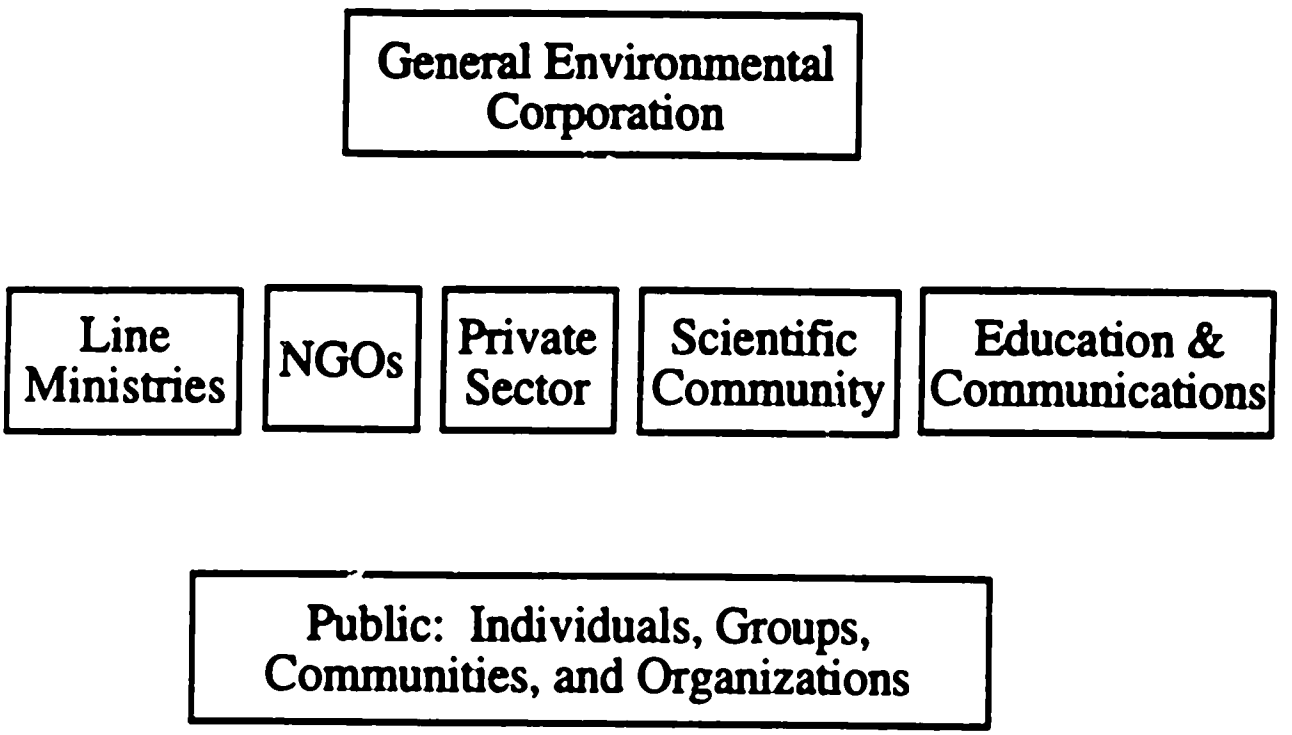
Jordan has an excellent higher education system that has produced many engineers, doctors, and other professionals. However, concern for environmental protection is rather new to the country. The National Environment Strategy for Jordan identifies areas where technical and professional personnel are needed. Two concerns were addressed in this component: (1) providing short-term training on environmental subjects to professionals working in governmental and nongovernmental agencies; and (2) introducing environmental subjects to technical and higher education programs.

This component focuses on identifying professional and technical training/education needs in Jordan and determining how to meet them. The basic principle PRIDE follows is to utilize in-country training and educational institutions as much as possible. Therefore, this assessment included an inventory of training and educational institutions in the environmental field. The recommendations (see Section V) include information on the needs to strengthen these institutions and ways to do it. Where appropriate, recommendations were made to GOJ and donors on how they can help strengthen the training and technical/professional infrastructure in Jordan.

D. Jordan's Environmental System

The Jordan National Environment Strategy offers a broad plan of priorities and areas to address. No single organization can carry out the entire implementation. The team developed a systems overview of organizations that should be involved in a national environmental protection program, as illustrated on the next page. The chart has no lines, just as there are no formal lines of communication between the organizations or institutional hierarchical structure. National environmental programs that do not enlist the participation of these groups will probably be unsuccessful.

Exhibit 1. Jordan's Environmental System



E. Current Situation

Jordan is fortunate, compared to neighboring countries, to have organizations active in its environmental system. The overall approach to developing the National Environment Strategy set the stage for participation by government ministries, NGOs, universities, scientific organizations, and other groups. The Kingdom has two active environmental NGOs-the Royal Society for the Conservation of Nature (focusing on "green" concerns) and the Jordan Society for the Control of Environmental Pollution (focusing on "brown" issues). Jordanian universities-University of Jordan, Yarmouk University, and Jordan University for Science and Technology (JUST)-offer courses on environmental concerns and are designing more to be offered in the coming year. The scientific community is active-particularly in the physical sciences-in developing research to contribute to the overall environmental system. The GOJ line ministries-MWI, MOH, MOA and others-are performing vital roles in monitoring and in some cases, enforcement.

The following outline lists most key organizations involved, or that could be involved, in Jordan's environmental program. They are grouped according to the three components in this review-information systems, education/communication, technical/professional training. The last part of the outline lists current and pipeline environmental projects supported by international donor agencies.

Jordan Information/Education/Communications
Organizational Outline

I. Information Systems

A. Environmental Technical Literature/Information

1. Internal Sources
   a. University of Jordan
   b. JUST University
   c. Jordan University at Muta
   d. Yarmouk University
   e. Royal Scientific Society (RSS) Library
   f. Jordan Society for the Control of Environmental Pollution (JSCEP) Information Center
   g. Royal Society for the Control of Nature (RSCN) Library
   h. Ministry of Municipal and Rural Affairs and Environment (MMRAE) Department of Environment (DE) Library
   i. Ministry of Water and Irrigation (MWI) Library
   j. Ministry of Health (MoH) Library

k. Ministry of Agriculture (MoA) Library
l. WHO Center for Environment Health Activities (CEHA)
m. FAO collection at University of Jordan

2. External Sources
   a. UNEP Data bases
   b. USEPA Databases/Information Services
   c. European Databases/Information Services
   d. Other regional and international information services

B. Environmental Monitoring Data/Information

1. Sources of Monitoring Data/Information
   a. MWI
      -Jordan Valley Authority (JVA)
      -Water Authority of Jordan (WAJ)
   b. MoH
   c. MoA
   d. RSS
   e. Water and Environmental Research and Study Center (WERSC) UoJ
   f. Yarmouk (Marine Station at Aqaba)
   g. RSCN
   h. Royal Geographic Society
   i. Ministry of Industries (MOI) (in the future)

2. Research on Environmental Concerns
   a. Higher Council for Science and Technology (HCST)
   b. WERSC/UoJ
   c. Yarmouk University
   d. JUST University

3. Data Storage and Processing
   a. HCST/National Information Center (NIC)
   b. Ministry of Planning (MOP)
   c. Dept. of Statistics
   d. MWI

4. Data Interpretation and Packaging
   a. MMRAE/DE
   b. RSS
   c. WERSC/UoJ
   d. Yarmouk University
   e. JUST University

5. Primary Users of Environmental Data/Information
   a. GOJ Cabinet and Parliament

b. Line ministries
c. MMRAE/DE
d. JSCEP
e. RSCN
f. Other NGOs
g. University of Jordan
h. Yarmouk University
i. JUST
j. Ministry of Information and Broadcasting and Mass Media
k. Chamber of Industries and Private Sector
l. Donor Agencies

II. Environmental Awareness Programs

A. Target Groups

1. Political Leaders/Policy Makers
2. Public Service Administrators
3. Private Sector Managers
4. Opinion Leaders (religious leaders, school teachers, NGOs, agricultural extension workers, mass media managers/journalists, local leaders)
5. General Public
   a. Families
   b. Youth/School Children

B. Originators of Environmental Awareness Campaigns

1. MMRAE/DE
2. JSCEP
3. RSCN
4. HCST
5. RSS
6. MWI: JVA and WAJ
7. Ministry of Education (curricula development)
8. Ministry of Higher Education/universities
9. Ministry of Industry/Chamber of Industries
10. MOH
12. MOA
13. Jordan Cooperative Organization (JCO)

C. Communications Services

1. Social Science/Communication Research Units
2. Higher Committee for Environmental Information
3. Ministry of Information (MoI)
4. Radio Jordan

5. TV Jordan
6. Newspapers
7. Commercial Presses, Audio-Visual Production Units, Advertising Agencies
8. Outside sources of environmental education/communication materials
9. Universities (Yarmouk Journalism Faculty, etc.)

III. Professional Environmental Education/Training

A. Groups/Organizations Requiring Training

1. MMRAE/DE Staff
2. Public Service Administrators
3. Private Sector Managers
4. Professionals-engineers, school teachers, agricultural extension workers, media producers, community services (such as water, etc.)
5. NGO Staffs
6. GOJ Line Ministries Staff-technical and support personnel
7. Municipalities' Staffs-Aqaba, Amman, etc.
8. Ministry of Tourism Staff
9. Antiquities Department Staff

B. Organizations Conducting Training or Could Conduct Training

1. University of Jordan-WERSC, Engineering Faculty, etc.
2. Yarmouk University-Education Faculty, Journalism Faculty, Earth Sciences Faculty, etc.
3. Ministry of Higher Education-other universities, colleges and technical institutes
4. JSCEP
5. RSCN
6. MMRAE/DE (training unit needs to be established)
7. MWI/WAJ Training Center
8. Institute of Public Administration
9. Institute of Administration of Manufacturing Groups, Chamber of Industries
10. RSS
11. Ministry of Education
12. Corporation of Vocational Training
13. Ministry of Health
14. Ministry of Labor
15. Public Safety Training Institute
16. Queen Alia Fund
17. Nour Hussein Foundation
18. Jordan Cooperatives Organization (JCO)
19. UNWRA Training Program
20. WHO/CEHA
21. Donor supported training

C. Degree Programs in Environmental Field

1. University of Jordan–Engineering Faculty and WERSC
2. Yarmouk University
3. JUST

Table 1. Donor Sponsored Environmental Projects

DESCRIPTION and AMOUNT	IMPLEMENTING AGENCY	EXECUTING AGENCY	REMARKS
ONGOING OR APPROVED PROJECTS:			
Dana GEF Project ($3 mil)	RSCN	World Bank	
Azraq GEF Project ($3.3 mil)	GOJ	UNDP	Steering committee includes MWI, MMRAE/DE, MoA, RSCN and WERSC
Small GEF Grants Program ($250,000)	National Selection Committee	GEF	Maximum grants $50,000 1993 Pilot year–estimate 1994 budget $1 mil.
National Environmental Information and Education Program–Friedrich-Naumann-Stiftung Foundation (JD300,000)	JSCEP	Friedrich-Naumann-Stiftung	Three-year project begin in 1990, with possible extension
Agricultural Pesticide Program–GTZ	MoA Pesticide Laboratory	GTZ	Communication campaign being initiated
Short-Term Studies–ESCWA	Local Consultants/Groups	ESCWA	
Training in Environmental Health–WHO/CEHA	Government and Non-Government officials	WHO/CEHA	Regional Training Center linked to Ministries of Health
Water Quality–Friedrich Ebert Foundation	NA	NA	
PIPELINE/PLANNED PROJECTS:			
Aqaba GEF ($8 mil)	Aqaba Authority	Unknown	Pipeline project
Water Quality and Conservation–USAID ($25 mil)	MWI	Contractor to be selected	Planned implementation after mid-1993
Agricultural Environmental Concerns–FAO	Ministry of Agriculture	FAO	
Japanese JICA	NA	NA	Areas not known

While these organizations make impressive individual efforts, the team observed minimal cooperation in developing complementary programs. Yet the possibilities are unlimited. For example, TV Jordan children's programs could use RSCN nature clubs in the schools. There is almost no sharing of resources, even though every organization interviewed said it lacked sufficient resources (money and personnel) to do the job it should be doing.

One critical weakness in the system is the private sector's limited participation. The private sector and the promoters of stronger environmental controls have a latent adversary relationship. Here is an area where Jordan can learn from the United States Environmental Protection Agency (USEPA) experience. After 10-15 years of focusing on "command and control," the USEPA realized that environmental controls do not have to be an economic liability for industry. It set about developing a major program focusing on incentive-based pollution prevention activities using clean technologies. Pollution prevention can often be profitable for industry. This program also was a major contributor to closer working relationships and cooperation between USEPA and industry. The draft Jordanian environmental legislation does not include incentive-based pollution prevention programs.

In-depth interviews with many organizations involved in the environmental program revealed that they have limited staff, equipment, and funding. It was also observed that many of these organizations had not clearly defined their mission, formulated a work program reflecting priority goals, or developed mechanisms for cooperating with other groups. While many of these organizations are enthusiastic and dedicated-especially NGOs, universities, and scientific groups-their planning and management capabilities are generally weak.

Organizations must have clear goals and missions to develop cooperative and complementary programs with other groups. An important aspect of cooperation is the capacity to effectively communicate and share information with other organizations.

The organizational outline summarizes donor-assisted projects which are ongoing, approved, or in the pipeline (which may or may not be approved and implemented). As compared with sectors, such as water, agriculture, industry, the environmental sector receives little assistance from the donor community. Most of what is currently approved is the special multi-donor sponsored General Environmental Fund (GEF) for which United Nations Development Program (UNDP) and the World Bank are providing leadership on the Jordanian projects. However, these two agencies are not putting any of their own resources into Jordan's environmental program. There are no donor assisted projects in the DE. USAID did sponsor the preparation and printing of the National Environment Strategy.

The consensus of almost everyone the team talked to was that the weakest link in Jordan's environmental system is the central environmental agency-the MMRAE/DE, which has approximately 25 staff, mainly engineers. It has no clear mandate nor a clear role for itself. Without a strong, clearly focused central environmental agency, it will be almost impossible for Jordan to successfully implement the National Environment Strategy. A leadership agency is required, especially within GOJ. Others in the system have special roles and functions, but are not in a position to provide the overall framework for a national environmental program. The central focus of the new General Environmental Corporation (GEC) should be to provide leadership in the environmental sector, especially within government, and serve as facilitator to strengthen the environmental system as a whole, thus encouraging active participation of NGOs, private sector, other ministries, educational institutions, mass media, and the scientific community.

New environmental legislation is being introduced which should provide a base for strengthening the Department of Environment. The legislation calls for creating a GEC as a semi-autonomous organization under MMRAE. The legislation is primarily an enabling law to create the GEC; however, it contains little information on its role and functions, relationships with other environmentally concerned agencies, or any details on operating modalities. It does specify the membership of a 23-person high council, but does not spell out its roles. Little mention is made of monitoring programs, who will be responsible, and how the information will be disseminated. No mention is made of pollution prevention/ incentive-based programs, environmental education/communication, or other critical areas. Also missing is a description of the procedures for formulating the by-laws and regulations/standards to make the law operational.

Since there was a consensus on the need to strengthen the DE in its transition to GEC, many recommendations in this report are directed to this task. This does not mean other groups in the system can be overlooked. The team strongly feels that major support is also needed for NGOs, educational/training institutions, research organizations, and other ministries. The team feels that much more should be done in strategic planning and organizational development planning for all key groups-governmental and nongovernmental-involved in Jordan's environmental program to clarify the role of each and to strengthen their institutional capacities.

F. Recommendations for Strengthening Organizations

The following recommendations are designed to strengthen the organizational capabilities of the institutions involved in Jordan's environmental program.

F1. Pass the Environmental Law

A draft law establishing a GEC is with the Legislative Board in the Prime Minister's Office. If the board approves the draft, it will be presented to the Cabinet and then to Parliament. This legislation has been pending since 1981. It is important to adopt suitable legislation to facilitate development of a strong central environmental agency that can provide leadership for the Kingdom. While many people feel the current legislation is flawed, the majority of those with whom the team talked said that it should be passed anyway. If the legislation is sent back for additional work, assistance should be sought from consultants with experience in preparing, negotiating, and implementing environmental legislation. Institutions in Jordan (public, NGO, and private) should participate in the drafting process to build a consensus for the new legislation.

F2. Establish Participatory Mechanisms for Formulating By-laws and Regulations/Standards

The legislation being processed is an enabling law creating the GEC. It contains few specifics on GEC's exact roles and functions and relationships with other governmental and nongovernmental bodies. It also does not spell out environmental regulations and standards or enforcement mechanisms. There are to references on how information, education, and

communication programs will be organized or carried out. Therefore, the important step that must follow enactment of this legislation is formulating and processing by-laws and regulations/standards.

Building on the experience of the USEPA, it is strongly recommended that mechanisms be established to encourage wide participation in the formulation of these by-laws and regulations/standards through public hearings, advisory committees, and surveys/studies. The process must include the groups most affected (such as industry, farmers, local communities), special interest groups (NGOs, local groups, chamber of industries), and other ministries involved in monitoring and regulating activities (such as Health, Water and Irrigation, Industries, Agriculture). The team has recommended a special unit be created in the DE/GEC-the Participation/Information Gathering Unit under the Office of Serving the Public (OSP).

In designing this unit, expertise should be drawn from the Environmental Protection Agency (EPA) Public Affairs Department, which is responsible for this program. Universities and other groups should be enlisted to conduct surveys and do special studies related to the by-laws or regulations. Technical and social concerns and bureaucratic realities will have to be blended to make these operational details viable.

F3. Implement Policy of Freedom of Access to Environmental Monitoring Information, Including Information on Polluters

The team found that considerable effort is being spent by line ministries, RSS, universities, private sector groups, NGOs, and other groups that monitor Jordan's environmental program. However, every group the team interviewed said that it cannot access most monitoring information. In some cases, the problem relates to bureaucratic sluggishness. In others, the fear is that the information would reflect badly on the offender. In other cases the mechanisms (computerization, etc.) are not in place to process and disseminate monitoring data/information. It is important that policies be put in place and resources made available to promote the free flow of monitoring data. All groups should be able to access these data. This was one of the basic principles coming from UNCED. Without freedom of access to environmental information policy, Jordan's environmental program cannot succeed because concerned groups cannot be confident that they are addressing vital environmental concerns.

Section III provides details on designing an environmental information system and a center. However, these steps will not happen until the policy makers develop the rules and policies to ensure a free flow of information and make available the human and financial resources to make it happen. The most difficult aspect is to make available information on specific polluters. In the United States individuals and groups can access large databases which state the level of pollution by factory, pending ligation, and other information, including name of the factory, chief executive officer, and address. Public access to this type of information is vital but will not occur without changes in policy.

F4. Encourage More Involvement of NGOs, Educational and Scientific

Institutions, the Private Sector, and Others in Implementing the NES

While Jordan has strong participation of two NGOs, active research institutions, concerned universities, and other groups, greater participation is needed. The base exists, but the organizations need to be strengthened and other groups encouraged to participate. Public awareness or concern for environmental protection is minimal, but could be greatly increased through NGOs, the mass media, and the schools. Also, the private sector is not aware of the advantages of introducing clean technologies.

Building more awareness requires policies that do not restrict these groups from participating in environmental programs and that help them build the capacity to do their tasks. It is important that NGOs, research organizations, universities, schools, and other groups have independence to develop their programs. While the by-laws and regulations for the new environmental law are being formulated, this issue must be addressed. There must be provisions for "watch dog" roles for nongovernmental agencies to participate in environmental programs alongside but separate from the GEC and line ministries. The mass media, including GOJ-controlled broadcast services, must be encouraged to be independent and to do investigative reporting on environmental concerns.

Another important action is to establish "twinning" arrangements between Jordanian institutions and similar institutions in the United States and other "environmentally experienced" countries. Not only will such arrangements provide role models for the Jordanian institutions, but the exchange of information and experience should strengthen capabilities also. The UoJ and Washington State University (WSU) already have a twinning arrangement Another is being planned between RSCN and the University of Maine. (However, RSCN should also investigate twinning arrangements with like-minded NGOs such as the Nations Conservatory).

F5. Strengthen and Focus Roles/Responsibilities of DE/GEC

As mentioned above, DE is the weakest link in the environmental system. A strong focal point should be created within GOJ for environmental protection, also encouraging active participation of nongovernmental groups in addressing Jordan's environmental concerns. Enacting the new environmental legislation will not automatically strengthen DE. Work must be started as soon as possible on an organizational development plan to clearly specify roles and responsibilities of DE and other concerned groups, linkages to other groups, priority programs to operate, human resource needs, training and equipment needs, and a revised organizational structure. This work can be done through a strategic planning process, which is usually done with the help of management consultants (from the institute of public administration, universities, or outside the country).

It is recommended that action begin as soon as possible on an organizational development plan for DE before the legislation is enacted. Following are the steps that should be taken in an exercise to develop such a plan:

F5a. Review the NES and program which needs to be developed for an overview of

the national environmental program and directions it needs to go.

F5b. Map the environmental system, identifying all key organizations and their current and potential roles in the national environmental program. The purpose of this step is to identify current practices and any gaps in coverage.

F5c. Determine where your organization fits into the environmental system, its primary roles and responsibilities. This activity should clarify its unique focus and its place in the national environmental system, including relationships with other key organizations.

F5d. Prepare a mission statement clearly articulating the primary focus of your organization. DE/GEC and other organizations may each have a single overall focus and a series of sub-foci (overseeing national environmental program may be the primary focus and sub-foci could include monitoring the monitors and providing secretariat to implement the NES).

F5e. Formulate the "objectives" for your organization. These are specific areas for which the organization will be responsible (similar to the sub-foci). For DE/GEC, these could include providing leadership in developing of environmental legislation and standards, enlisting public participation in the environmental legislative process, and establishing and overseeing the National Environmental Information Center (EIC).

F5f. Identify specific programs for which your organization will be responsible. This activity focuses on how to implement the objectives identified in the last step. It must take account of what other organizations are doing and the relationship with them in operating these programs.

F5g. Determine five-year targets/goals for each program (i.e., what should be the output in five years).

F5h. Determine the resources needed to successfully achieve these program targets/goals. This analysis should determine the requirements for staff (and their skills), equipment, facilities, operating budget, etc.

F5i. Do a "gap analysis" that identifies the current resources (human, equipment, facilities, budget, etc.) and compares them with what is needed to achieve the targets/goals. The analysis should include requirements for staff (including training of existing staff), equipment (including repair or upgrades of existing equipment), facilities (including renovation), and budget. A phased-in plan must be developed showing how this gap can be filled over time. This must be a realistic plan that can be presented to GOJ and, if needed, through the Ministry of Planning (MOP) to donor agencies for outside assistance.

F5j. Prepare a master training plan based on the human resources and skills needed to achieve the organizational targets/goals. The first step will be to develop an action plan for each program and unit in the organization, including a "manning table" identifying all the staff needed. The next step should be preparing job descriptions for each staff position with

particular emphasis on the skills and knowledge each requires. A training needs analysis will have to be done for each staff member (and estimates for staff to be recruited) comparing their current knowledge/skill/attitude levels with what is required. The training should focus on or fill that gap. The training needs assessments of the staff combined to make up the master training plan. The plan should identify subjects, staff, timing and possible location (in-house, other institutions in Jordan, or outside the country) for the training. Section V recommends creation of a training coordination committee that can compare the master training plans of various environmentally related organizations and share them with potential training institutions.

F5k. Where needed, prepare project proposals for additional funds to enable your organization to achieve its targets/goals. These proposals can be directed to GOJ or other in-country groups, or presented to donor agencies for external assistance. Too often, organizations prepare project proposals (which are one-time activities to help an organization create a specific capability) without going through the logical strategic planning process. Without this logical process, there is no assurance that the needs are correctly identified, no knowledge of whether other organizations are already doing the program, and no detailed justification for the project. This process is required by most donor agencies. Therefore, initiating such a strategic planning process now should ensure DE/GEC (and other organizations doing the same process--see below) a better chance of getting additional support from GOJ and outside donors. It will also ensure that other organizations (line ministries, NGOs, etc.) will not fight the proposal because they can clearly see where they fit into the scheme and where your organization's program will support or complement what they are doing.

Another critical DE/GEC need is to strengthen management capabilities, ranging from training senior managers in strategic planning, goal setting, and delegation of authority, to training program managers in program planning, resource management, and monitoring/evaluating techniques. The office administrative operations also urgently need streamlining, including the filing system, personnel records, financial management, and inventory control.

F6. Establish New Units in DE/GEC

DE consists of approximately 25 people, mostly engineers and technical specialists. The new GEC program will introduce new programs that require a different mix of expertise. Based on the draft legislation and findings of this study, several new units must be added to the existing DE structure. At the end of this section are three charts including one suggesting GEC organization. Included are the following units relating to the information/ education/communications programs in particular:

F6a. The Policy and Legislative Development Unit will provide leadership in developing national environmental policies, formulating regulations and standards, and drafting new legislation. This unit will work closely with the proposed Participation/ Information Gathering Unit and the Technical and Information Division.

F6b. The Project and External Liaison Unit will be working with all units and outside groups to develop proposals for environmental projects that could be funded by GEC, other GOJ units, the private sector, or international donors. This unit will be the official liaison with other GOJ agencies, NGOs, the private sector, and through the Ministry of Planning (MOP), with international organizations, donor agencies, etc. Official communications for donor projects, will be through the MOP. This unit, however, will ensure that DE/GEC units comply with donor requirements and that they report in a timely manner.

F6c. The Environmental Information Center, explained in more detail below, will be the focal point for environmentally related monitoring data and information needed by GEC and other groups (public, NGO, private, international) to carry out their environmental responsibilities. GEC will probably not perform the actual operations of this information center (the computer databases, etc.); rather, they will be contracted out to a computer/ information services center (either public or private). Section III has more details on how this center can be created and operated.

F6d. The Participation/Information Gathering Unit will ensure maximum participation of all concerned groups in formulating and implementing environmental legislation, by-laws, regulations, and standards. For EPA, this function, introduced after roughly 10 years of operation, is now required for all new environmental programs in the United States. As explained above, this unit will be responsible for organizing and conducting public hearings, operating advisory committees, having surveys and studies conducted, and other activities which ensure maximum participation in decision making and feedback from all concerned groups. This unit will provide services to the Policy and Legislative Development Unit.

F6e. The Communications/Education Unit will inform the target groups about new GOJ environmental programs and regulations/standards. This unit will educate target groups and encourage them to participate in new programs. It will also work closely with private sector groups, the mass media, schools and universities, NGOs, local communities, and other concerned groups. It will also develop communications campaigns for the Kingdom's priority environmental concerns that are not being addressed by other groups. Section IV has more information on this unit.

F6f. The Training/Human Resources Development Center will perform a dual function by organizing training for both GEC staff and outside clientele. This unit will follow up on the work of the Communication/Education Unit to train officials in the target groups (such as industry, local government agencies, farmers' associations) on how to comply with new programs and regulations/standards. Section V has more information on the potential functions of this unit.

F6g. The Public Information Unit will inform other groups about GEC activities, including new programs, regulations, and standards. It will be the "early alert service" to inform concerned parties about new regulations and standards through the mass media and other communication channels. The Communications/Education Unit will follow up with programs directed at changing behavior among target groups.

Before any of these units (or any other new units, if fact) can be created it is strongly recommended that DE/GEC go through the suggested strategic planning process and create an organizational development plan. This plan should be reviewed by all concerned groups (policy makers, line ministries, NGOs, the scientific community, the private sector, universities and training institutions, etc.). Because the GEC program will be mostly new, there is concern that it will overlap or infringe on the domains of other groups. Wherever possible, these other groups should participate in the strategic planning process so that they will support the outcomes.

The charts on the following pages suggest how the information, education, and communication functions could be integrated into a national environmental agency.

Exhibit 2. Organization Chart for the General Environmental Corporation

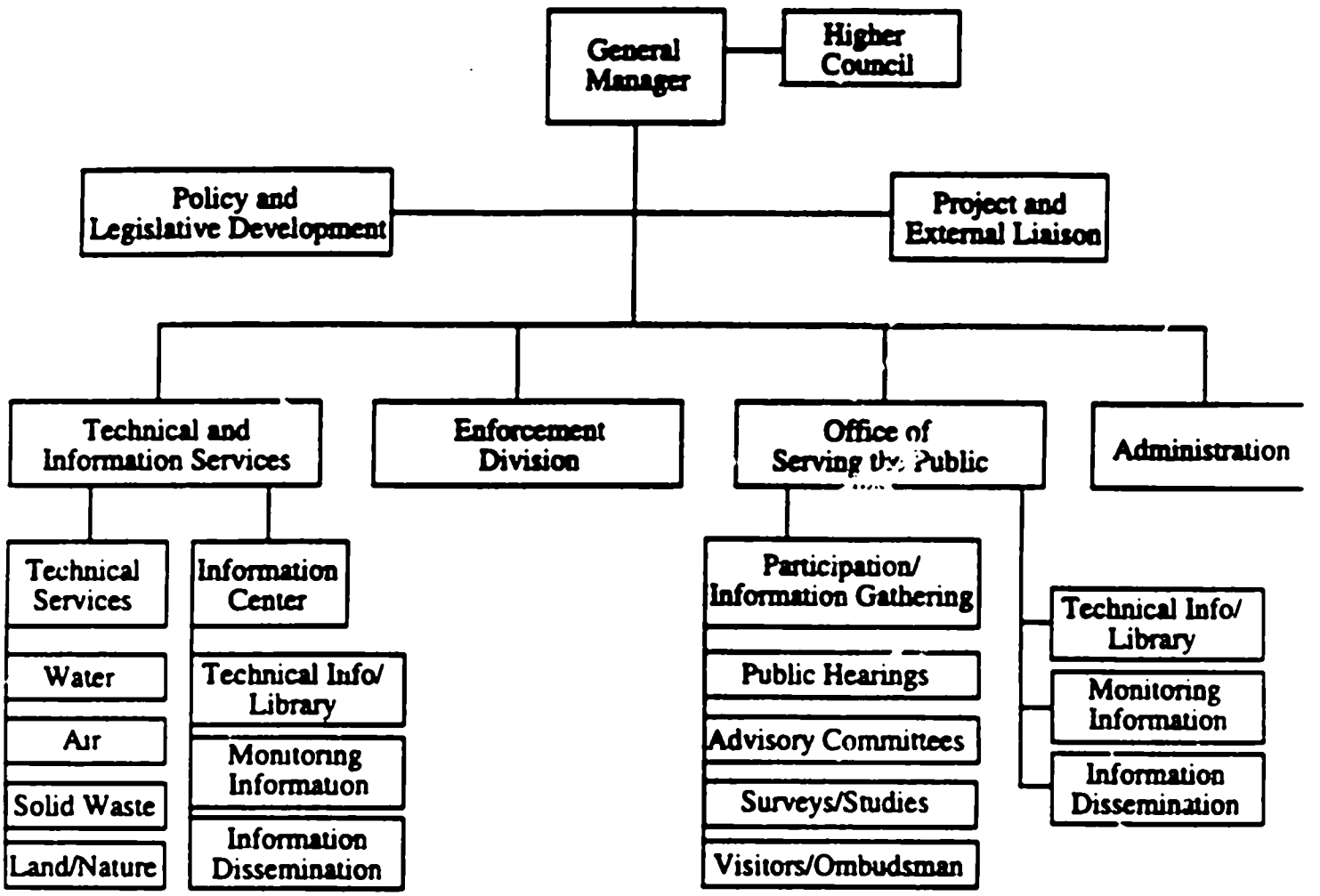


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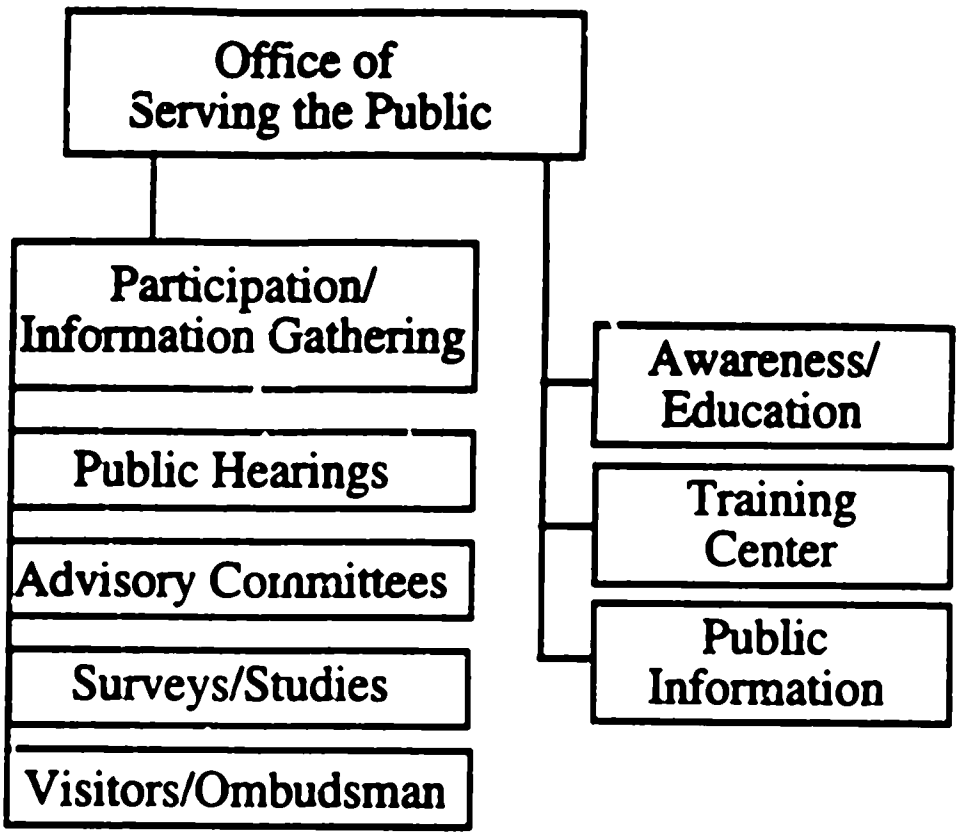
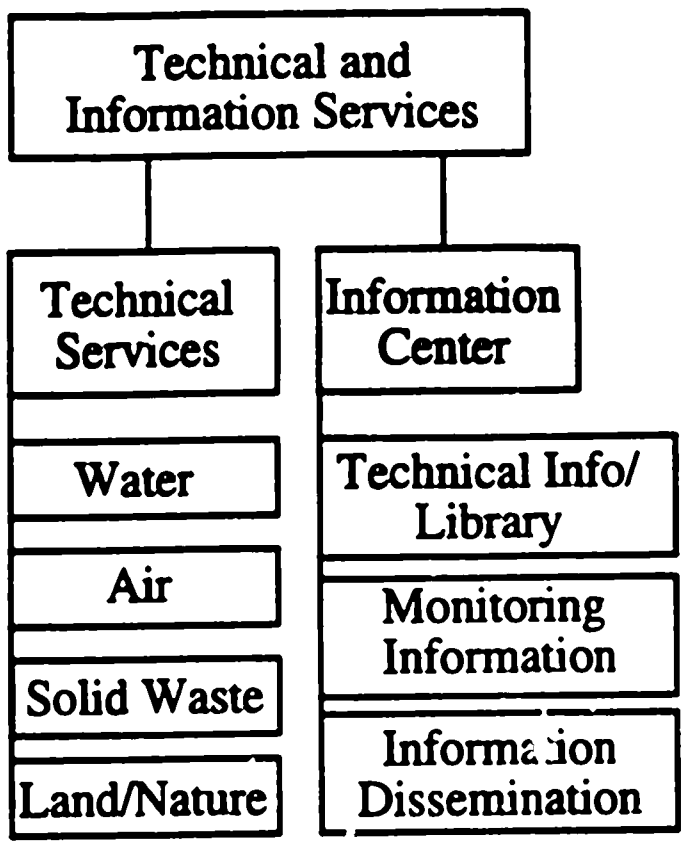
Exhibit 3. Organizational Chart for the Office of Serving the Public[3]



[3] This is a direct translation from an Arabic phrase proposed by the MMRAE/DE staff.

Exhibit 4. Organizational Chart for Technical and Information Services



F7. Key Environmental Agencies–Governmental and Nongovernmental–Conduct Organizational Development Strategic Planning Exercises

The team was impressed with the number of organizations that are active in Jordan's environmental program. However, these organizations were found to have limited financial and human resources. On the one hand, their achievement is impressive, given their limited resources. On the other hand, little attention was given to clearly identifying their focus, particularly in relationship to other organizations. There also seems to be little official sharing of resources or program coordination. They have done little to identify a "niche" that they could develop, thus having a unique impact.

It seems essential that these key organizations focus on management issues, precisely defining their roles and functions and concentrating on developing relevant programs. Key organizational groups should be encouraged and assisted to conduct strategic planning exercises to create organizational development plans and receive assistance in the management development field. Strategic planning should help identify the role and responsibilities and priority programs, formulate an organizational development plan, and determine how to cooperate with other organizations to achieve goals and targets.

It is recommended that the other key units (NGOs, research organizations, universities, private sector, line ministries, etc.) initiate institutional development strategic planning exercises. The steps are the same as described above. The best way for these organizations to gain support (financial, advisory, equipment, funds, etc.) from GOJ, in-country groups, or outside donors is to go through a strategic planning process to document needs, the planned uses of assistance, and the potential impact.

G. Opportunities for Donor Assistance

This section outlines briefly possible support activities that donors might provide organizations in Jordan to strengthen their capacity in the environmental field. Any requests for donor support for governmental agencies must be directed through the MOP.

This list is not complete nor are the activities developed in detail. It is expected that activities like the recommended strategic planning exercises and other planning will develop these ideas in more detail. Such exercises may also determine that some of these activities are not needed. Donors always expect a systematic project identification and formulation process to be followed before they provide funding, however.

G1. Help Establish Participatory Mechanisms to Formulating By-Laws and Regulations/Standards

Once Parliament passes the environmental legislation, the by-laws and regulations/standards will have to be formulated and processed. At this stage, specific functions and responsibilities of GEC and other organizations will have to be determined. An outside legal advisor experienced in similar settings can facilitate this process. Technical expertise in setting standards may also be required. A consultant experienced in developing

organizational development plans will be required to map out the structure, staffing, and technical assistance needed for DE/GEC (this work should begin before passage of the legislation). These consultants should have practical experience in setting up mechanisms to enlist participation of all concerned groups in the process of formulating by-laws and regulations/standards.

This activity should focus on building the capability to enlist participation in the DE/GEC, as proposed in Participation/Information Gathering Unit and the Policy and Legislative Development Unit. The EPA Public Affairs Division (especially regional offices) has expertise in organizing public meetings, operating advisory committee/panels, conducting surveys, and other techniques to ensure widespread participation in the legislative/standard setting process.

G2. Help Prepare Action Plan to Implement NES

The NES involved roughly 150 Jordanian officials working with a wide variety of organizations. It succeeded in expanding awareness of Jordan's environmental concerns among high governmental and nongovernmental officials. The next step is critical: to develop an action plan to implement the strategy involving identifying priority programs, determining who will be responsible for implementing them, and deciding what resources will be needed and who will provide them. This action plan will have to be formulated utilizing a wide variety of expertise representing many types of groups-governmental, scientific, academic, nongovernmental, and private sector. Donor agencies can help provide advisory assistance and funding to facilitate the process.

Donor support could be used for advisory assistance (similar to that provided for the original strategy formulation process), funds for task force work, meetings, publishing documents, study tours, etc.

G3. Provide Assistance to Key Environmentally Related Organizations to Conduct Environmental Strategic Planning Exercises

This could be a combination of outside consultants working with a Jordanian management school, or the Institute of Public Administration, which would help interested organizations organize and conduct strategic planning exercises. These organizational development plans should identify priority programs, and requirements for staff, facilities, equipment, and budget. They could also be used to seek outside support.

One technique for doing this is the twinning arrangement. For example, an NGO could twin with an overseas NGO and through staff exchanges, a strategic planning exercise could be initiated. The overseas twin could become a role model with the Jordanian twin drawing on the relevant experience and expertise. Considerable adaptation will be needed, but the twinning approach allows both partners to get to know each other well enough so that sorting and selecting relevant pieces is much easier than through the traditional technical assistance project modality. Also, chances that the twinning arrangement will continue long after a project is completed are improved.

G4. Help Prepare Comprehensive Organizational Development Plan for DE/GEC

High priority must be given to helping DE do a systematic and comprehensive strategic planning exercise to prepare a road map for creating GEC and building the capacity to implement its role in the NES. An institutional development specialist is required to work with DE and other concerned groups in a decision making process which will determine the GEC's roles and functions under the new law, priority programs for which it is responsible, organizational structure required, staffing (including job descriptions), training required, equipment/supplies, and other resources needed. An outside legal specialist and technical expert should provide input to help formulate by-laws and regulations/standards that also affect GEC organizational structure and functions.

This work should begin as soon as possible, before passage of the new environmental legislation. The advisory assistance could be intermittent with outside (expatriate) consultant(s) working with Jordanian management consultants in designing, checking data, interpreting findings, and helping to prepare recommendations. Both groups would work with DE/GEC and other concerned groups that would collect much of the information and go through a decision making process.

G5. Provide Funds and Technical Assistance to Establish in DE/GEC a Project and External Liaison and Other Units

A donor should be asked to help establish a unit that will help GEC and other environmentally concerned organizations prepare project proposals, maintain liaison with the Ministry of Planning, ensure effective linkages with other groups (other ministries, NGOs, the private sector, research organizations, etc.), and oversee the implementation of projects funded by GOJ and/or donors. One technique would be for a donor to bring back to Jordan for a year an overseas Jordanian experienced with international donor agencies. This person would identify and train staff, put into place the operating mechanisms, and help GEC prepare the initial set of environmental projects. This type of project is currently underway in Egypt where UNDP has helped the Egyptian Environmental Affairs Agency create an International Cooperation Unit.

Donor support should also be sought to create other units identified above, if recommended by the organizational development plan, and to strengthen the DE/GEC management system.

G6. Help Establish Seminars to Increase Policy Makers' and Senior Managers' (Public and Private Sector) Understanding of Jordan's Environmental Concerns

In implementing the National Environment Strategy, a series of seminars and other events should be organized to increase policy makers' and senior managers' understanding of environmental concerns, priority needs, and what they and their organizations can do.

G7. Fund National Meetings/Seminars Implementing the Action Plan for the National Environment Strategy

In implementing an action plan for the NES, donors could help organize and fund a series of workshops for the task force groups and others involved in the process.

G8. Establish a Donor Environmental Coordinating Committee

The donor community is minimally involved in Jordan's environmental program. On the other hand, interest is growing at the highest levels of government and among other groups in addressing environmental concerns in the Kingdom. It is recommended that the donor community take the initiative to periodically meet to review the needs for assistance to the environmental sector, share information on what donors are doing in this sector, and monitor implementation of the NES.

The key is to strengthen the management and planning of institutions involved in Jordan's environmental program. The basis exists, except for perhaps in the MMRAE/DE, to build strategic planning programs and other activities that could quickly produce results in strengthening environmental programs. The PRIDE team strongly recommends that GOJ, the participating organizations, and donors move quickly and aggressively to strengthen key institutions and further develop environmental programs.

This section has summarized the recommendations for strengthening the capabilities and capacities of the organizations involved in the Jordanian environmental program. Sections III-V make specific recommendations for strengthening the information, education/communication, and technical/professional training programs in many of these organizations.

SECTION III
ENVIRONMENTAL INFORMATION SYSTEMS[4]

A. Overview of Situation and Needs

Many organizations in Jordan (ministries, universities, nongovernmental organizations (NGOs), and donors) have an active, growing interest in the nation's environment, and the trends and changes due to development pressures and human activities. Responsibility for environmental oversight and monitoring is spread among at least 10 ministries and departments, each with its own specific role. Research into environmental issues is being conducted at several universities in Jordan and at the Royal Scientific Society (RSS) through the Higher Council for Science and Technology (HCST).

Thus, much work is being done in monitoring, testing, and research. However, no coordinated effort is guiding the generation and dissemination of environmental information. There is no central repository or clearinghouse for data and results in the environmental sector. Additionally, there are no standards to format and exchange environmental data and results on a government-wide scale. The data and analyses exchanged within or between departments, directorates, and ministries are almost entirely in the form of written reports, not electronic data files.

For example, the Water Authority of Jordan (WAJ) is responsible for monitoring and enforcing standards for surface and groundwater and wastewater throughout the country. To meet this responsibility, WAJ has established a water monitoring and testing laboratory, which samples, tests, and analyzes water sources throughout the country. This lab has the power to enforce standards, up to and including the right to close an offending operation (note that as far as we were told, this power has not been used since 1990). It has been able to increase the number of samples taken and tests conducted steadily from year to year, and produce monthly and yearly management summary reports, which are delivered to the minister. The reports recount the number and types of samples and tests conducted, as well as the incidence of non-compliance with standards. The reports also contain brief recommendations to the minister for possible projects and activities, but their effect on planning and strategy at the minister's office is unknown. The resources available at the WAJ laboratory are quite limited, especially with respect to computers (hardware, storage capacity and on-site expertise to create new databases). As a result, it is difficult to envision the lab doing much to contribute information to other organizations or to a national information database, if additional analysis or repackaging of the data were required.

As another example, the pesticides laboratory located at the National Center for Agricultural Research and Technology Transfer (NCARTT) is responsible, under the auspices of the Ministry of Agriculture (MOA), for testing all pesticides imported into the country and

[4] Section III was prepared by Christopher Stathes, senior vice president, Capital Systems Group, a PRIDE subcontractor specializing in information systems and databases.

formulated locally. Additionally, it is responsible for the monitoring imported and domestic produce (fruits and vegetables) for residual pesticides. It has enforcement powers. When local produce fails to meet standards, violators are cited to local courts where fines of up to 100 JD can be assessed. For imported produce, it can block importation and/or impound fruits or vegetables that fail to meet Jordanian standards. For imported pesticides, the lab has the authority to block importation or impound products that do not meet standards and established chemical criteria. As with the WAJ water lab, resources are limited, and the reporting now being done by the pesticides laboratory, other than what is generated for testing result documents, is in summary form, and delivered only to the Minister of Agriculture. Computerized results are maintained on-site, but only for use by the lab itself. The information, considered confidential, is not shared with any other ministry or public group.

Many governmental groups have turned to the RSS for research, monitoring, or analytic support, mostly on a project-related basis. The universities are also players in the environmental information sector, but primarily on a more narrowly focused basis, through research. In another sense, the pesticides lab and the WAJ lab both work with the University of Jordan (UoJ) by bringing in graduate students to take training and to do research projects using the lab facilities.The director of the pesticides lab also teaches courses on pesticides at the UoJ. These examples are presented to emphasize two points:

- Data is being generated in various locations that touches on environmental issues and concerns.

- Due to institutional practice, legal barriers, and perhaps most often, the lack of resources and incentives, data is not often shared with others, except in reports to the management of the ministry where the data originates.

When someone in the government need data or results from a source organization, the only formal way to acquire it is to have his minister write a request letter to the minister of the organization with the data. If that minister is convinced that the request is valid and does not compromise his ministry, he directs that the data be transferred. Our discussions indicate this process is sufficiently cumbersome that it is seldom used. The process for nongovernmental groups to obtain information is even more difficult. Moreover, few arrangements seem to allow for a routine transfer of data between and among departments and ministries, so every request becomes a one-time event. The notable exception would be the data needed by the Ministry of Planning (MOP) when donor agency projects are involved.

The more common way for data to move from one department or ministry to another is through personal contacts between individual staff members. If staff members need data from another organization, and know one or more staff in that organization, they contact them directly and explain their requirements. Often, they obtain what they need through this unofficial channel. Unfortunately, not everyone who could use data has a friend in the organization where the data are created or reside, and they may not even have a good idea of what data they need or where data exist. In these cases, data often are never obtained. Nongovernmental groups, private sector members, academic institutions and the like, are

even less able to obtain environmental information from government sources. Dissemination of reports is strictly limited, except in cases such as the general statistical volume published by the Department of Statistics, and the Environmental Strategy for Jordan report, which have been made available to a wider audience.

When data are made available, it is seldom in the form of electronic files or databases. Most information transfer occurs through written reports submitted to a limited audience. Others may review these documents or receive copies, but they have to re-enter or hand calculate the data in order to use them. Additionally, these reports, as noted above, are often highly summarized and do not contain much data or even full analytical results. A potential requestor and user of the data would have to go back to the source organization to supplement its contents.

The databases that do exist in the source organizations that have computing capabilities are almost entirely limited to those designed for internal use to support analysis and reporting functions on a normal operational basis. Databases designed to provide information for larger audiences or general concerns do not exist.

Many data collection organizations, such as the Environmental Health Laboratories of the Ministry of Health (MOH), lack computer resources. All data functions are performed manually, and recorded on paper. Limited computing equipment and mass storage media burden many source organizations that do have some computing resources, requiring them to archive data and results on a short-turnaround basis. The result is that it is extremely difficult for the organization to produce data series or analyses over any significant time line, or to return to check for the data or results on a site except for the most recent samplings. This adversely affects the ability of organizations to do trend analysis of changes in their areas of responsibility, or to meet others' requests for timeline data.

The NGOs, especially the Jordanian Society for the Control of Environmental Pollution (JSCEP) and the Royal Society for the Conservation of Nature (RSCN), are providing helpful pressure to open discussions on environmental issues within and outside of government circles. JSCEP and RSCN are raising environmental consciousness through their school programs and other lectures and seminars. Outreach programs run by the ministries, for example, the GTZ-supported program at the pesticides lab, plans to develop a seminar/lecture program for extension officers and farmers. Media programs are also important contributors to the dissemination of environmental information.

Discussions with technical personnel at the data collecting organizations and the Department of Environment (DE) lead to the conclusion that reluctance at the higher levels of the ministries, the government, and industry to deal effectively with environmental problems is diminishing. However, this trend seems to be restricted at this time to a willingness to deal with current crises and problems on a local basis, without taking action to formulate and apply a real strategy. The generation, in August 1991, of the National Environment Strategy for Jordan is an important first step in this direction, but its impact is hard to see at the line ministry level. An exception to this general situation is the recent establishment of the Higher Technical Committee for Drinking Water Quality. Five ministries, including MOH,

and Water and Irrigation (MWI), are participating members of the committee. The committee intends to help the MOH build strategies and programs for water quality assurance, and to coordinate activities among the participating ministries, directorates and departments. Sharing data resources will hopefully contribute significantly to this coordination and cooperation.

The recent creation of the National Information Center (NIC), under the National Information System (NIS), will help define a set of data standards and formats for data exchange in Jordan. These can be adopted by organizations working in the environmental sector to ensure that future data sharing is compatible with national norms. This will act to reduce the amount of data conversion and the possible introduction of data errors, as data will not have to be transformed or reentered into electronic database files as is necessary now with the reliance on paper systems.

B. State of Technical Information Resources

Various ministries have technical libraries, many of which have texts, reports, and other literature that can be applied to environmental situations. The UoJ, other universities, the RSS, several NGOs and donor agencies have libraries as well. Many of these libraries contain information and materials related to the overall environmental picture. However, someone seeking environmental information has to know where the libraries are, gain access to them, and determine what information is housed in each.

Several government libraries that we saw (e.g. DE and NCARTT) are not indexed, although the latter is conducting an inventory and will index its resources soon. Other libraries are organized only to the extent that internal users of the office or lab where they are located understand what is available and where to find information or texts. Many smaller libraries have no permanent librarian to assist users or to maintain the indexing and acquisition functions of the library.

Current technical information on environmental issues is spotty at best. None of the libraries that the team saw are able to maintain significant numbers of subscriptions to journals, technical newsletters, etc. that are not provided gratis or funded through a donor project. Access to remote databases is limited; the major hurdles are funding for subscriptions and searches and equipment gaps (computers, modems, communications software, training, etc.).

Rules on access to libraries vary widely. Many donor organization libraries, such as the one at World Health Organization/Center for Environmental Health (WHO/CEHA), are open to all interested persons, as is the JSCEP library. The university libraries are generally open for on-site inspection of materials, but withdrawal privileges are restricted to faculty, staff, and students. Many government-held libraries are reserved for use by department or directorate staff, unless by explicit invitation. Overall, it is difficult for individuals to learn what materials are available in Jordan, or to gain access to the material.

C. Situation in the DE

The DE seems to lack a clear mission, authority, and responsibilities, from a data and analysis perspective. It receives no data from the majority of the line ministries that collect and generate environmental data. It is not likely to gain access to more of these data under the current organizational and operational structures. One of the many reasons is the lack of established databases from which processed results may be routinely drawn. Another is the lack of a well-defined set of responsibilities for the department that does not overlap the authority of other ministries. A third is the real or perceived confidentiality of data being captured or generated at the line ministries. These factors make it difficult for the department to access data that would be useful.

The department is staffed primarily by engineers, some of whom have specialized training in environmental fields. The computer and analytic resources available in the department are extremely limited and the general level of computer skills among the staff is not high. It appears that the RSS is conducting analytic work for the DE under a contractual arrangement that must be funded and renewed annually. There is little evidence of regular analysis being conducted by the department's staff. Analysis is conducted for specific projects. However, few of them are transformed into regular, ongoing, efforts that could build a longer-term baseline of environmental data and results in specific environmental areas.

As a result of the meetings and discussions on the state of environmental information among Jordanian organizations, a matrix was developed to increase understanding of where information resides and where it is needed or used. This matrix is presented below with an explanation of its contents. The matrix describes the organizational sources and users of environmental information in eight categories.

- If the organization is a *source* of information for the category, the cell contains an "s."
- If the organization is a *user* of information for the category, the cell contains a "u."

Also included is a subjective rating of the relative importance of the organization as a source and/or user of information in each category, on a scale of one to ten (1 = least important, 10 = most important).

The number appearing in the lower left-hand corner of each cell represents the *current* relative importance of the organization, and the number in the lower right-hand corner of the cell represents the projected *future* importance, with respect to the particular category of information. Where information regarding the relative importance of an organization was lacking, no values appear in the table.

Table 2
Matrix of Environmental Information Categories and Organizational Relationships

ORG.	Water		Air		Solid Waste		Hazardous Waste		Soil		Biodiversity		Human		Quarries/ Minerals	
DE	s	u		u	s	u	s	u	s	u	s	u	s	u		u
	9	9	6	9	8	10	10	9	6	8	4	6	7	10	6	6
MWI/ WAJ	s	u			s	u							s	u		u
	10	10			5	5							5	5	6	6
MOH	s	u	s	u	s	u	s	u	s	u			s	u		
	7		10	10	8	8	9	9	6	8			10	10		
MOA	s	u							s	u	s	u	s	u		u
	7	7							10	10	8	8	7	7	6	6
MOI							s	u								
							9	9								
MOP		u		u		u		u		u		u		u		u
	9	10	9	10	9	10	9	10	9	10	9	10	9	10	9	10
JS CEP		u		u		u		u		u		u		u		u
	5	8	5	8	5	8	5	8	3	3	3	3	5	8	3	3
RSCN											s	u	s			
											10	10	8	8		
UoJ	s	u	s			u	s	u	s	u	s	u	s	u	s	u
	9	9	5	9	6	6	9	9	8	8	7	7	5	5	6	6
RSS	s	u	s	u	s	u	s	u	s	u			s	u		
	9	9	9	9	6	6	7	7	8	8			5	5		
DoM	s		s	u												
	1	1	7	7												
OSH							s	u					s	u		
							7	7					7	7		

ORG.	Water		Air		Solid Waste		Hazardous Waste		Soil		Bio-diversity		Human		Quarries/ Minerals	
Grtr Amn					s	u	s	u					s	u		
					10	10	7	7					7	7		
Other Muni					s	u	s	u					s	u		
					10	10	7	7					7	7		
Natl Resr															s	u
															10	10
M of Intr		u		u		u		u		u		u		u		u
Safety Com		u		u		u		u		u		u		u		u
DOS		u		u		u		u		u		u		u		u
Civil Defen							s	u						u		u
JUST		u		u		u			u		u		u		u	
Chr Inds	s	u	s	u	s	u	s	u	s	u	s	u	s	u	s	u

KEY: s = source of information u = user of information
No. in lower left = current relative importance on a scale of 1-10
No. in lower right = future relative importance on a scale of 1-10

This table is based on discussions the PRIDE team information systems specialist had with individuals in several ministries and NGOs. The subjective values assigned to current and possible future importance are primarily the result of discussions of the information systems specialist and Department of Environment staff and a member of the research staff of the Center for Water Research and the Environment at the UoJ. Staff at the Ministry of Planning directly contributed their inputs for the ministry's values. As such, the values should be considered highly tentative, and perhaps useful primarily as the starting point for further discussions among all parties. Where specific knowledge of the relative importance of an organization was felt to be lacking, no values were entered. Thus, modifications to this table are encouraged. Moreover, institutions and organizations will probably need to be added to the list in the current matrix, based on other contributions from interested parties.

D. Suggested Steps for Establishing National Environmental Information System (EIS) and National Environmental Information Center (EIC)

The government must encourage true cooperation among the relevant participants in the environmental sector for progress to occur. This will have to be accomplished gradually, particularly in light of the limits on resources (computer equipment and computer skills) available within the information sources that make it difficult to share information regularly without heavy burdens on the affected organizations. It is important that a real effort be made in these discussions to identify areas of feedback to the organizations that are sources of needed data. Feedback means information, such as additional analyses or other data types, that the contributing sources can receive in return for their inputs and that would help them in their own work. By providing something of value to the contributors, the system would encourage participation.

The establishment of an EIS and an EIC, under the guidance of a National Environmental Information Coordination Committee (NEICC) would be the best way to approach this cooperation. The framework being established by the NIC at RSS for sectoral information centers and standards should be used in the design and implementation of the EIC. NIC personnel should be asked to participate in the discussion, design, and implementation processes to assure conformance with NIC's work and the forthcoming national standards.

To begin the work toward an EIC under the aegis of NEICC, an organization needs to be nominated as the primary liaison and coordination point for all data flows. The managers and technical staff of all sources and users of environmental data must be asked to join discussions on formulating plans for the EIC shape and contents. Government organizations that collect or generate significant types or amounts of environmentally related data would be asked to join the NEICC. Other organizations that deal with environmental issues and data, such as universities, RSS, NGOs and private sector groups, would also be invited to participate in the NEICC, either as full participants or observers. Each participating organization would nominate two members to the NEICC, one representing the management and policy-making side of that organization, the other representing the technical and scientific side. In this way, the NEICC could divide itself when appropriate into two standing subcommittees, one dealing with organizational, policy, and legal issues, and the other with strictly technical issues surrounding data collection, generation, analysis, and dissemination.

With the prospect that the currently drafted Environmental Law will move to the Parliament and be passed, and that the DE will be transformed into the General Environmental Corporation (GEC) and gain a larger role in the environmentally related affairs of the nation, it makes sense to offer Department of Environment/General Environment Corporation DE/GEC as the proper agency to lead the formation of the NEICC, and later the EIC. In other words, the DE/GEC should become the reference point for the NEICC activities, coordinating tasks, taking the lead in carrying out strategies, and liaising with other interested parties. Later, DE/GEC would become the coordinator through which all relevant, processed, or summarized environmental data could be passed for further analysis, and sharing with interested parties. Even before any new environmental legislation

is implemented, work can begin on formation of the NEICC, and discussions and agreements necessary to establish the basis for the EIC.

The DE is staffed with subject matter experts in the environmental field (engineers, chemists, a legal representative, etc.), but not necessarily with the truly specialized scientists who perform the primary monitoring functions at the laboratories of the various ministries, the RSS, and the universities. As such, DE/GEC could work with the specialists who the NEICC nominates to determine the types and levels of base-line data, processed data, and analyses that might profitably be shared outside the agencies that collect the data and perform the primary analysis and enforcement functions. These definitions could be transmitted to the respective managements of the ministries involved for consideration and approval. At the same time, each monitoring organization would be obligated to conduct an internal review to clarify its role(s) in the collection, analysis, and reporting of environmental information. The goal of this effort, in conjunction with the NEICC-generated list of data types to be considered for inclusion in the EIC, would be to establish in principle the content and scope of environmental data sharing. Approval would allow for the initiation of the next stages in the development cycle:

- Strengthening the (computerized) data collection and analysis resources at the monitoring organizations by acquiring data management skills, hardware, software, and training in computer use.

- Creating standards for data packaging for transfer to the EIC and/or other users, along with a statement of rights, responsibilities, and restrictions on the use and dissemination of any/all data classes contributed by the source organization.

- Defining the contents and format of the initial series of EIC databases.

On a parallel track within the NEICC activities, there needs to be an effort to determine the scope and specifics of technical information in the environmental sector (government, universities, NGOs, donor organizations). The results of the search would be used to establish a national index/bibliography of environmental technical literature that would become part of the EIC and available to all users. A significant part of the construction of the bibliography will be developing agreements to share technical information. Rules for access to various libraries must be established. Access mechanisms to other indexes that would supplement or complement that of the EIC need to be established, and requirements for their usage detailed. (For example, certain bibliographic indices are being built using the library cataloging software from Canada (CDS ISIS) distributed by WHO/CECA, and users wishing to access these would need to know how to obtain a copy of the software and be trained in its use). Another important result of constructing the bibliography will be to identify duplications in information, as well as gaps in current holdings. Decisions on duplications would be needed to avoid acquiring more information than is needed (journals, reference volumes, etc.), although certain items might be needed in more than one library. Gaps, once identified, need to be prioritized, so that they can be filled as resources become available. New materials must also be assigned to a residence

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library, with a goal of providing the widest possible accessibility for all items.

The DE has no expertise in database design, development, or maintenance. Even the new GEC has no clear need to acquire this expertise internally. The most efficient approach would be for the DE/GEC to use the resources of one or more organizations, such as RSS/HAST, that specialize in data and information processing, to build and maintain databases and construct analytic and reporting capabilities that would use the EIC databases. The information to be captured in the databases would be determined from the cooperative work in the NEICC between the DE and the ministries and labs that are the sources of primary data and that would contribute processed results to the EIC. Throughout this process, the various users of environmental data, including governmental organizations, NGOs, the academic community, and private sector representatives, must take part in discussions leading to data accessibility and standardized reporting.

A concept that would provide a large amount of technical and summary information on the environment to a wide audience is the generation of a bi-annual "State of the Environment Report Card for Jordan. Following up on the experience of several years ago, this report would summarize the important data that is to be included in the EIC and present it with descriptive text and references to give an overview of environmental conditions and trends in Jordan. The exact contents of the document would be determined through discussions among interested parties. However, to be useful not only as a narrative, but also as a means of accessing the underlying data and analysis, the reports should be much more analytical than the previous effort and contain as much of the data as possible in the presentation. Data could be made available not only in tabular form within the report or in appendices, but perhaps also on diskette in a standardized format that could be incorporated into other work.

Because of the likely delay in full implementation of the EIC, it is suggested that the initial report card be assembled before the EIC is completely operational, taking as input from the data sources, the types of information agreed upon to become a part of the EIC. The creation of such a report, which would be produced every two years at first would demonstrate to a wide range of parties in and out of government the work being done in the environmental sector. It would also highlight the types of information that are to be part of the EIC. It may prove impossible to obtain all the information that ought to be included in the initial report card. The gaps in data collection and information retention and difficulties in obtaining data for the report would serve to point out weaknesses in data assembly and analysis resources in specific areas. The discussions among interested parties that would be generated by its publication would also serve to identify data types and analyses not included that might be considered for later reports. All these results should lead to efforts to strengthen the capabilities of the organizations responsible for data gathering in the environmental sector.

The EIC would become a functioning participant in the new NIC that is being developed out of RSS/HCST. The NIC will not be a national database, but will coordinate data sharing across sectors of the national interest, and help to establish standards for data transfer and communications. The EIC developers should utilize the knowledge and

assistance of the NIC team at every point throughout the definition and development of the EIC to ensure that it meets national standards and can receive information from, as well as contribute data to the NIC.

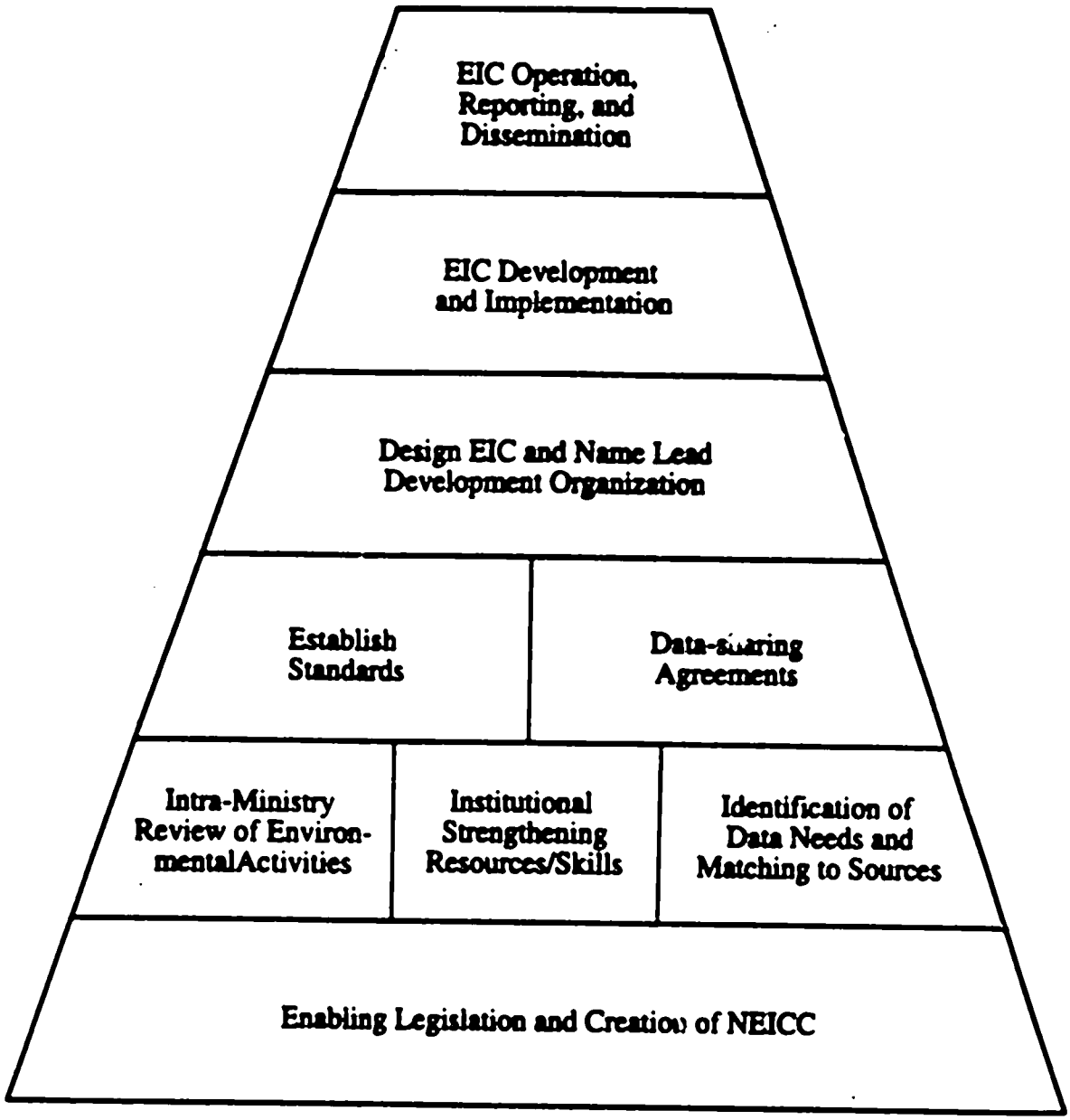
Ongoing EIC oversight should reside at the DE/GEC. The actual maintenance and modification of the databases and surrounding software systems that comprise the EIC should remain in the hands of data processing professionals, who will perform a service, working at the direction of the DE/GEC and the other sources and users who belong to the EIC community.

It would be expected that the definition and design of the EIC would require approximately 12 months to complete. During this time, it is important to find resources to strengthen the data collection and monitoring organizations so that their ability to participate as contributors of processed data would mature while the EIC itself was being constructed. The initiation of the programs and databases that make up the EIC might best be done in stages over perhaps 24 months, with early sections up and running in 8 to 12 months. Determining which pieces of the system are brought on-line first should in part be tied to the knowledge of who is ready to produce inputs.

Striving to make the EIC open-ended is an important aspect of the design and development of the system, beyond basic good practice in database and software engineering and adherence to NIC standards. By this we mean that the data structures and programs should utilize generally accepted forms and practices, and take advantage of widely used and "standard" database and reporting software (thus minimizing programming done at the lowest levels, which is expensive to create and maintain) wherever possible. Care should be taken to allow the EIC to expand to accept new data types at a later date. The EIC must be efficiently designed so that new or modified reporting requirements do not force the respecification of basic data structures or relationships.

The diagram below illustrates the steps involved in moving from the current situation to the inauguration of a functioning EIC. The bottom of the pyramid represents the first set of tasks to be undertaken. Each layer would build on the successful efforts that preceded it.

Exhibit 5. Building Blocks Towards an EIC



E. Recommendations for Jordanian Institutions

E1. Establish a NEICC

The NEICC will identify the key sources of environmental data/information, addressing legal and technical issues in accessing data/information, determining how the EIC will operate and what its relationship will be to the NIC and other databases, and working with users to ensure that they get the information they need in forms they can readily use. The formation and initial tasks of the NEICC are described below:

E1a. Establish the authority for creation of the NEICC. The committee will coordinate efforts in the environmental information area. It should have two members from each major participant in environmental information creation or use. The lead member should be a senior management staffer with a working knowledge of the environmental data his area generates. The technical member should be a senior staff member actually working to collect and analyze environmental data. Among the ministries that should be represented on the NEICC are: MMRAE/DE, MWI, MOP, MOP, MOH, MOA, Industry, Natural Resources, and Interior. Departments and other governmental members should include: departments of Meteorology, Occupational Health and Safety, and MOS; the Greater Amman Authority; other major municipal authorities; the Safety Committee; and Civil Defense. Additional membership should be drawn from NIC staff, environmental sector staff of HAST/RSS, and the universities. Observer status should be offered to the major environmental-oriented NGOs (JSCEP and RSCN), and to the private sector, most likely through the Chamber of Industry. A lead organization should be named to serve as overall coordinator of the NEICC and for the EIC development effort and operation. The DE/GEC under the pending environmental legislation will have significantly expanded review and oversight environmental responsibilities, and is the best candidate for the lead role. The department will need to be strengthened, however, to perform this function properly. Staffing and skills in environmental sciences, and management of projects and systems must be enhanced. Computer equipment must be provided, along with training in its use.

E1b. Each ministry or department currently involved in developing environmental data through monitoring, analysis, or research activities, should undertake a review to determine the type, frequency, and volume of the data that it is generating. The various forms that the data takes while under control of the organization should also be assessed: raw, processed (after analysis), and formatted (in tables or reports). The types of reports routinely created that use the data or its results should also be inventoried. Each organization should itemize how the data are stored during and after collection and analysis: written logs, computer files, and so forth. Last, the organization should determine any legal requirements for handling data in its possession, especially restrictions on the transfer of data or results to other organizations within or outside the government. If restrictions are found, their basis (by-law, regulation, etc.) should be noted.

E1c. Each organization should also inventory all data types and elements that it receives from other sources (that is, for which it is not the generation source). The source and frequency of the data receipt should be determined.

E1d. Each member organization should submit the results of its data inventory to the committee for inclusion in a comprehensive environmental data survey.

E1e. At the same time, organizations should also list the environmental data types that they do not currently generate or receive but that they would like to obtain. A statement of the way data would be used should accompany each data type. This list should also be presented to the committee.

E1f. Additionally, each organization should provide to the committee a report or bibliography of technical materials (texts, reports, periodicals, newsletters, etc.) that relate to environmental issues that are housed in any library under the control of the organization.

E2. Prepare Plan to Establish EIS

Under NEICC guidance and with donor assistance, a plan should be developed identifying the primary sources of data/information, technical standards, means of processing the data, and forms for outputting the information for users. Wherever possible, the plan should be based on and not conflict with the strategic plans of the key organizations involved. The plan will identify how the system will operate, including who will provide data/information, how it will be stored and processed, and who will be the anticipated users. The plan will also specify when the State of the Environment Report Card and other outputs will be prepared and disseminated.

E2a. When the comprehensive environmental data survey is complete, the committee should organize the survey submissions, categorizing them according to environmental area (for instance, water, air, solid waste, etc.). A matrix should be constructed relating data sources and uses, which can be used to identify gaps between sources and unmet user requirements (see sample matrix earlier in this report). This organized data bibliography will be used to match sources and potential users for discussions on data sharing and as the primary input document for the first round in designing the EIC's databases.

E2b. The data survey results should be shared with all participating organizations. User organizations should be encouraged to contact the sources of information that they need. Working through the committee structure, discussions between sources and users can take place, leading to agreements for sharing data with new user groups even before EIC implementation. It is important to note that legal and practical limitations may retard such agreements. Nevertheless, the discussions will always serve to highlight problems in data transfers that can be addressed under the EIC umbrella. If significant legal barriers are found that will hamper free information exchange, consideration should be given to working through the appropriate government channels to develop a bill (for a by-law or regulation, as required) to be submitted to the legislature that would codify the legal basis for wide access to environmental information.

E2c. Wherever limits in data management skills and/or equipment are major reasons limiting the sharing of environmental data (as opposed to legal limits), an effort should be

made to strengthen the organizations involved by adding computers and peripherals and training staff.

E2d. Submissions from participating organizations regarding technical literature resources should be compiled into a single list or bibliography. Duplications and information gaps should be noted, and a strategy developed, along with the EIC design, for acquiring additional technical materials.

E2e. With identified sources and requirements for environmental data and technical literature, the committee can begin the process of the development of the goals and objectives of the EIC. This center will serve as the focal point for collecting environmental data and technical information on environmental issues-the clearinghouse of data, technical information, and resources. The EIC design should be patterned on the model being developed by the NIS and NIC, which has the lead role in Jordan in establishing standards for data formatting and exchange, and for maintaining indexes to guide inquiries for data and technical information to their proper sources. NIC staff assistance should be sought during the EIC design process so that it will reflect national standards from its inception. The design document must include: data formats, exchange formats, security issues (access rights and limits), database contents, access methods, standard reports, and linkages to external databases or technical reference services. DE/GEC will serve as the lead organization for the design effort and will coordinate the participation of all NEICC members. It is strongly believed that the EIC should not reside at DE/GEC, or with any existing source organization. It is to serve all organizations equally, regardless of whether they are source, user, or lead or non-lead designated. The best solution is to place EIC management as a day-to-day operation with an organization that specializes in data processing functions. The candidate that comes to mind is RSS/HAST, which has skills in computers, software development, and database work that are needed to ensure that the EIC functions properly. It is possible that other organizations, including private ones, might have the skills and resources needed to operate the EIC, so this work could be opened to other qualified bidders, with the committee judging to determine to whom the award should be given.

E3. Establish an EIC

Using the plan prepared, and working with the NIC and other groups, an EIC needs to be established dealing specifically with environmental data/information for a wide variety of users. The DE/GEC will be responsible for the center; however, actual operations will most likely be handled by an information systems service group. The center will provide information for DE/GEC and other groups to carry out regulatory functions and provide information to other GOJ agencies, NGOs, educational institutions, scientific organizations, private sector, local groups, and many others.

E3a. The plan for the EIC will be the primary input for developing the EIC specifications. The drafting of the specifications; technical documents detailing the EIC structure, databases, data input routines, analytical capabilities, reporting capabilities, and user interfaces will fall primarily to the information specialists and computer scientists selected by the NEICC to be the EIC implementers and later the operators. The Knack

technical members, representing the concerned community of sources and users, will work with the specifications design team from the implementers to look after the needs of their organizations.

E3b. The specifications will require precise statements on the number and contents of the databases to be initially included in the EIC. The database access/query/update basis must be clearly defined. It is assumed that a non-hierarchical database concept would be selected, most likely some form of relational database that allows for the widest possible linkages between and among data elements, while minimizing redundancies in element appearance.

E3c. The hardware platforms on which the EIC is to be constructed will need to be determined as part of the system specification. The hardware decisions should take account of the number of connections (maximum and anticipated average levels) to the EIC that will need to be simultaneously supported, the expected size and growth rates of the databases, the desired response rate for users to maintain in their queries and reporting, and the choice of software to be used (including communications routines). While the number of EIC users will be quite large, it is important to emphasize that the EIC need not provide "instantaneous" responses to users. The databases will not be used for time-critical mission work that involves minute-to-minute decisions. On the other hand, the EIC must be designed to accommodate growth in the amount of data held, and the number of users that are likely to occur over at least 6 to 10 years. Expansion of the hardware base, addition of storage or replacement of processors with faster ones can be part of the growth strategy that will extend the life cycle of the system without the need to rebuild.

E3d. Software should be selected to maximize the utilization of off-the-shelf packages and utilities, thus reducing the amount of low level source code that will have to be programmed for the EIC. Certainly, a commercially available relational database package should be selected. Other considerations for software selection should refer to the standards set by NIC for data exchange, and to the data formats and standards NEICC members develop while the EIC plan is being developed.

E3e. The EIC specifications must include detailed plans for software and systems testing and validation. It is recommended that the NEICC insist that the developer work with the committee to construct a comprehensive test bed of data to be used in testing, that a separate testing plan, clearly indicating how each database and module will be validated, be attached to the specification, and that the quality control teams set up to conduct testing and validation exclude analysts or programmers from testing their own work. The acceptance plan (the final part of the testing plan) should not only address completeness of implementation of the specification, but should also include minimum acceptable time limits for the performance of well defined sets of operations using the system. To ensure system integrity, these timings should be performed under a range of (simulated) user loads. If the NEICC has contracted with an outside organization for development, the test plan should clearly state cost and effort limits for each major module that does not meet specifications during testing and validating stage, with remedies and penalties for late or incorrect work being paid or refunded to the project by the developer.

E4. Produce Biannual State of Environment Report Card

A vital output of the EIC will be to produce every two years (at least initially) a State of the Environment Report Card containing key analytical data and other information for by policy makers, NGOs, educational institutions, research organizations, international agencies, and other groups. This report card will be produced as the EIC is being established and will provide a framework to put the operating modalities in place for the center. It is envisioned that outside help will be used to design the system for producing the report card.

E4a. The report card will consist of data and text covering as wide a range of environmental categories as is practical. It should be used to communicate to readers a precise picture of the state of the environment in Jordan. Data will summarize environmental monitoring and analysis activities that indicate the level and rate of change in environmental problems the nation is facing. It will be important to point out environmental efforts that are controlling or improving environmental indicators. It will be just as important to include and discuss problems that are of growing concern (perhaps where levels of a type of pollutant are increasing because of developmental pressures), indicating their magnitude and rate of growth, and contrasting current indicators with national or international standards.

E4b. One suggestion for organization of the report card is to provide a separate section in the data and write-up for each major environmental category: water, air, solid waste, hazardous waste, soil, biodiversity, human factors, natural resources, and so on. The material may be subdivided by geographic areas wherever the available data allows that level of detail.

E4c. The report will also provide an opportunity to disseminate ideas and plans for environmental action that could be solicited from NEICC members.

E4d. It is not likely that all indicators that would be desirable to include in the initial report card will be available when the report is written. These gaps are areas where the NEICC must push to obtain the data if it exists, or plan to collect or generate data if it not currently being developed. The indicators that are used and the analysis that might be done to enhance their presentation should all become EIC elements.

E5. Help Build Capacity to Train EIC Users

An important function of the EIC will be promoting its services to encourage a wide variety of groups to use it. Training should be available to help users understand how to use the center and interpret its information. It is envisioned that GEC staff, NGOs, other ministries, policy-making groups, universities, research organizations, private sector firms, and many other groups should be users.

E5a. The range of skills for which training might be useful and appropriate is wide. Many potential users will come to the EIC with minimal experience in using a PC or other computer terminal. Many others will have no background in the use of an interactive, relational database system. Still others will require knowledge and understanding of data

communications and data exchange software use to be effective sources or users of EIC data. Skills in data analysis and interpretation will also be high on the list of expertise that serious users will require to become qualified EIC users.

E5b. Training courses should be divided into subject areas and proficiency levels. Many courses could last for as little as several hours. Some may require a week or more of intensive teaching and practical exercises. Classes should be small enough so that all students can test and demonstrate the skills acquired on a PC or terminal and to interact with an instructor who will review their progress individually. Wherever possible, users should train on the same basic sort of equipment that they will use in their jobs.

E6. Provide World Environment Center (WEC) with a List of Books and Other Materials to be Acquired or Purchased for JSCEP Information Center

The WEC was asked to work with JSCEP to identify information materials that will serve as the initial stage in establishing an information center. This involved helping JSCEP determine their precise needs and what environmental areas they want to focus on. It also involved checking other libraries and environmental information centers in Jordan to make sure what is established in JSCEP complements them. Other donors should be contacted by various groups to help secure environmental data and information for their libraries.

E6a. The information specialist on the PRIDE team has interviewed JSCEP staff to determine current library/information center status. A major failing of the library is that the material in hand is not indexed for access. An index of all materials must be constructed. It is recommended that the index be built within a computerized indexing software package. The recommended package is CDS ISIS, available at no cost from the WHO/CECA regional offices in Amman.

E6b. The current library is also limited in scope, consisting largely of donated materials from Environment Protection Agency (EPA), United Nations Environmental Programme (UNEP), the Department of Statistics, United States Information Service (USIS), WHO/CEHA, and a small number of periodicals. In addition a limited number of videotapes is available through the library's collection.

E6c. JSCEP needs to acquire more information to meet the needs of their target audiences:

- School children
- University students/researchers
- Policy makers
- Industry representatives
- External groups working to foster awareness
- Other NGOs and donor organizations

Information is required in these media:

- Books
- Reference volumes
- Journals and periodicals
- Educational/curriculum guides
- Reports and profiles (Jordanian and worldwide)
- Manuals for trainers (how to run workshops, etc.)
- Videotapes/general information
- Slides
- Electronic (computer-based); software for indexing library contents (recommended source is WHO/CEHA CDS ISIS system, which many environmental organizations are using, including the UoJ for their periodicals catalog, and the NCARTT. WHO/CEHA will provide software, databases, manuals, and training to JSCEP at no cost. JSCEP must formally request WHO/Ceca assistance by letter as soon as is possible. Additionally, CDS ISIS can be used to access three Compact Disk Read Only Memory (CD ROM) databases that WHO/CECA has in their offices for bibliographic searches on a wide range of environmental health topics.
- Software to communicate with other organizations and databases
- Membership in Center for Environmental Health Activities Network (CEHANET), WHO/CEHA regional network of health environmental dissemination points, if it supports JSCEP's mission.
- Electronic references (CD ROM or disk-based texts)

E6d. Computer hardware will be required. The computer's primary function is to house the library index that JSCEP staff or qualified inquirerers would use to search for references. It would also be available for other work of the society when not committed to library usage. Recommended are a 486/DX processor-based PC with a large hard disk (over 500 megabytes), communications modem (1200/2400 baud will be sufficient, as discussions with users of fax/modem connections in Jordan indicate that transmission noise and breakup result in an unacceptably high number of retransmits at higher speeds), (CD ROM) drive, digitizer/scanner, and a printer as the basic hardware platform.

E6e. Designated JSCEP staff should be trained in the use of any software obtained as part of the computer setup, and possibly in library/indexing techniques as well.

F. Opportunities for Donor Assistance

F1. Provide Funds and Technical Assistance to the NEICC

Assistance should be given to establish the committee, provide reference materials and technical advice in information systems, and prepare the plan to create the National Environmental Information Library.

Specific assistance in identifying and organizing data indicators and elements that would be included in the EIC databases, as well as in a comprehensive technical resource bibliography would be useful.

F2. Provide Technical Assistance to Prepare Plan for an EIS

A consultant with experience in establishing information systems and with experience in Jordan or similar countries, should work with GEC, the coordination committee, NIC, and other groups to prepare an overall description of the EIS and a specific plan to establish the EIC. This plan should include sources of information, types of initial data/information to collect, processing and packaging, user needs, staffing and training, equipment, and other resources to sustain the center's operations. Decisions will have to be made on GEC role as the responsible agency for the center that will actually operate the data processing services.

The technical advisor should be assigned to the NEICC to help develop the EIC specifications (hardware and software). If outside services are to be used to develop and/or provide the service operating the EIC, the advisor should help prepare the criteria for organizations allowed to submit bids, help prepare technical portions of the Request for Proposal (RFP), and sit on the subcommittee that judges the technical proposals.

F3. Provide Technical Assistance, Equipment, Training and Funds to Set Up EIC

The plan should serve as the framework for a donor-supported project to actually create the center, which would provide equipment (hardware and software), staff training, advisory assistance, etc.

The advisor should work with the NEICC, DE/GEC, and the development staff to monitor progress and adherence to specifications and standards. The advisor should automatically be a member of the quality assurance team that conducts acceptance testing of all modules and finally approves the EIC.

F4. Provide Funds and Technical Assistance to Prepare State of Environment Report Card

Special advisory assistance will probably be needed to help prepare the first report card drawing on expertise from groups that have prepared these types of reports. This could be done at the time the information center is set up and used to work out the operating mechanisms for collecting, processing, and packaging information. The report card should come from a database that users can draw on for difference analyses. It is also recommended that a data disk be made available with the report so that users can further analyze information in the report. The report will become a valuable tool for compiling information from many sources and making it widely available. The report will be available to many groups to study the validity of the data and locate critical gaps in monitoring data. This should make a major contribution to improving the overall environmental monitoring program in Jordan. It will also serve as a record for measuring progress in addressing priority environmental concerns over the years.

The donor support could include specific ideas and concepts for contents, layouts, graphics, and maps that might be used in the report card. Assistance with desk-top publishing software and database interfaces would also be areas of expertise where an external advisor

could supplement the skills of the report card team.

F5. Help Design and Fund Training of Users of EIC

It is essential to encourage users to take advantage of the center and be trained on the information available and how to interpret it for use in their programs. Advisory assistance could be given to the center and the GEC or some appropriate training institution to conduct the course. User guides and teaching aids need to be developed and trainers trained.

A range of courses from basic personal computer (PC) usage to highly technical data analysis and interpretation methodologies might be developed. Hands-on training should be the goal in all courses, with case studies and self-paced exercises supplementing lectures and manuals.

F6. Procure Technical Literature/Data (Including CD-ROMs, Access to electronic databases, etc.) for Key Environmentally Related Groups

A survey should be taken of the technical information/data related to the environmental field as one of the initial tasks assigned to the NEICC. Different libraries should be designated to specialize in certain environmental areas and mechanisms developed to share information with other groups. The committee should determine areas where additional information is needed and let donors know.

External expertise and knowledge about available technical information, and its format and volatility would help guide the NEICC in determining the types of information to be acquired permanently and the media in which to acquire it. Other information would be better obtained through electronic downloading or search and access via remote databases of bibliographies which can be used to order relevant articles and journals. The experts assisting NEICC could develop the list of such databases to be included under the EIC on a subscription or pay-per-use basis.

SECTION IV
ENVIRONMENTAL EDUCATION/COMMUNICATION PROGRAMS[5]

A. Purpose and Overview

Many Jordanians are joining in the call for greater awareness of environmental issues. They are heard in government ministries, departments, or units that relate to Jordan's water, air, land, wildlife, or people; in nongovernmental organizations (NGOs) that focus on environment; and in international donor agencies whose programs touch environmental issues.

The meaning of the word "awareness" varies according to the context but generally seems to imply something more than simply knowing about the environment. To most Jordanians environmental awareness leads to action that protects at least the environmental element that most concerns them. When they talk of increasing awareness about environmental issues, they mean either (a) behavior in others they would like to change or (b) behavior they want people to learn. They want action.

Action, of course, is complex human behavior involving more than simple awareness or knowledge. Action–especially repeated action–involves motive as well as knowledge and ability. Actions may become learned behavior. Once learned, behavior patterns tend to persist. Still, behavior can be changed.

The environmental awareness that many Jordanians speak of involves actions that are friendly to the environment. They look to communication as the process to bring about awareness. Many hope that the mass media will do much of the task. One simple paradigm of action[6] identifies four distinct steps leading from a communicated message to action.

Awareness is the first step. At this stage, targets become aware that someone has a message for them. Anyone who watches the Thursday night Jordan TV program on environment, for example, knows someone has a message about the environment. The person who does not turn on the set at that time cannot be aware of that and is out of the action process before it starts.

Acceptance is the second step. Some who have the TV set turned to Channel 1 on Thursday night pay no attention to the environmental message of the program; they read or talk or occupy themselves in some other way. They have dropped out of the action. On the

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[5] Section IV was prepared by K. Robert Kern, a development communication specialist who has served as a consultant to Project in Development and the Environment (PRIDE) on three previous assignments in Jordan. Dr. Kern is also providing the leadership for the development of the environmental awareness campaign training/reference package which will be tested in Jordan.

[6] This Action Model of Communication was set down by the author and a graduate advisee, Paul Yarbrough, who was at the time an M.S. candidate in technical journalism at Iowa State University, Ames, Iowa, U.S.A.

other hand, viewers who pay close attention absorb the message, although that does not guarantee that they will act on it.

Understanding is the third step. Viewers now have to understand what the message (the TV show in this case) has to say and specifically, how they could use the information. If they do not understand the message or do not know how they could use it, the communication process stops for them. Those who understand the message may go on to action.

Action is the fourth step. Once people know enough to take action, they face the final question: Do they want to take action? Are they motivated to act as the message suggests? Generally, they will act if they expect to benefit from the action.

Behavioral science has much more to say about how humans learn on the basis of actions and results. One powerful factor is time: people learn a behavior when they take an action and earn a reward, and repeat the action and earn the reward many times over. The more times they act and receive the reward, the more deeply they learn the behavior and are likely to repeat it.

Often no long-term action results from a single exposure to communication, even when an individual moves all the way through the process. That may explain why we see so little change in behavior resulting from well-considered, one-time awareness efforts, whether by mass media or interpersonal means such as seminars and lectures. The evidence is convincing that environmental awareness is a complex undertaking.

This brief introduction to behavioral science base sets general parameters for the kind of communication activity that should encourage environment-friendly actions by Jordanians. It suggests careful choice of target audience and action desired from that audience. Messages must be developed to produce audience awareness, interest the audience, and promise benefits resulting from the recommended action.

Communication intended to produce action has to be much more than a single shot: it must continue over time with simple repetition plus ingenuity to find new ways to convey the message without wearing out the audience. This kind of carefully crafted communication often brings about the desired effects.

This is the model we use to evaluate needs for environmental awareness programs in Jordan: targeted audiences and messages relevant to those audiences, delivered effectively, and continued over time.

B. Current Situation

In Jordan we found what our hosts call environmental "awareness efforts" that target individuals, with little attention paid to firms, businesses, or government units (which may follow practices unfriendly to the environment). Most awareness programs consist of a single effort (such as a television program) on one subject provided to a general audience with little

or no cross reference to other awareness efforts. We found some indications that the environment has become more prominent on the public agenda in Jordan.

Jordan TV devotes more time to environmental issues now than it did formerly. Beginning in January 1993, a half-hour program in prime time each Thursday is devoted to an environmental subject. This emphasis has resulted from appointment, by the minister of information (encouraged by the prime minister), of a Higher Committee on Environmental Information with members from radio and television programming units; ministries of Agriculture (MOA), Health (MOH), Environment (MOE), and Water and Irrigation (MWI); the University of Jordan (UoJ); and two NGOs interested in the environment.

The first meeting was held in mid-December, and the fourth in late January. The group selects a different subject for emphasis for each month. The January topic was water. Energy had been chosen as the February topic, but at the late-January meeting, a spirited discussion led to a decision to delay energy until March and advance agriculture to February. The group showed considerable interest in discussing programming approaches with two consultants attending. (Both had years of experience in educational radio and television programming in the United States.)

Neither consultant had the capability to judge the Arabic-language programs. Informants suggested that the shows fell notably below the quality and production standards that Jordan TV can meet. Programs tended to feature lectures or interviews (talking heads). A production unit assigned to the environmental programs seems to have adequate personnel to produce good television. There were indications, however, that the medium has not yet been creatively applied to environmental subjects. Also, there was little evidence of use of television to support specific behavior objectives or contribute to long-term influence.

Radio may also emphasize environmental subjects. However, we did not have the opportunity to determine its commitment as we did with TV due to the invitation to meet with the Higher Committee.

Groups with basic concern for the environment-Department of Environment (DE), ministries, NGOs-do not appear to have devised awareness campaigns. Without such campaigns, radio and television can give only limited support.

Newspapers occasionally cover the environment. In the last week of January, the English-language daily *Jordan Times* carried a lengthy editorial page feature from the U.S. Information Agency: "1993-A Year of Commitment to the Environment." The theme was global, with a Washington (U.S.A.) dateline. Content related mainly to the United Nations and the United States, with no Jordan angle.

News columns sometimes focus on environmental topics. In addition, individuals contribute letters or essays. One such contributor is educator Dr. Mohammed S. Subbarini of the Yarmouk University Faculty of Arts. Such environmental coverage, however, even when provided by individuals with special interests such as Dr. Subbarini, appears as isolated messages. One Jordanian observed that most mass media programs on the environment really

consisted more of propaganda for the agency or individual, than any contribution to environmental awareness.

The MWI, through the Water Authority of Jordan (WAJ), has produced environmental programs. The work has been sporadic, subject to the availability of a tiny production staff and uncertain funding. The output has included some television spot announcements, posters, and lectures in schools. We found no evidence of awareness output by the ministry's other major component, the Jordan Valley Authority (JVA).

The Ministry of Municipal and Rural Affairs, and Department of Environment (MMRAE/DE), we were told, has produced booklets on the environment, primarily for municipal and government officials. We were unable to confirm this. However, a film on the environment was under discussion at the time of our visit.

The ministry's environment arm, the DE, has no specialists to deal with environmental awareness efforts, nor does this activity appear to have priority among the engineers who staff the department. The staff could issue material through a complex process, involving the ministry's one-person public relations staff within a tightly disciplined approval procedure. The process has seldom if ever been used, however.

The MCA radio and publications officers issue materials on agriculture. The environment may be involved in some instances, but apparently receives no significant attention. Within the ministry is the Center for Pesticide Residue and Formulation Analysis. Under stimulus of its donor (the German GTZ), the center plans to launch a national campaign related to pesticides in the environment.

These efforts are valuable in the attempt to increase Jordanians' awareness of environmental issues. They put the subject before many people. Extensive research in the United States over the last half century has shown the mass media's major power is to place a subject on the public agenda. Media coverage tends to stimulate people to discuss a subject with others. Being on the agenda is not enough, however: few lasting changes in behavior can be attributed to the mass media alone. To the degree that Jordanians respond in the same way, these efforts appear to have a useful but limited role in the continuing task of encouraging individual behavior that protects the environment. The following cases illustrate how to carry the process beyond what the mass media alone can do.

The Ministry of Education (MOE) cooperates with NGOs and the Higher Council on Science and Technology (HCST) to give increasing attention to the environment as an extra-curricular activity. Two years ago, with the support of UNESCO, the ministry held a workshop on the environment for potential curriculum writers. Apparently, such materials have not yet begun to move into publication and use. HCST assisted in efforts to reform science curricula to give the environment more emphasis.

Environmentalists applaud efforts that bring quality materials and activities into the education process. They see the long-term advantage of building environment-friendly knowledge, attitudes, and practices into the learning experiences of youth. (Children do not

begin learning with a blank page when they arrive in school. A study by Dr. Subbarini found that a majority of fourth graders tested in his research had attitudes favorable toward the environment; however, nearly 40 percent already had developed negative attitudes.) In addition to the benefits of initiating long-term behavior in children, environmental education at an early age can lead youngsters to exert a powerful influence on the habits of their families.

Some efforts have been directed to strengthening teacher training on environmental subjects. Yarmouk University, for example, offers courses on the environment, some especially for diploma teachers who now need certification to the B.A. level. The university also offers a master's degree in philosophy of environmental education. No doubt other teacher-training institutions also contribute; time did not permit us to seek them out.

In addition, time did not permit us to contact all ministries in search of possible environmental work. The MOH, for example, probably has done environmental awareness work, especially in primary health. One source said that industrialists receive environmental information from the Chamber of Industries; another said there were no such identifiable programs. If they exist, they seem be limited in number and impact.

These efforts have the potential to achieve results beyond those expected from regular mass media reports. People usually take personally and seriously any information related to their health. Industrialists may be threatened with legal action. In these cases, environmental messages may have significant influence.

The Ministry of Information (MOI) has a group with responsibility for "media in development." We did not obtain specific examples of its work in environmental awareness. However, it appears to have potential, especially since it has a record of creating communication campaigns.

The work described above was found in the government sector. As noted, these are mainly isolated efforts that appear to be unrelated to efforts of other groups, or even to efforts of the same group over time. (For example, DE officers were unaware that a film on Jordan's environment was under discussion in its parent ministry.) It may be broadly stated that governmental units devote few staff (specialists in environmental communication campaigns) or financial resources to environmental awareness.

Except for the school emphasis, which is still in early stages, the efforts cited here do not measure up to the model we established to evaluate environmental awareness programs. The picture is less grim in the case of two NGOs. Neither meets all the criteria of our behavior-change model, but each has succeeded in some areas to a degree that generally exceeds government efforts.

The Royal Society for Conservation of Nature[7] (RSCN) contributes to environmental

[7] The society was created in 1966 under patronage of His Majesty King Hussein as honorary president. In 1975, the Minister of Agriculture granted it the authority to enforce the law of wildlife protection.

protection in several ways. It works with nature reserves (which preserve the environment by shielding it from alternative development). It also plays a significant role in licensing and controlling wildlife hunting.

We looked most closely at what the RSCN calls "awareness work," which it carries out through nature clubs associated with schools. The clubs function as extracurricular activity, operating by legal agreement of the school and society and conducting a continuing program of activity with their teacher-sponsor. RSCN's six awareness staff gather and prepare materials for the clubs, and work directly with club members by visiting each club once per school term. The staff prepares six to eight subjects or program features for each term. A typical visit to a club may include a lecture and slide show, activities, and distribution of publications for later use. Each member has a highly prized identity card and receives the magazine *El Reem* and a monthly newsletter.

This program has a quality of continuity over time for its members who typically belong for about two years. Some 10,000 Jordanian youth have been members of nature clubs, a significant number but only a tiny fraction of youth in the potential target audience, estimated to be nearly 1 million.

Awareness officers identify their own needs to upgrade skills in the following areas: curriculum building; information media; exhibitions; public awareness materials; finances; and marketing.

Less than five years old, the Jordanian Society for Control of Environmental Pollution (JSCEP) was formed by a nucleus of leaders concerned about pollution. It now numbers more than 1,200 members nationally with eight local branches in various parts of Jordan. The society carries out a variety of activities aimed at controlling pollution, including financing research projects, assembling a library on the environment, and operating an active outreach or awareness program (lectures, seminars, a magazine, leaflets, campaigns, poster program, mobile exhibition, and more). The awareness program spans target audiences from school children to policy and opinion leaders and persons in all walks who share a concern about environmental pollution.

Aided by the Friedrich Naumann Stiftung (of Germany), the JSCEP has a program staff of four persons. Three devote full time to the awareness project: the National Environmental Information and Education Programme. In 1992, more than 2,000 persons (40 percent women) attended program events: 18 seminars at 10 locations for a total of 25 days; a six-day workshop to train liaison officers; and a working day when 175 persons turned out to clean the Amman National Park. The final event of 1992 was the four-day education and action week in Aqaba. The society has a good record of attracting mass media coverage of its activities, which extends its messages.

The society undertakes some events that the staff calls campaigns. In one example, at North Shuna, February 1-3, 1993, a one-day program was repeated for 13 secondary schools (seven schools one day, six another). The program included information on global environment problems; agricultural problems; organic farming; films on five agricultural

issues; and a tour of the society's mobile exhibition. One day was planned for adults, featuring eight agricultural topics by MOA and Jordan University.

The efforts of these two NGOs have more continuity than government programs do. Still, their repeat contacts with the individuals and the total numbers they reach are limited. They do not fully measure up to our model for effective environmental programs to develop the desired behaviors.

C. Priority Needs

All 4 million Jordanians have individual stakes in their country's environment. Hundreds of thousands may get occasional messages about the environment; perhaps tens of thousands have some deeper exposure through school clubs and NGO campaigns. In total, current efforts only scratch the surface of need for well-planned and skillfully delivered programs that will lead to greater environmental protection.

Two tracks can lead to the kind of awareness that environmentalists in Jordan have in mind. The first is to derive more benefits from the current resources through strategically planned efforts and collaboration among the active units.

The second is to bring in more resources and especially to upgrade the skills of those who create and carry out the efforts. The techniques of communication campaigns now well-developed in North America and Europe need to be imported and adapted to Jordanian conditions.

The United States Agency for International Development (USAID) has authorized PRIDE to develop an environmental awareness campaign training and reference package and to field test it in a Near East (NE) country. Findings from this needs assessment mission will provide a partial basis for that package. Working with a panel of behavioral scientists and environmental communications professionals, the team leader (an environmental awareness specialist on this mission) will prepare the package of campaign training materials and references.

The primary aim of the package is to provide materials and guidelines that can be used to train nationals in designing and creating awareness campaigns (such as the model presented in Section I) and producing, delivering, and evaluating campaigns.

The field test, which will probably be conducted in Jordan later this year, will involve two stages. First, a small cadre of Jordanian professionals will pre-test the concepts and teaching materials (lectures, demonstrations, case studies, exercises, group problems, etc.). They will then join the teaching team, using the locally adapted materials for the workshop that will field test the package.

About 20 Jordanian professionals will take part in the workshop, drawn from public, private, and NGO organizations involved in environmental awareness. As both a teaching method and a contribution to their organizations, the participants will design actual campaigns

in the course of the workshop. They can subsequently produce and deliver these campaigns on behalf of their agencies.

Most environmental observers consider water to be Jordan's most important environmental issue. A USAID project, expected to start in 1993, will address water problems of the Zarqa River Basin, and includes a major effort in environmental awareness. It is hoped that this campaign training/reference package can be field tested as part of awareness campaign development for the water project.

D. Recommendations for Strengthening Jordanian Institutions

D1. Establish a National Coordination Committee for Environmental Communication by Broadening Composition and Function of Higher Committee on Environmental Information.

This group should represent government units with major stakes in environmental issues and with responsibilities for communication and education. These include at least the MOH, MWI, MOA, Ministry of Industry, Ministry of Education (MOE), Ministry of Information (MOI), and MMRAE/DE. It should have membership as well from principal NGOs in the environmental field and from universities. This coordination committee could do the following:

- Define major public awareness objectives for environmental communication and education, based on the National Environmental Strategy and other relevant knowledge. This would involve working through strategic planning methodology to clarify environmental needs, ameliorate major conflicts of interest, and reach consensus on objectives.

- Establish and maintain current priorities among the public awareness objectives.

- Communicate objectives and priorities to the government, policy makers and influential leaders, and all managers of environmental communication/education programs.

- Sponsor periodic seminars for policy makers and managers of communication/education campaigns.

- Sponsor research into behavior by individuals, firms, and government that affect the environment. The research would aid policy makers and managers of communication/education programs. Also sponsor research on effectiveness of such programs.

- Sponsor workshops on research methodologies (knowledge-attitude-practice studies, media behavior studies, and campaign evaluation) needed to build

basis for effective design and evaluation of environmental awareness communication/education programs.

D2. Establish Organizational Focus for Training on Environmental Communications and Interaction Among Groups Carrying Out Environmental Communication/Education

Placed either within a strengthened DE[8] or an NGO, the unit could:

- Sponsor training for managers and producers of communication/education campaigns.

- Provide a small secretariat that would serve the national task force as a clearinghouse for a wide range of environmental awareness information and stimulate communication and collaboration among groups producing communication/education campaigns.

- Encourage development of a training center on environmental communication and education campaigns by an existing Jordanian institution (possibly the Department of Journalism and Mass Communication, Yarmouk University).

- Give special attention to the need to coordinate environmental awareness programs that involve schools, nature clubs, and other possible youth groups. This may call for a national committee to assure that interests and resources from public and private sources are integrated in optimum ways. Environmental education for children, both in school and outside, may be the single most important means of developing an environment-friendly society in Jordan.

- Create an environmental awareness program within DE as a means to work on environmental awareness with other units of government, schools, NGOs, private sector, mass media, and others. Such a program would require an organizational unit that does not now exist in the DE. Under the proposed development for the department, it would become part of the Office of Serving the Public. Its specific responsibilities, activities, and staffing needs would be determined in the organizational development project activated as a key step in strengthening the DE.

[8] No such unit now exists in the DE, so it would have to be created. Such a unit is needed simply to serve the department's communications needs. If it were to serve as the focus for training, additional capabilities would be required beyond those that exist in a department communications unit.

E. Opportunities for Donor Assistance

E1. Provide Funds and Technical Assistance to Develop Office of Serving the Public (OSP) Within the DE and Provide for Equipment and Personnel to Operate the Office

This office would have two major functions in which no staff are now trained: (1) assuring public participation in bylaws and regulations processes and on environmental aspects of development issues, proposals, and projects; (2) designing and managing environmental awareness programs (discussed below).

Technical assistance would be needed to guide staff in establishing the office, develop training plans for staff, and serve as mentor to staff in new roles and activities. Funds would be needed for equipment and training (some of which would require international travel and training at external sites).

E2. Provide Funds for Equipment and Technical Assistance to Create an Environmental Awareness Program in the DE. Optimally, this Would Be in the OSP Under a Proposed Organizational Plan. If that Plan Is not Activated Soon, the Environmental Awareness Program Should Be Established As a New Function.

Technical assistance and funding for this function could begin immediately. Passage of the environment law will present the department (the corporation when formed) with an enormous public information task. Broad public awareness of the law will be needed for optimum public participation. To handle this task, the department will need aid to recruit staff, organize staff and services, and implement its programs. Computer equipment and software for word processing and desktop publishing will be needed as well as training on their use, available from Jordanian sources.

E3. Provide Funds for a Train-the-Trainer Program and Subsequent Workshops to Train Government and NGO Personnel Responsible for Designing and Implementing Environmental Awareness Campaigns

A first train-the-trainer effort would be the field test of PRIDE's environmental awareness campaign training/reference package. Funds will be required for national team-trainers (honoraria and expenses for about three weeks), and training facilities and equipment, along with materials, transport, etc.

Other train-the-trainer programs and workshops cover research methodologies for which funds would be needed for a teaching cadre, facilities, materials, transport for fieldwork, etc.

E5. Provide Financial Support to Aid Public, NGO, and Private Sector Groups in Designing and Implementing Environmental Awareness Campaigns

While these groups have staff trained to design and implement campaigns, most lack

funds to produce and deliver all elements of a successful project. Funds will be needed for materials, production (video, print, for example), and delivery of the campaign itself. Support will be needed both to complete the training sequence through actual performance and to assure that the campaign contributes to environmental awareness in Jordan.

E6. Support a Public, NGO, or Private Sector Group to Develop Programs and Materials to Inform Policy-maker and Opinion-leader Groups on Environmental Issues

Effective awareness campaigns require that policy and opinion leaders understand and support the efforts. This may be especially important as groups begin to design campaigns on different phases of the environment. The task requires a mix of interpersonal and communications materials support. Donor investment to support an ad hoc group would strengthen the overall work. Funds would be needed most for production of quality materials, drawing on the best services available, much from the private sector.

E7. Provide Funds and Technical Assistance to Strengthen Capacity of Existing Social-Science and Market-Research Groups to Carry out Knowledge-attitude-practice Studies of Major Audiences for Environmental Awareness Programs

The initial stimulus in this area would be a workshop on research methodologies for behavioral studies and evaluation of environmental awareness programs. A one-time donor investment would assure an effective workshop in which experienced researchers from North America or Europe worked with Jordanian researchers to provide the training.

An additional donor investment might encourage a Jordanian institution to develop a specialty in this area, both to undertake such research and to provide subsequent research training to others.

E8. Provide Training and Technical Assistance to the MOE or an NGO to Produce Environmental Kits for use in the Schools. (The Innovative Earth Generation Kits from a U.S. Firm Provide an Example.)

Donor funds would make it possible to bring kit producers (the Earth Generation group perhaps) to work with Jordanians. In addition to technical assistance, financial support would be needed to produce the kits for distribution. With donor seed money, it should be possible to secure support within Jordan, especially from private-sector sources.

E9. Open Access to Requests for Funds to Support a Variety of Initiatives for Environmental Awareness.

Some funding may provide seed money and planning aid, demonstrating how these initiatives can be developed and perhaps taken over by national sponsors. Three examples follow.

E9a. A grant would enable the Yarmouk University Department of Earth and Environmental Sciences, to issue a newsletter sharing its findings with professional, technical,

and policy-maker audiences in Jordan.

E9b. Small grants, perhaps to Yarmouk University's Department of Journalism and Mass Communication and the MOI, could provide for seminars or short courses on environmental issues for writers and producers for the mass media; also for newspaper editorial writers.

E9c. A modest grant could sponsor training on strategic planning, a skill needed in virtually all public, private, or NGO groups engaged in environmental awareness communication and education. Also, collaboration between an external and a national group could qualify the latter to offer training to the many others whose programs could be strengthened by better planning.

SECTION V
TECHNICAL/PROFESSIONAL TRAINING[1]

A. Purpose and Overview

The National Environmental Strategy (NES) for Jordan was developed by many agencies, organizations and interests. Without the proper tools, skills, and resources, however, any plan is difficult to implement. Jordan must have the appropriate tools and skills in place in order to turn the NES into action and reach its environmental objectives. Recognizing the need for these tools and skills, the NES calls for institutional strengthening across the board, including staffing and training. This section of the report addresses Jordan's professional training and higher educational needs and capabilities related to reaching those environmental objectives.

Training and developing a person's skills and knowledge can take many forms including traditional classroom lectures, apprenticeships, workshops, and on-the-job training. The choice of forms depends on the individual, the kind of skill desired, and the situation.

Training can be expensive, so it is important to choose training options carefully. Training the wrong person or paying for a course that is too advanced or too simple for the student clearly wastes time and money. It is better to know the exact information needed, the information included in a training activity, the persons who need that knowledge or skill in an organization, and the training method preferred. If considerable training is involved, it may be wise to use a professional educator to help define the training objectives and evaluate the options.

Often, organizations and institutions underestimate the benefits of well-planned training. It is not unusual for a manager to complain about low productivity or underskilled staff, and then cancel the training budget in order to buy another piece of equipment. This new burden could add work to the underproductive staff, especially if their skill levels are not adequate to handle the new apparatus, or if they do not fully understand its limits and output. The proper training of the right individuals is almost always cost effective, beyond the benefits derived from increased staff morale. Although the cost benefit may not show up on a standard accounting balance sheet, an analysis can be done to specifically demonstrate the financial benefits of training.

The more we learn about environmental issues, the more we realize that controlling factors are frequently located in several different sectors. For example, to develop a program to reduce air pollution, we should know something about chemistry, engine combustion, weather patterns, health impacts, and the law. To manage a wildlife park, we should know something about biology, ecology, business management, and economics. To control

[1] Section V was prepared by Stacey Tighe, an American Association for the Advancement of Science fellow in the AID/W, R&D/ENR Office, who serves as training director of the EPAT Project office.

hazardous waste disposal, a company should know specific facts about geology, chemistry, physics, health and medicine, and economics. Those in the field of environmental science may need to acquire skills and knowledge in law, economics, or engineering, while the economists, lawyers, and engineers may need to learn some biology or chemistry. Environmental professionals require frequent retraining and cross training and updating of skills, as this is a dynamic, interdisciplinary, evolving field.

When discussing environmental training at the professional and college level, four primary target audiences should be considered for additional training:

- Professionals working in environmental science careers. This includes government workers in the environment-related offices, staff members of environmental NGOs, and environmental specialists in the private sector (industry, consulting).

- Professionals working in non-environmental science careers whose business affects the environmental sector. This includes professionals in manufacturing, building development, the news media, and law makers.

- Undergraduate and graduate students studying in environmental degree programs. This includes students in the various environmental programs at the University of Jordan (Water Resources and Environment Research Center, Environmental Engineering), at Yarmouk and JUST in Environmental Sciences and Earth Sciences.

- Undergraduate and graduate students studying in non-environmental fields, whose activities will have environmental consequences. This includes students in Jordanian institutions of higher education who are majoring in other fields such as journalism, government, teaching, business, or agriculture.

Each of these four groups will be discussed below, in terms of the current environmental training needs and capabilities, their priority training needs, and recommendations for further assistance.

B. Current Situation

Despite the talented, enthusiastic, and frequently well-trained individuals in the various Jordanian ministries, nongovernmental organizations (NGOs), and the private sector, literally everyone interviewed expressed a need for training in some area. Most people felt that although they could use some upgrading of skills in their area of expertise, they really sought training in another sector affecting their work. For instance, some engineers in the Department of the Environment (DE) wanted to learn how to develop an oil spill contingency plan (project design and development skills), how to choose between two forms of pollution controls, i.e. require air scrubbers or just fine-tune those that exceed a certain pollutant level (policy analysis skills). Those outside the environmental science field (teachers, newspaper reporters, administrators) wanted training in the concepts and principles of environmental science.

It was clear from the interviews, however, that many of these institutions and organizations had not fully analyzed their training needs in the context of an organizational strategy. Therefore, the requests and descriptions of training were often ad hoc, relating more to a present task than to their priority tasks and overall job description. The identified (and requested) training needs are very real; they have just not been placed in the context of the organizational needs and training priorities as a whole.

What follows is a brief description of the training needs and capabilities of several key environmental-related organizations in Jordan by general category of institution.

B1. Government of Jordan (GOJ)

B1a. The Ministry of Municipal and Rural Affairs and Environment/Department of Environment (MMRAE/DE) Staff

This small organization (20-30 people) will soon undergo a fundamental change in mandate, responsibility, and authority as a result of the National Environmental Strategy (NES) and the proposed environmental law. Among all the environmental institutions in Jordan, this group has the largest gap between its current capabilities and its proposed level of expertise, and therefore the greatest training need of all of the organizations surveyed (other actions will also have to be taken to strengthen DE to the desired levels). The engineers in the office are all members of the local engineering professional society (credentials acceptance by the society is required to work as an engineer for the government). Individual job descriptions included expertise in air quality control, environmental law and strategy, water resources, chemical engineering, agriculture and land use, industrial engineering, and land fill. Some of the engineers have one-year masters degrees from Eastern European schools, which are considered lower in quality than Western European, American or other schools. Although many of the engineers speak English, few have scored high enough on the teaching of English as a foreign language (TOEFL) exams for admission to U.S. Agency for International Development (USAID) courses taught in English.

The department staff appeared to agree on their vast need for training on many fronts. These topics fell into three general categories:

- Technical/Scientific Information Transfer: These requests were usually for the updating of information, and state-of-knowledge in managing various environmental issues; i.e. for technical or scientific information within their own area(s) of expertise. For example, they asked: What factors need to be included in an oil spill contingency plan? What is the state-of-knowledge in dealing with oily ship ballast water? What types of pollution control mechanisms are being used and how do they work? What factors/questions/criteria should be included in an EIA for a refinery, a thermal energy generation facility, or a factory?

- Conceptual Awareness and Understanding of External Sectors: Resolving environmental problems requires an understanding of the sectors that are the sources of those problems. Only by understanding the issues and operations of the environmental situation and the external sector's situation can a solution be developed cooperatively at the least cost. This

requires "cross training," both within the environmental sector (e.g. biologists learning water chemistry, atmospheric chemists learning about combustion engines), and between very different sectors (e.g. an atmospheric chemist learning legal concepts, an environmental engineer learning about transportation and shipping policies). At present, most environmental professionals in the DE have expertise in only one sector (i.e. sanitation engineering).

- Management/Professional Skill Transfer: These requests were for management skills and institutional building to develop and implement environmental programs, skills that often come from on-the-job experience or training in professional management. For example, requests included: What are the strategic concepts and steps involved in designing and implementing a monitoring program? What are the effective means for communicating environmental hazards and awareness to the public? How do we train trainers for our own programs and projects? How do we structure our organization so that everyone can participate in decision making, and top decision makers can understand the issues? How do we learn the policy process: problem identification, option development, option analysis, project development, project implementation, enforcement and management, and conflict resolution? How do we learn management skills, including information analysis, strategy design, prioritization, budgeting, and reporting?

The DE needs a strong continuing education program in applied environmental sciences to maintain up-to-date knowledge in their fields and to cross train them in the external sectors that affect the environment. They also need, perhaps as much or more than technical knowledge, training outside the environmental sector in business, management techniques and tools, communications, writing, etc. Without such training, no department, regardless of how powerful, can develop and sustain programs without outside assistance.

The DE is interested in establishing a training center within its own offices, primarily to service its employees (e.g. how to use specific pieces of computer software, how to execute existing monitoring programs) and to implement its own programs including promoting a newly developed recycling program to municipal sanitation engineers or industry, describing the Environmental Impact Assessment (EIA) process and implications to industry, promote pollution prevention programs in industry/agriculture/public sectors. The DE has little or no educational expertise at present.

B1b. Ministry of Water and Irrigation (MWI)/Water Authority of Jordan (WAJ)

MWI/WAJ is a large (>8,000 employees), complex, and fairly powerful organization. Training needs and proposed assistance for developing WAJ's training capabilities are reviewed in the project design of the USAID/Jordan Water Quality Improvement and Conservation Project. Its needs are on three fronts: technical skills and advancement within the sector; conceptual awareness and understanding of other sectors; and management, planning, and program development skills.

WAJ does have a Water Training Institute, established in 1983, with a fairly large program that trains technical staff in monitoring skills, etc. The institute has conducted more than 93 courses for some 2,000 MWI trainees and more than 15 courses for some 350 people

from outside of MWI. Training does not include program management skills. The center currently has 11 full-time staff, and uses more than 10 outside specialists each year. The facilities are old and far from MWI headquarters.

The water project design proposes a Human Resources Development Plan in connection with the ministry strategic planning activity for institutional objectives and the Central Planning Unit.

B1c. Other Line Ministries

Several other GOJ ministries should include access to training on environmental issues. These include the Ministry of Industry and Trade (which has weak contacts at present with DE, and would be a target for DE outreach); the Ministry of Agriculture (MOA) (the agriculture extension service has just completed two or three new facilities with USAID/Jordan support, including training facilities); GTZ, the German assistance agency, is providing a lot of ad hoc, short-term training in agriculture with some emphasis on environmental issues); other USAID/Jordan agricultural projects (these have training with environmental awareness goals); the Ministry of Health (due to WHO's regional training center location in Amman, this area is fairly well established); the Ministry of Tourism (although the focus of Jordan's tourism is antiquities, there is also some interest in developing an eco-tourism capability; both require short-term environmental training which is not yet recognized as a strong need); the Ministry of Labor (not contacted directly, but it should have a Human Resources Department (HRD) strategy and/or the capability of instructing other organizations in how to develop such a plan); and the Ministry of Planning (this organization must understand the direct and indirect impacts of activities on the environment to prioritize resources; however, based on anecdotal evidence, it is apparent that this ministry wants to better understand the value of environmental concerns in relation to economic development).

B1d. Regional Authorities

Both Aqaba and Amman have regional authorities that manage the municipal interests of the areas. Each has two to three individuals in an environment office or capacity. The individuals we met in Aqaba did not appear to specialize in the environment, but had been delegated responsibility to coordinate and represent the environmental sector in the Regional Authority. Environmental awareness in Aqaba was quite high, with the master plan for zoning and land use already including environmental precautions such as set-backs and erosion control, and with the solicited presence of a consulting team from the European Economic Community (EEC) to do an environmental management study (resulting in recommendations) for the Aqaba Authority. Although still in progress, the training needs to develop and implement an environmental management program seem to have been identified.

B1e. Higher Council for Science and Technology (HCST)

HCST has a growing mandate in the environmental sector, including possibly establishing an environmental database, and developing of the science curriculum in the

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elementary public schools, although only two individuals on the staff are dedicated to environmental issues. HCST already does some training, particularly in the areas of computer hardware and software, although training is not one of its major mandates. This organization is very aware of environmental issues and linkages to other sectors. This group has little need for environmental training; however, it could conduct small training courses and/or provide technical advice for such courses. The HCST environmental office might also be a reasonable place to locate a national environmental training coordinative/collaborative body (see recommendations).

B1f. Institute of Public Administration

This is a government-operated institute that provides administrative and career skills training for civil servants. Indirect queries of those who had attended its programs suggested that environmental topics were not presented as such and training focuses on generic management skills for supervisors and department directors. Topics included personnel issues and administrative reporting. Although this institution has little or no need to develop environmental expertise, it is a possible source for some needed strategic planning, program development, and management skills that were identified in other environmental government institutions.

B1g. Academic Institutions

In general, Jordan's academic institutions are strong; almost all of them have some program in or knowledge of the environmental field. We encountered at least four leaders or centers in environmental higher education in Jordan: Dr. Moh'd Subbarini in the Faculty of Education and Fine Arts at Yarmouk University, the Department of Earth and Environmental Sciences at Yarmouk University, the Environmental Engineering Department at the University of Jordan (UoJ), and the Water and Environment Research and Study Center (WERSC) at the UoJ. These environmental degree programs are being further developed, although there is still room for additional assistance with resources and guidance.

B1g(1). UoJ/Amman

The WERSC and the Department of Environmental Engineering are the two focal points for environmental degrees at UoJ. The Washington State University (WSU) has a twinning arrangement with UoJ in environment, and with the assistance of USAID/Jordan, is presently developing the curricula for master's degrees in water resources planning and management, and in environmental management. The Washington State team indicated that they were starting with as many courses as possible that could be taught with existing UoJ faculty, adding two or three new courses each year. A course in resource economics is suggested, and a course in environmental policy and law may be added in the future. The Masters' program will begin in fall 1993. Although short-term and specialized training, seminars and workshops are mentioned in the work plan, they have low priority for the center at present, relative to teaching degree students and furthering research. It was suggested, however, that the center's director is interested in these programs and would welcome resources or expertise that could help develop this capability.

The four full-time Environmental Engineering faculty members are also fairly strong. This program received high marks from the University of Illinois (UOI) team that was exploring establishment of a regional environmental training network. The faculty member who will teach the first EIA class is from the Environmental Engineering Department. Short-term training is not a priority for this faculty.

UoJ also has departments of Population, Meteorology, and Earth Sciences, which may be able to develop and offer an environment-linkage course for students, as well as for environmental degree students. UoJ also has a University-based Center for Consultations, which offers short courses and continuing education classes in a variety of subjects. This center would be a possible source of continuing education classes for professionals (those in and out of the environment sector). Clearly, outside organizations would have to solicit and possibly develop the classes, but the University Center facilities and the UoJ faculty could be used as desired.

B1g(2). Yarmouk University

Yarmouk has three departments of primary interest to the environmental sector: Education, Journalism, and Earth and Environmental Sciences. The Education Department hosts Dr. Subbarini who has published widely on environmental education in the Arab world. His work is important, but more relevant to school children through professionals in the non-environmental sectors. The Journalism School was a target for Dr. Robert Kern as a possible focal point for training media professionals in the environment. The Department of Earth and Environmental Sciences has a strong undergraduate program, but no graduate program in environment.

B1h. Other Jordanian Institutions

Several other institutions of higher education were not surveyed on this mission, but have the capability of contributing to the wide dissemination of environmental information in various sectors. These institutions include the Jordan University of Science and Technology (JUST), Mu'ta University, and several vocational schools located throughout the country.

B1i. Nongovernmental Organizations

Environmental NGOs are quite active in Jordan. The three primary ones surveyed were the Jordanian Society for the Control of Environmental Pollution (JSCEP), the Royal Society for the Conservation of Nature (RSCN), and the Royal Scientific Society (RSS). All three have knowledgeable and motivated individuals in key positions, which meant that most of the training requests/needs were for skill development outside the environmental sector.

B1i(1). Jordanian Society for the Control of Environmental Pollution

The needs for training for these environmental professionals were primarily related to their outreach programs, and their desires to become more active in developing environmental regulations and policy. The specific needs mentioned for training of trainers,

media expertise, strategic planning, and comparative environmental law were not yet developed fully, nor placed in the context of the organization's overall needs, priorities, and resources. Due to the extent of this NGO's outreach activities, it should probably develop a small in-house capability to train staff and volunteers in their programs, as well as participate in training targeted at the wider environmental professional audience in Jordan.

B1i(2). Royal Society for the Conservation of Nature

The activities of this NGO are diverse and influential, so numerous small groups could use skill development. Many training needs mentioned by the organization (training public school teachers in the new environmental curriculum and materials, training nature youth group leaders, training in organizational development and awareness campaigns) are also outside the strictly environmental sector. Others are environmental in nature, including training in park or reserve management and environmental law. Likewise, due to the extent and diversity of RSCN's activities, (hunting and licensing management and enforcement, marine pollution control enforcement, park management, etc.), it should also have some in-house training capability. The RSCN mentioned at our last meeting that it was planning to establish a regional training school for wildlife management and other topics.

B1i(3). Royal Scientific Society

As this NGO also handles environmental activities on contract for GOJ (monitoring, data handling, etc), its members are knowledgeable on environmental topics. Their technical staff needs training on methodology and information handling/computer skills, as well as institutional development guidance.

C. Priority Needs

Overwhelmingly, the MMRAE/DE has the greatest environmental training needs in Jordan. The individuals there are minimally certified and trained engineers who are being asked (or will soon be required) to develop and manage entire environmental programs. They need short-term, long-term, and continuing education in the evolving technologies and global standards, as well as institutional development and program management.

A second need is for the various organizations and institutions to prioritize their many environmental training needs and analyze the best methodology for achieving their training goals (i.e. by in-country courses, twinning arrangements, internships, etc.), and then to synthesize/coordinate their findings with the other organizations who require environmental training.

The third need, once training priorities across the country are prioritized, is to saturate the country with as much environmental training, partnerships, and mentorships as funds allow. This includes professional and academic environmental training both within and outside of the environmental sector.

D. Recommendations

D1. Appoint Human Resource Development Coordinators in Environmentally Concerned Organizations and Institutions, and Develop and Implement Training Strategy

As mentioned in the introduction, all the environmental programs-government and nongovernment-have expressed the need to strengthen their capacities and capabilities. Therefore, it is recommended that they select one policy maker from within their organization to develop a training strategy linked to their institutional development goals. The human resources development coordinator should encourage strategic planning exercises and then use them to conduct training needs assessments for all key staff. Once the tasks for a position are known, then a training needs assessment matches the current capabilities of an individual with the required capabilities. The training should concentrate on the gap. Training must focus on improving staff work performance, which in turn strengthens the institutional capability and capacity. These training needs assessments should be developed into master training plans for these institutions.

D2. Establish Training Center in Department of Environment/General Environment Corporation (DE/GEC) to Serve In-House Training Needs and Train Outsiders Related to DE/GEC Programs

DE/GEC is the governmental institution considered most in need of HRD activities. It requires continuing education in its areas of expertise, training in other sectors that affect the environment, and training in management, planning, program design and implementation, and administration. The recipients of this training would include office and field DE staff, including those in the three centers and 12 governorate and sub-governorate offices. As new environmental programs, regulations, and standards are introduced, there will be a strong need to train outsiders-such as industrial managers and technical staffs, local government staffs, and agricultural personnel. Therefore, it is recommended that DE/GEC establish a training center to focus on these areas and audiences that other training institutions are not targeting. It should be autonomous but coordinated with the WAJ Training Center. Outside assistance will probably be needed to develop the HRD program, train staff, provide equipment, and help organize key courses.

D3. Identify and Develop Training Institution (WERSC?) to Become Focal Point for EIA Training, Industrial Plant Audits, and Similar Activities

The team observed a widespread interest in training in the area of EIAs and related fields such as how to conduct in-plant assessments. This type of training is not offered in Jordan. The new legislation will require much more use of EIAs in all sectors-industry, agriculture, and domestic. It is recommended that one or more training institutions be identified as leads in this type of training and possibly receive donor assistance to build their institutional capability.

Our visit to Jordan coincided with that of the USAID/WSU team, which was there to

develop the curriculum for UoJ's WERSC new Master's degree programs in water resources planning and management, and environmental management. A priority in each curriculum is an EIA course that UoJ staff can teach. The USAID mission has suggested that WSU co-teach the course this summer (1993) and that it be added to the regular annual program beginning in fall 1993.

D4. Strengthen and Diversify Environmental Academic Programs and Focus on Jordanian Concerns

Jordan's university system is the best place to cultivate a long-term commitment to training the nation's environmental scientists and leaders. UoJ, Yarmouk University, and the Jordan University of Science and Technology all have environmental courses or programs, and the UoJ also has courses in development. Many courses already focus on Jordan's needs, although not all those needs are represented. For instance, a researcher in the agriculture sector commented that although rangelands cover 91 percent of Jordan, he is the only staff range biologist, and he cannot attract students who have had more than a token course or two taught here on rangelands. These programs need to be strengthened and expanded to handle the need for environmental skills. Twinning arrangements, such as the UoJ's with WSU, are a good beginning but a strong, diverse program is needed. Resources should be targeted to further develop this environmental academic sector.

D5. Establish Additional Environmental Academic Programs in Strategic Areas

While the review of the environmental academic programs in Jordan was not exhaustive, the academic offerings have some major gaps, such as the lack of strong linkages between the science curriculum and non-scientific sectors. For instance, the Masters programs in development at WERSC include no law courses, and only one (in the water masters) in economics. These courses are in development, but will be introduced to the curriculum gradually, so as not to overwhelm the faculty. Other critical gaps are listed below:

D5a. Management/Administration of Environmental Programs

It was observed that many organizations involved in the environmental field need assistance to strengthen their management and strategic planning capabilities. Private sector managers and public service administrators also need a working understanding of environmental concerns. The Environmental Management Masters is not targeted to meet these specific needs. It is suggested that the business and public administration faculties consider introducing specific courses and/or elements of courses with an environmental focus.

D5b. Environmental Law

With the upcoming enactment of new legislation and increased activity in the environmental enforcement area, the legal profession needs to become better versed in the environmental field, and environmental scientists, managers, and engineers need to become

knowledgeable in the legal field. Law faculties should consider adding components to their courses related to the environmental sector.

D5c. Environmental Health

Public health programs have an opportunity to increase the environmental subject matter included in their courses through the World Health Organization's (WHO) regional center.

D5d. Environmental Journalism/Communications

The team discussed this area with the head of the Faculty of Journalism at Yarmouk University. The faculty are interested in developing courses with an environmental focus, but more resources and faculty training are needed to ensure that the courses are relevant.

D5e. Environmental Policy Planning, Development, and Analysis

These topics are briefly addressed in some course descriptions in the environmental curriculum, but the instruction is inadequate if most of Jordan's environmental leaders are to come from these institutions. This topic was also one of the most frequently requested areas for professional training.

D5f. Environmental Economics

As mentioned earlier, a single course in the economics of water resources is taught at the WERSC. Environmental economics is rapidly developing into a field of its own, and is an especially important tool for modifying industry and public attitudes and behavior. Especially at the Masters level, this curriculum needs development. The curriculum should continuously expand, as the environmental field and Jordan's needs develop.

D6. Increase the Number and Breadth of Professional Development Training Courses in the Environmental Field

As training needs assessments are conducted and master training plans developed, the priorities for developing short-term environmental training will become clearer. The required courses can be developed at any of several training centers in Jordan, depending on the audience, the frequency of the offering, and the evolution of environmental training capabilities in organizations. To help in this process, the following actions are recommended:

D6a. Establish National Environmental Training/HRD Cooperation Committee or Task Force

A team from key environmental agencies (MWI, MMRAE/DE, MOH), environmental NGOs, the professional organizations, and interested training institutions should be formed to provide leadership in this field. The team should identify experts who can help concerned organizations conduct training needs assessments and master training plans. They should also

survey all possible training institutions on their availability and capability for conducting training programs.

D6b. Develop and Publish Annual Directory of Training Opportunities in Environmental Field

The environmental training/HRD committee could perform a valuable service by developing and publishing annually a list of environmental training opportunities available to Jordanians. This would include in-country training by Jordanian institutions and organizations, short courses offered in-country by international organizations (such as World Health Organization/Center for Environmental health Activities (WHO/CEHA), and short courses or university fellowships offered outside the country that Jordanians could attend (USAID courses, university summer programs). This directory should stimulate demand for environmental training and at the same time make local training institutions aware of the interest in environmental training.

E. Opportunities for Donor Assistance

E1. Provide Funds and Technical Assistance for HRD Strategy Development Workshop and National Environmental HRD/Training Cooperation Committee

An HRD/training consultant could help the various organizations and institutions identify and prioritize their training needs, organize the committee, and guide it in establishing a worthwhile program. This effort could also include short briefings or seminars for committee members as well as managers/administrators of the institutions they represent. The main purpose of the committee is to coordinate and stimulate short-term technical/ professional training interest in the environmental field, and to motivate local Jordanian institutions to develop the capacity to provide this training.

E2. Provide Technical Assistance, Training and Equipment to Establish Training Center in DE/GEC

Considerable assistance will be needed to create an effective training center in DE/GEC, which has no training program or capabilities at present. It is recommended that an HRD/training consultant be brought to Jordan to help determine the actual needs and potential program for such a center. Working with the DE/GEC staff and other groups, the consultant would design a proposal to create the training center, and determine resources required by the GOJ and support needed by donors. The next phase would be to implement the project by creating the center, training the staff, providing equipment, etc.

E3. Establish Additional Twinning Arrangements Between Academic Institutions in the Environmental Field

Environmental technology and program approaches are changing so quickly that Jordanian institutions need to establish effective linkages with institutions in countries where environmental programs are on the cutting edge. One example is in the field of pollution

prevention which is often called "clean technology" or "incentive-based programs." Many universities work closely with their environmental agencies and the industrial sector to introduce newer technologies in their countries. Jordan could benefit from learning how such partnerships are formed, and how other institutions, agencies, and industries operate. Donor agencies should be encouraged to help Jordanian universities identify partners and provide seed money to facilitate these twinning arrangements which could include faculty exchanges, sharing of curricula and teaching materials, transfers of books and data, jointly conducted seminars or research, staff development, etc.

E4. Conduct Short Courses for In-Country Training of Trainers

If DE/GEC and other training institutions are to develop environmental short courses, the trainers will need to be trained to understand the subject matter, have appropriate teaching materials, and use proper teaching methods. The training of trainers should also include evaluation techniques so trainers and clientele can measure the effectiveness of the training and improve future short courses. The HRD/training consultant, working with the HRD/Training Task Force, could provide the leadership in organizing training of trainers. Wherever possible, Jordanian expertise should be utilized.

E5. Provide Funds to Collect Information and Publish Annual Directory of Training Opportunities for Jordanians in Environmental Field

The same HRD/training consultant could help the task force develop mechanisms to collect information on available training, access it, and publish this directory. The directory might also include master training plans and other information for training which could be useful to all Jordanian environmental training centers.

ANNEX A
SCHEDULE

NOTE: The following initials are used for the individual team members:

- BK = Bob Kern, Education/Communications Specialist
- CS = Chris Stathes, Information Systems Specialist
- ST = Stacey Tighe, Training Specialist
- JLW = John Woods, Team Leader and Organizational Development Specialist

Saturday 16 January 1993

5:30 pm	Arrival in Amman.
7:00 pm	Phone conversation with Carl Dutto.

Sunday 17 January 1993

9:40 am	Meeting Carl Dutto and Ahmed Abdullah.
10:00 am	Meeting: JSCEP: Suleiman Hanbali (Manager, JSCEP), Dr. Saleh Share (Director, MMRAE/DE), MunirAl-Adsham (UoJ and JSCEP), Ziad Alawneh (JSCEP), Mohammad Khair Ababneh (UoJ and JSCEP), Dr. Yousef Shurai Qi (MOA).
11:30 am	USAID to print and copy report.
12:30 pm	Lunch with Carl Dutto.
1:45 pm	Meeting: Ali Ghezawi, MWI.
3:00 pm	Arrangements with hotel for team and meeting/work space.
4:00 pm	Review National Environmental Strategy and copy key sections for team .
5:30 pm	BK, CS, and ST: Arrival in Amman.
7:30 pm	Team Meeting.

Monday 18 January 1993

8:30 am	Meeting: with counterpart team at JSCEP: Munir Al-Adgham, Mohammad Khair Ababneh, and Saqer Salem (JSCEP); Ramzy Batineh and Raed Abu Hasam (MMRAE/DE).
12:20 - 2 pm	JSCEP Population and Environment conference and interviews with attendees: Lina Mousa (UNFPA), Sufyan Tell (former Director, DE) and others.
3:30 pm	Team meeting with Carl Dutto and Abdullah .
4:45 pm	Team meeting.
7:30 pm	Working dinner.
9:00 pm	Preparation and transmittal of fax to Chemonics.

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Tuesday 19 January 1993

9:00 am	Meeting at MMRAE/DE: Dr. Saleh Shara, Director, Ramzy Batineh and Ra'ed Abu Hasam, Water Section, Sameh Tubicshat, Int. Coop., Husni Ahmad Hamder, Water, and others.
9:30 am	MMRAE/DE senior staff briefing.
11:00 am	Meeting: Royal Society for the Conservation of Nature (RSCN): Mather Abu Jafar, Director General: Janet Al-Joundi.
2:00 pm	ST: AID.
2:30 pm	JLW, BK, CS team meeting.
3:30 pm	Meeting: Dr. Fadwa Kirrish, Consultant, Environmental Working Group (West Bank).
7:00 pm	Hotel reception.

Wednesday 20 January 1993

8:00 am	Team meeting.
10:00 am	Work session on definitions and questions for Thursday meeting and for MMRAE/DE.
11:00 am	Meeting: Peter Ohlmeyer, GTZ Irrigation Engineer with MWI.
3:30 pm	Review components: definitions, questions and issues.
5:45 pm	Dinner with Carl Dutto at American Club.

Thursday 21 January 1993

8:00 am	Team meeting: assemble questions for MMRAE/DE and prepare for policy review.
9:00 am	Meeting at JSCEP: Policy making brainstorming; provide questions for gathering information.
12 noon	Meeting with Prof. Subbarini, Yarmouk University.
2:00 pm	Team meeting reviewing interview instruments.
3:30 pm	ST: to USAID.
4:30 pm	Meeting: Siegfried Holtkemper and Iyad Ahmed, GTZ, Information Systems advisory team to Ministry of Planning.
5:00 pm	JLW: Ramzi Kawar, Community Development Group, review of environmental legislation.

Friday 22 January 1993

9:00 am	Preparation of faxes for PRIDE.
11:00 am	Review of survey questionnaire with Bob Kern.
1:30 - 5:30 pm	Work session: WP Presentations charts.

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Saturday 23 January 1993

8:00 am	Team meeting.
8:30 am	JLW, CS meeting: University of Jordan Water and Environment Research and Study Center: Dr. Muhammad Shatanawi, Director and Dr. Manar Fayyad, Dep. Director.
8:30 am	BK: Samar Rabadi, RSS Public Relations and join team at UoJ.
10:00 am	ST: to Kuwait.
11:30 am	Meeting: Subhi Qasem, Office for Integrated Agricultural Development.
2:30 pm	Higher Council for Science and Technology: Fawwaz Elkarmi, Acting Director General; Talal Akasheh, Director of Environmental Sector; Mohammad Shahbaz, Researcher.

Sunday 24 January 1993

8:00 am	Team meeting.
9:00 am	MMRAE/DE meeting with working groups to gather information.
10:30 am	JLW: Review with Dr. Saleh Al-Share', Director, MMRAE/DE, of possible sources of funds for future programs.
12:30 pm	Lunch at AID: Update Carl Dutto and Abdullah Ahmed on team interview and approach.
2:15 pm	Briefing of USAID Deputy Director.
3:15 pm	CS meeting: with Yousef A. Nusseir, Acting Director, National Information Center, HCST.

Monday 25 January 1993

7:15 am	JLW meeting: at RSCN.
9:30 am	CS meeting: with Ziad Alawneh and Huda Qasim, JSCEP to discuss library needs.
10:00 am	BK meeting: HCST educational curriculum development committee: Izzat Au-Humro and Hussein, AIR; Muwaffaq Abu Ghazleh (MoE); Ahmad Abu Shhout, Issa Abdel-Qader (Dept of Ed); Hassan Zabian (Arab Youth Org.); Victor Billeh (Nat. Center for Ed Res.).
11:00 am	JLW meeting: MWI/WAJ Secretary General Mutazz Bilbeisi.
12:30 pm	CS meeting: WAJ Laboratories (Mod'd Lafi).
1:00 pm	JLW meeting: WHO/Center for Environmental Health Activities: Dr. Baroudi and staff.
4:00 pm	Team meeting.
5:00 pm	JLW meeting: Ramzi Kawar.
9:00 pm	Telephone calls to PRIDE and CSG, Washington, D.C..

Tuesday 26 January 1993

8:00 am	Telephone briefing of Carl Dutto.
8:30 am	CS meeting: Ministry of Agriculture pesticide monitoring laboratory: Yousef Sharairar, Director; GTZ advisers Peter Schuremann and Kaus Ziller.
9:00 am	BK and JLW meeting: JSCEP with Huda Qasim.
10:00 am	BK and JLW meeting: MMRAE/DE with Ramzi Bataineh and Dr. Saleh Al-Share, Director.
11:00 am	CS meeting: Dr. Mahmud Duwayri, Director, NCARTT.
12:30 pm	BK and JLW meeting: JSCEP with Huda Qasim.
1:30 pm	Fawzi Abu Niaaj, MWI.
3:00 pm	Team meeting.
4:00 pm	Drafting of conclusions and recommendations.

Wednesday 27 January 1993

7:45 am	CS meeting: RSCN.
9:00 am	BK and JLW meeting: Mr. Hambali, Executive Director, JSCEP.
9:30 am	BK meeting: Friedrich Naumann Foundation: Walter Rudel, Representative.
10:00 am	JLW meeting: Tawfiq Khaled Khrisat, WAJ.
10:30 am	BK meeting: MMRAE Public Relations Department: M. Awad (Director), and Jalal Tu'meh (private film producer).
2:00 pm	BK meeting: EMS.
5:00 pm	BK and JLW meeting: Jordan TV-Higher Environmental Information Committee: Share (DE), Hussein Allchandak (MoH), Ibrahim Shazdek (JTV), Zahia Annab (JTV), Hani Farhan (JTV), Mather Abu Jafar (RSCN), and others.
7:30 pm	Team meeting to finalize recommendations for briefing.

Thursday 28 January 1993

7:30 am	Team meeting to prepare for meeting.
8:00 am	JSCEP to duplicate materials for meeting.
9:00 am	JSCEP-Review Group.
12:30 pm	BK: JSCEP information staff.
12:45 pm	CS, JLW meeting: Mr. Husseini, MWI.
1:30 pm	CS meeting: Al Ghezawi, MWI.
3:00 pm	Team meeting to begin to outline final report.
4:00 pm	Meeting with Mazin Qubbaj and Kazem El-Qubbaj, Radio-TV Jordan.

Friday 29 January 1993

11:00 am	ST: with Mr. Haddudin in Valley.
12:00 noon	Meet with Washington State University team.

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Saturday 30 January 1993

8:00 am	BK meeting: Yarmouk University: Ibrahim Dwairy, Sameh Gharaibeh, Yousef H. Abu-Rukah, Jawad Ali (Earth and Environmental Sciences); Issam Mousa (Journalism and Mass Communications).
11:00 am	JLW: Join DE Director in meeting with Rafiq Shuka, Deputy ResRep, UNDP.
11:00 am	CS and ST meeting: NCARTT: Kamel Tadros, Mohammad Abubneh, Ahmad Bulad, and Ali R. Abu Zurayk.
12:00 noon	JLW meeting: H.E. Mahmoud El-Sherif, Minister of Information and Director, DE.
1:00 pm	JLW meeting: H.E. Ghazi Mawla, Secretary General, Ministry of Information.
1:00 pm	ST meeting: Jim Cassanos, WAJ.

Sunday 31 January 1993

7:00 am	ST: Departs for Aqaba.
8:00 am	Team meeting.
9:30 am	Team brief DE Director on recommendations.
10:00 am	JLW and CS: briefing at WHO/CEHA.
3:00 pm	Team meeting to prepare summary of recommendations .

Monday 1 February 1993

8:00 am	Team meeting.
8:00 am	ST meeting: Bassam Kakish, President, Aqaba Regional Authority.
9:30 am	JLW, BK, and CS meeting: H.E. Abdul Razzq Tubaishat, Minister, MMRAE, and Director, DE.
10:00 am	ST meeting: Dureid Mahasneh, Director, Port Corporation.
11:00 am	CS meeting: Ministry of Planning, Information Center.
11:00 am	STmeeting: Janti Qua, Marine Science Center.
11:30 am	BK meeting: WHO/CEHA.
12:00 noon	ST meeting: EC Task Force working on Aqaba Environmental Action Plan.
12:30 pm	CS meeting: University of Jordan Library.
3:00 pm	JLW meeting: Peter Kovsch, USIA Director.

Tuesday 2 February 1993

7:00 am	Report writing.
11:00 am	CS and BK meeting: Ministry of Health Monitoring Laboratory.
2:00 pm	Team meeting.

Wednesday 3 February 1993

7:00 am	ST meeting: with Washington State University team.
8:00 am	Team meeting and report writing.
11:30 am	JLW, BK, CS meeting: Suleman E. Hambali, JSCEP .
12:30 pm	CS meeting: Mahmoud A. Al-Khoshman, to review JSCEP information center needs.
6:00 pm	Team meeting review USAID recommendations.
7:00 pm	JLW meeting: Gordon Rodewald, Washington State University, to review EIA training and University of Jordan.

Thursday 4 February 1993

8:00 am	Team meeting.
9:00 am	JSCEP Review Group-final presentation.
12:00 noon	BK meeting: Janet Al-Joundi to review pilot workshop plans.
12:00 noon	CS meeting: Mahmoud A. Al-Khoshman to review books needed for JSCEP.
2:00 pm	Briefing for USAID (with USIA and Embassy Environmental Officer).
3:00 pm	Meeting Carl Dutto and Abdullah Ahmed.
7:30 pm	Dinner at home of Tom Oliver.

Friday 5 February 1993

7:00 am	BK Departure.
11:00 am	CS and ST Departure.

Saturday 6 February 1993

8:00 am	JLW meeting: Maher Abu Jafar and Janet Al-Joundi, RSCN.
11:00 am	JLW meeting: Suleiman E. Hanbali, JSCEP.
12:00 noon	JLW meeting: Ramzi Batayneh, MMRAE/DE.
1:30 pm	JLW meeting: Edit report and print copies and prepare disk for Carl Dutto.
7:00 pm	JLW meeting: Carl Dutto to give copy of draft report.

Sunday 7 February 1993

9:00 am	JLW: Departure.

ANNEX B
TERMS OF REFERENCE:
INFORMATION/EDUCATION/COMMUNICATION
NEEDS ASSESSMENT IN JORDAN

1. Introduction

The Rio Declaration on Environment and Development approved at the United Nations Conference on Environment and Development (UNCED) proclaims that:

> *Principle 1: Human beings are at the centre of concerns for sustainable development. They are entitled to a healthy and productive life in harmony with nature.*
>
> *Principle 10: Environmental issues are best handled with the participation of all concerned citizens, at the relevant level. At the national level, each individual shall have appropriate access to information concerning the environment that is held by public authorities, including information on hazardous materials and activities in their communities, and the opportunity to participate in decision-making processes. States shall facilitate and encourage public awareness and participation by making information widely available.*

The PRIDE contract specifies that the project will carry out two or three country needs assessments which will serve as the first stage in the process of developing national action plans for environmental education/information/communication programs. Working with local groups, the needs assessment is to help set priorities, identify key local institutions that can develop and implement the national action plan, and specify needs for donor assistance. The needs assessment will focus on how to develop local capability in the environmental information/education/communication fields.

This PRIDE core activity will work with the Jordan Society for the Control of Environmental Pollution (JSCEP), MMRAE Department of Environment, and other Jordanian organizations to carry out this needs assessment. It will also link with the earlier work of PRIDE with the Ministry of Water and Irrigation (MWI). This activity encompasses three tasks in the PRIDE Second Annual Work Plan. Task 1.B., Environmental Education/Communication Needs Assessment, will be the focal point of this activity. It is also linked with Task 2.D, Develop and Test an Environmental Awareness Campaign Training/Reference Package, and with Task 6.J, Support World Environmental Center (WEC) Assistance to Establish a Library/Information Center at JSCEP. By combining these three inter-related activities PRIDE is able to assemble a broader range of expertise for this activity. PRIDE is also cooperating with the A.I.D. centrally funded Environmental and Natural Resources Policy and Training Project (EPAT) who will provide leadership in the area of training needs assessment and higher education in the environmental field. A four person team will spend three weeks in Jordan conducting, in association with local organizations, the needs assessment and present a report to the concerned organizations and USAID. The report will serve as the first step in preparing a national environmental

information/education/communication action plan for Jordan. This activity has been accepted by USAID/Amman who are making the arrangements for JSCEP and the MMRAE Department of Environment to be co-hosts for the team (see Attachment #1).

2. Proposed Dates and Duration

This needs assessment mission will begin 17 January 1993 with the Team Leader working with the co-hosts and USAID Mission. The remaining team members will begin work on 18 January. The needs assessment will last for three weeks, with the team leaving on 5 February 1993.

3. Overall Objective

To assist the Government of Jordan, JSCEP, other interested host country organizations, USAID, and other donors to assess the current capabilities and future needs in developing capacity in the environmental information/education/communications field.

4. Overview of Activity

PRIDE uses a broad definition of environmental information/education/communication which involves the collection, processing and dissemination of all types of environmental information for a wide range of clientele to use. The information program area is concerned with technical information databases, clearinghouses, libraries, and facilitating the flow of technical information in the environmental field. The education program area includes formal education (university degree programs, introducing environmentally related subjects in primary and secondary schools, etc.), non-formal education and training, and the development of environmentally related curricula and teaching materials. The communication program area focuses on all aspects of media and face-to-face communications directed towards awareness, motivation, and behavioral change of various groups and organizations, including the general public. These programs can be involved in disseminating information to political and policy makers, program managers, opinion leaders, students, NGOs, mass media, the general public, and others. There are two goals of environmental information/education/communication programs: (1) to facilitate broad-based participation in environmental programs; and (2) to strengthen institutional capabilities through education/training programs to carry out effective environmental programs.

This needs assessment will start with an inventory of organizations in Jordan involved in environmental information/education/communication programs. A sample matrix is given in Section 8. This inventory will serve as a base for identifying the key organizations which will be interviewed to learn what they are doing, their future plans, and recommendations of what should go into the national action plan. Working with a small task force group of Jordanians, representing the key organizations, the team will identify the roles of these organizations, determine their current capabilities, and estimate what capabilities they will

need in the future. This will serve as a base for determining what steps should be taken to enhance the environmental information/education/communication programs. The last step will be to formulate recommendations on actions that can be taken by GOJ, the concerned host country organizations, and donors.

This activity does not imply any commitment on the part of USAID or PRIDE to provide financial or technical support to implementing the action plan. This activity is to prepare a road map which governmental and non-governmental agencies, where appropriate working the donor community, can use in strengthening environmental information/education/communication programs in Jordan.

5. Description of Components

As mentioned above, this activity will take a broad look at collecting, processing and disseminating environmental information. It is concerned with getting relevant and useful information to policy makers, program managers, researcher/technical specialists, opinion leaders, students, and the general public. The method of disseminating the information will be in a number of forms from computerized data bases, classroom teaching, mass media, focus groups, etc. Therefore, the team will be looking at technical information systems, environmental education in primary and secondary schools, technical education in higher education and continuing professional education, public awareness campaigns, and other programs which will increase participation and/or strengthen institutions. The following are the areas which the team will focus.

5.1 Organizational Inventory

An inventory of public, private, NGO and other organizations (including educational, mass media, trade associations, chambers, etc.) will be prepared of all organizations which are, or could be, involved in environmental information/education/communication programs in Jordan. Section 8 of this paper gives a possible outline for this inventory.

From this inventory, the key organizations will be identified and, if possible, lead institutions specified for various information/education/communication functions. These institutions will be contacted and asked to participate in the assessment of current programs, future opportunities, and drafting the recommendations for an action plan. The inventory will also include a listing of donor supported projects which are directed wholly or have components that support environmental information/education/communication programs.

The Team Leader, Dr. John Woods, will work with JSCEP and Department of Environment officials in develop this inventory and provide leadership in clarifying roles and functions of the key institutions.

5.2 Information Systems

This component will look at technical and management information which is available from within Jordan and from outside. This is environmentally related information that can be

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packaged in various ways to serve a number of users including policy makers, higher education, professional and technical trainers, private sector groups, and organizations involved preparing in public awareness campaigns.

5.2.1 JSCEP Library and Information Center

WEC, with PRIDE assistance, has agreed to help JSCEP establish a library and information center. It is envisioned that this center will focus on information most relevant for public awareness campaigns, in-schools environmental awareness programs, and information for political leadership. However, because of the WEC focus, it will be explored how to link this information center to the private sector in Jordan, including the Chamber of Industries. This component will determine JSCEP information needs, outline how an information center can serve the needs of JSCEP and other groups, determine where and how the information can be accessed, and recommend how to implement the program. This will include recommendations to WEC for the purchase of information materials recommendations to JSCEP for establishing an information center, and suggestions of additional assistance required for equipment (such as CD-ROM, direct access to external data bases, etc.), training of staff, information materials, etc. This work will be linked with the environmental awareness/education/communication component (section 5.4) which will be concerned primarily with processing and disseminating of this information. It will also link to the MWI public awareness program which is included in the new USAID Water Quality and Conservation project.

5.2.2 Technical Information Systems

An inventory will be made of other libraries/information centers in Jordan who maintain technical information in the environmental field: universities, research organizations, governmental agencies. An assessment of the technical information needs of universities, technical training centers, research organizations, private sector agencies, government agencies and other groups will be made to get some idea of the overall need for technical information and by whom. A preliminary assessment will be made on where this type of information is available: within Jordan and outside. During the needs assessment it hoped that a lead organization can be identified for serving as the technical information center for the environmental field, and a plan for how other organizations can use this center for there work. This component also links to the new USAID Water Quality and Conservation project which is also concerned with the flow of technical information. It will be coordinated with the environmental professional/technical education and training component (section 5.3) which will have a large need for technical information.

5.2.3 Integrated Environmental Monitoring Information System

A number of organizations in Jordan are monitoring various environmental concerns. These organizations include the Ministry of Health, Ministry of Water and Irrigation, Ministry of Agriculture, RSS, University of Jordan, and others. The team will look into the possibilities of establishing an integrated environmental monitoring information system which would capture this monitoring information, produce periodically a "state of the environment"

report, and disseminate this information to various users including policy makers, program managers, mass media, schools, private sector groups, and other groups. The team will make recommendations on the feasibility of establishing an integrated environmental monitoring information system, who should be the lead organization, and what it will require to implement. This component will build upon the experience of the World Resources Institute (WRI) in preparing state of the environment reports and Capital Systems Group work in preparing "electronic report cards" which is a printed report with a computer data disk included. This component will be done with linkages with the awareness (section 5.4) and training (section 5.3) components which will be users of this information.

The PRIDE subcontractor, Capital Systems Group (CSG), who specializes in information systems and data bases, will provide the leadership for this component. CSG will work closely with WEC for the JSCEP library/information center portion of this component. They will provide Mr. Christopher Stathes, one of their senior computer/information systems staff, to participate in this needs assessment. In addition to working with JSCEP, CSG will also work with the Higher Council for Science and Technology, University of Jordan, RSS, and other groups on the technical and monitoring information systems identified in sections 5.2.2 and 5.2.3.

5.3 Environmental Professional/Technical Education and Training

Jordan has been blessed with an excellent higher education system which has produced engineers, doctors, and many other professionals. However, concern for environmental protection is rather new to Jordan. The National Environment Strategy for Jordan identifies a number of areas where technical and professional personnel are needed. Two concerns will be addressed in this component: (1) providing refresher training on environmental subjects to professionals already working in governmental and non-governmental agencies; and (2) introducing environmental subjects in technical and higher education programs.

This component is concerned with identifying professional and technical training/education needs in Jordan and determining how these needs will be met. The basic principle PRIDE follows is to utilize in-country training and educational institutions to the maximum level possible. Therefore, this assessment will include an inventory of training and educational institutions which can be used in the future to meet the environmental field in Jordan. The recommendations will include information on the needs for strengthening these training and educational institutions and how it can be done. Where appropriate, recommendations will be made to GOJ and donors on where they can help strengthening the training and technical/professional infrastructure in Jordan. The team member working on this component will work with the team members in assessing training needs in their areas.....communications, information systems, etc.

Leadership for this component will be provided by Ms. Stacey Tighe (RandD/ENR), Training Director for EPAT. Working with local partners, they will collect information on training and academic programs that currently exist in Jordan. The second step will be to assess the needs for continuing professional education and future needs for expanding academic programs in the environmental field. The team will then make recommendations to

the concerned organizations, GOJ, and donors on what should be done to strengthen the HRD program in the environmental field.

5.4 Environmental Awareness/Education/Communication

There is an urgent need to increase the understanding of environmental issues in Jordan among a large number of groups including policy makers, private sector firms, school children, government and non-government program managers, opinion leaders (local leaders, religious leaders, etc.), mass media personnel, and the general public. PRIDE is preparing an Environmental Awareness Campaign Training/Reference package which can be used for training communications specialists and helping institutions to develop effective public awareness campaigns, school environmental education kits, briefings for policy makers, and other environmental awareness activities. Therefore, this component will serve as the first step in the design of this training/reference package. It is envisioned that the PRIDE project will pretest the campaign training package in Jordan funded through the core project (Task 2.D). The package will also be used in the public awareness component of the new USAID Water Quality and Conservation project which will involve JSCEP and MWI.

Working with the JSCEP, MMRAE/DE information unit, Ministry of Information, MWI, mass media, Ministry of Education instructional materials units, and possibly other groups, determine what types of environmental awareness programs are currently being produced and identify what organizations have special capabilities in this field. The second step will be to determine what types of environmental awareness campaigns should be initiated in the future including the target audiences, subjects covered, and groups involved in the production and dissemination of the campaign. This will serve as a base for determining the types of personnel needed for planning, producing, and disseminating these awareness campaigns. The team will provide recommendations on how effective environmental awareness campaigns can be carried out in Jordan, suggest the primary agencies that should be involved, and what outside assistance will be needed to implement this program.

This component will be led by Dr. Robert Kern who has a long history as a development communication practitioner and educator/trainer in the U.S. and many other countries. Dr. Kern served on the PRIDE team for the water study and through that activity worked closely with JSCEP on developing plans for their handling the public awareness campaigns. Dr. Kern will also be providing the leadership for PRIDE in developing and testing the Environmental Awareness Campaign Training/Reference package. Through that activity, it is intended that the package can be tested in Jordan working with JSCEP, Department of Environment, MWI, and other interested groups.

6. Administrative/Operational Procedures

JSCEP and the MMRAE Department of Environment have agreed to serve as the co-hosts for this needs assessment. They will work closely with the MWI, University of Jordan, RSS, Ministry of Information, and other appropriate groups. It is recommended that a task force be formed with members from the key agencies concerned with the above components. It is hoped that some of the information can be gathered in advance of the arrival of the

team. The Team Leader will travel to Jordan one day ahead of the team and will meet with the task force to finish the first draft of the organizational inventory and prepare a plan of work for the team.

Once the initial organizational inventory is completed, an advisory committee will be formed to serve as members of the team to assess the needs and draft recommendations. The advisory committee will include representatives from the key organizations which might be involved in the future information/education/communication programs. The group should be kept small (4-7) so that it can effectively focus on the vital issues. Within the first few days a detailed work plan will be finalized. This will identify the groups to be involved in the advisory committee, organizations to be interviewed, who should receive briefings of the draft report, and who should receive the final report.

It is hoped that JSCEP can provide space for meetings and to allow the team to work. PRIDE will pay for transport and other costs involved in the collection and processing the information, and for preparing the reports. PRIDE will pay for any out-of-pocket costs incurred by the hosts in conducting the needs.

It is envisioned that the PRIDE team working with local groups and USAID/Jordan will do the following steps:

- The task force assembles the information, including information on interested organizations and examples of their current programs.
- The Team Leader goes one day in advance and reviews the organizational inventory and prepares an initial work plan.
- The PRIDE team visits Jordan and reviews with the task force information gathered.
- Meet interested agencies to learn what they are doing and study their capabilities.
- Draft a plan for strengthening environmental information, education and communication programs in Jordan: identify priority programs and institutions to do it.
- Conduct a briefing focusing on environmental information/ education/communication needs and opportunities (participants from JSCEP, GOJ, education, NGO, private sector, and donor agencies). This would be done near the end of the visit with the idea that the feedback from this meeting would be used in the report.
- Review the plan with policy makers and donor agencies.
- If appropriate, prepare a project concept paper or papers outlining areas where Jordanian agencies and donors could prepare project proposals.

These steps could change following the initial discussions with the task force and the USAID/Mission. It is envisioned that this activity will be kept as flexible as possible in order to meet the needs of the host country institutions, USAID and other interested groups.

Following this activity, PRIDE would be available to assist GOJ and other concern organizations explain to donors how the plan can be implemented and to help establish

linkages with environmental information/education/communication programs in other countries. Information from other countries which PRIDE is involved will be shared with Jordan to help in the process. This is the first information/education/communication needs assessment done by PRIDE. Therefore, Jordan could become the model for other countries in the region.

7. Proposed Personnel

Team Leader : Dr. John L. Woods, Institutional and Information Specialist, PRIDE. Dr. Woods has spent more than 30 years working in the information/ education/communication field, including more than 17 years overseas. His involvement in Jordan began in 1965-66 when he was an USAID advisor establishing the agricultural information unit in the Ministry of Agriculture. He has been back to Jordan several times since and last May-June led the PRIDE team to help develop a USAID project paper for water quality and conservation.

Information Specialist : Mr. Christopher Stathes, Senior Systems Analyst, Capital Systems Group (CSG). He will be backstopped and assisted by Mr. Raj Shah, President, of CSG. Mr. Stathes, Mr. Shah and other CSG staff specialize in developing information systems and creating computer data bases to serve managers, trainers, and many other groups. They are heavily involved with a number of PRIDE activities related to establishing information systems. CSG has recently assisted the World Bank establish an environmental decision support computer program for policy makers, program managers, and others to graphically see the implications of environmentally related programs.

Education/Training Specialist : Ms. Stacey Tighe, AAAS Fellow in AID/RandD/ENR, serves as the project training director for the USAID sponsored Environmental and Natural Resources Policy and Training Project (EPAT). EPAT staff are conducting world-wide training needs assessments and organizing a wide range of training courses. EPAT's primary purpose is to further the adoption of development policies that promote sustainable uses of natural resources and that preserve or enhance environmental quality. EPAT's mandate includes applied research, policy dialogue, and the strengthening of institutions capacity through training and education.

Environmental Awareness Specialist : Dr. Robert Kern has more than 30 years experience as a development communications professional managing communications units in the U.S. and overseas. He has been instrumental in the preparing professional development packages and programs in this field. He has conducted training programs for communications specialists throughout the world. Dr. Kern will be providing the leadership in the development of the PRIDE environmental awareness campaign training/reference package and through that activity will be conducting training programs in the NE region to field test the campaign training package. Dr. Kern was the communications specialist on the PRIDE water study and project paper preparation team and through this worked with the JSCEP, MWI and other groups in Jordan.

8. Organizational Analysis Matrix

The following is a preliminary list of functions to be used for identifying organizations working the environmental information/education/communication field, and corresponds to the table on the following page:

8.1 Functions:

8.1.1 (TI) Technical Information
- S = Source
- P = Processor
- D = Disseminator
- U = Utilizer

8.1.2 (E/T) Professional Education/Training
- G = Graduate Degree programs
- U = Undergraduate Degree programs
- C = Continuing Professional Education programs

8.1.3 (EA) Environmental Awareness (producers of awareness programs/campaigns)
- PM = Public Awareness programs/mass media
- PG = Public Awareness programs/groups and/or advisory committees
- S = Schools programs and/or instructional materials
- P = Awareness programs for policy makers
- I = Awareness programs for intermediaries such as private sector, technical personnel, associations, managers, parastatals, etc.

8.1.4 (POL) Environmental Information/Education/Communication Policy
- L = Legislative
- F = Funding E I/E/C programs
- I = International linkages (with donors, international organizations, etc.

Organizational Analysis Framework

ORGANIZATIONS	FUNCTIONS				REMARKS
	TI	E/T	EA	POL	
PUBLIC SECTOR					
NGOs					
PRIVATE SECTOR					
OTHER ORGANIZATIONS					
DONOR SUPPORTED PROJECTS					

ANNEX C
RESUMES OF TEAM MEMBERS

Bob Kern: Education/Communication Specialist

A retired professor of journalism and mass communication, Dr. Kern holds degrees from three land-grant universities in the United States: University of Illinois (agriculture), Iowa State University (technical journalism), and University of Wisconsin (behavioral sciences and administration). His professional work includes 32 years in agricultural extension communications, 17 of the years as leader of a staff of 16 print, television, radio, and education specialists. At the time of retirement, Dr. Kern held the rank of professor in the Department of Journalism and Mass Communication, where he advised graduate students and taught courses in writing and educational campaigns. He has served more than five years as a communication specialist with international agricultural research centers in India, Mexico, and Netherlands. For the last nine years, Dr. Kern has been a private communications consultant with service in more than a dozen countries of Africa, Europe, Asia, and the Pacific. Within the last year, he has served four times as a consultant in Jordan for public awareness programs on water and the environment.

Christopher T. Stathes: Information Systems Specialist

Mr. Stathes was educated in the United States at Cornell University (B.S. Industrial Engineering, 1969), and at the Wharton School of the University of Pennsylvania (M.B.A. program, Marketing/Information Systems, 1971). He is employed full-time as Executive Vice President, Capital Systems Group, Inc., Rockville, MD. where his responsibilities include management of specific client projects in the systems development and decision support areas, as well as overall management of software development for the corporation. He has twenty-two years experience in the design, development and implementation of information systems and software applications for clients in the public and private sectors. Expertise in data base design, user interfaces, optimization techniques, and software development and quality control. Recent clients include: U.S. AID, the World Bank, The Corporation for Enterprise Development, National Institutes of Health, and the National Science Foundation.

Stacey Tighe: Professional/Technical Training Specialist

A marine scientist and manager, Ms. Tighe holds degrees from Dartmouth College (Earth Sciences), Fairleigh Dickinson University (Marine Biology), and the University of Rhode Island (Marine Affairs and Geological Oceanography). She has spent ten years in academic research in benthic ecology, coral reef ecology, marine geology and tectonics and coastal zone management, and over seven years as a manager in the marine survey and consulting industry. Ms. Tighe has been an instructor for over fifteen years, teaching classes in scuba diving; in marine science for graduate, undergraduate, university extension students and lay audiences; in underwater photography and in marine survey equipment operation. Her work and research have taken her throughout most of the United States including Alaska

and Hawaii, and to over 12 nations, including Nicaragua, El Salvador, Mexico, Guatamala, Spain, and the Pacific island nations. Ms. Tighe is serving as a consultant to U.S. AID's Washington, DC Bureau of Research and Development's Office of Environment and Natural Resources. There her responsibilities include coordinating the training activities for AID's Environment and Natural Resources Policy and Training Project and advising on coastal zone management issues.

John L. Woods: Team Leader and Organizational Development Specialist

Dr. Woods has degrees in agricultural extension/communications, broadcasting, and continuing education/management. He started his career as radio-TV coordinator for the Illinois agricultural extension service. In 1965/66, Dr. Woods began his international career in Jordan as an advisor helping establish an agricultural information unit. Since that time his has alternated working overseas and as a university administrator at the University of Illinois. He has had long term assignments in Jordan, Columbia, Malawi, India, Australia, and Thailand (covering all of Asia and the Pacific). He has served as a short term consultant in many other countries working for World Bank, UNDP, Kellogg Foundation, and USAID. In November 1991, Dr. Woods joined the then new PRIDE project as the Institutional and Information Specialist. Since joining PRIDE, Dr. Woods has visited Jordan four times. During 1992 he helped prepare the Jordan Water Management Plan and led a team to prepare the Water Quality and Conservation USAID project paper. Part of this current mission is to serve as a bridge with the implementation of the water project.