



**Project in Development and the Environment**

FY1995 - 5 - WBG

**Programmatic Environmental  
Assessment for Catholic Relief  
Services (CRS) Integrated Rural  
Development and Capacity Building  
Project**

**October 1994**

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Submitted by:  
PRIDE**

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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.

The opinions expressed in this paper are those of the author(s) and do not necessarily reflect the positions of the sponsoring agency or contractors.

**Programmatic Environmental  
Assessment for Catholic Relief Services  
(CRS) Integrated Rural Development  
and Capacity Building Project**

By:

Jack Farmer	Team Leader, Water Engineer/Water Resources Management Specialist
Joseph Karam	Environmental Engineer/Waste Management Specialist
Nader Al-Khatib	Municipal/Industrial Water-Wastewater Engineer
Ramez El-Titi	Water Resources Management Specialist
Lena Dajani	Project Administrator

With additional contributions by:

Anne Patterson  
Tina Rouse  
Phil Roark

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## PREFACE

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USAID's Asia/Near East Bureau requested that the Project for Development and the Environment (PRIDE) conduct an Environmental Assessment (EA) for the Ramallah Wastewater Systems project, a project of American Near East Refugee Aid (ANERA), as well as three Programmatic Environmental Assessments (PEAs) for: (1) West Bank Integrated Rural Development/Capacity Building, a Catholic Relief Services (CRS) project; (2) Institutional Development project, Save the Children Federation (SCF); and (3) Cooperative and Municipal Development project, ANERA.

The team included:

Jack Farmer	Team leader, water engineer/water resources management specialist
Joseph Karam	Environmental engineer/waste management specialist
Nader Al-Khatib	Municipal/industrial wastewater engineer
Ramez El-Titi	Water resources management specialist
Lena Dajani	Project administrator

A Scoping Session for CRS's Institutional Development project was conducted in September 1993. The PRIDE team implemented three remaining scoping sessions for SCF and the two ANERA projects on July 25 and 27, 1994, with the assistance of Paul des Rosiers of the ANE Bureau of USAID. The Scoping Statements were approved by USAID, allowing the PRIDE team to proceed with the EA and the three PEAs.

The four assessments were conducted from July 13 through September 30, 1994. This was during the transfer of limited authority for many government departments by Israel to the new Palestinian National Authority (PNA) in the West Bank and Gaza. During this period, as well as when this report was being written, the West Bank and Gaza environmental department was still under Israeli control. Due to various political factors it is uncertain when, and to what degree, environmental authority will pass from Israel to the PNA and what the new institutional structure will become. As a result of these conditions, this report will reflect the status at that time.

### Data Collection

Some of the information and data collected was still in the form of Jordanian (for West Bank) and Egyptian (for Gaza) policies, rules, and regulations. The costs of water, services, etc., were converted to New Israeli Shekels. Much of the Israeli data was very sparse, sometimes incomplete, and of little hard statistical value. However, it was sufficient, in most cases, to confirm the need for continuing with various ongoing programs and the starting of new programs and activities while putting into place substantive monitoring and data collection activities.

To help offset the lack of hard data, the PRIDE team developed a large photographic file as an additional reference base. This file also reflects the magnitude of the existing environmental status.

## **Workshops**

Five workshops were conducted. The first was an Overview Workshop on USAID Environmental Procedures. The results indicated that most private voluntary organization (PVO) personnel were not familiar with USAID general requirements nor with the technical aspects of the word "environment."

Therefore, the four individual PVO project workshops were revised to a more "open hearing" type format. These workshops were conducted mostly in Arabic, with both English and Arabic translations written on flip charts for complete understanding and acceptance of impacts, mitigation, monitoring, and management related to environmental issues and concerns.

The workshops were facilitated by Joseph Karam with support from other team members, Nader Al-Khateeb and Ramez El-Titi, and the PRIDE home-office project administrator, Lena Dajani.

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## ACRONYMS

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ANERA	American Near East Refugee Aid
ARIJ	Applied Research Institute of Jerusalem
AWCSW	Association of Women's Committees for Social Work
BEO	Bureau Environmental Officer (USAID)
BOD	Biochemical Oxygen Demand
CARE	Cooperative for Assistance and Relief Everywhere
CBS	Central Bureau of Statistics
CDP	Cooperative Development Project
CEOHS	Center for Environmental and Occupational Health Sciences
CIDA	Canadian International Development Agency
CIVAD	Israeli Civil Administration
CRS	Catholic Relief Services
EA	Environmental Assessment
EC	European Community
ECPD	Engineering Center for Planning and Design
FC	Fecal Coliform
GDP	Gross Domestic Product
GEF	Global Environment Facility
GNP	Gross National Product
HDPE	High Density Polyethelyene
HTH	High Test Hypochlorite
IA	Impact Areas
IDA	International Development Agency
IEE	Initial Environmental Examination
IMP	Integrated Pest Management
IRD	Integrated Rural Development
JD	Jordanian Dinar
JWU	Jerusalem Water Undertaking
MCM	Million Cubic Meters
MOI	Ministry of the Interior
NGO	Non-Governmental Organization
NIS	New Israeli Shekel
NPA	National Palestinian Authority
O&M	Operations and Maintenance
PARC	Palestinian Agricultural Research Center
PEA	Programmatic Environmental Assessment
PHG	Palestinian Hydrology Group
PRA	Participatory Rapid Appraisal
PRIDE	Project for Development and the Environment
PVC	Polyvinyl Chloride
PVO	Private Voluntary Organization

SAR	Semi-Annual Report
SCF	Save the Children Federation
SDT	Subsurface Draining Techniques
SS	Suspended Solids
TC	Total Coliform
TDI	Toluene Diisocyanate
TDS	Total Dissolved Solids
UAWC	Union of Agricultural Work Committees
UNDP	United Nations Development Program
UNRWA	United Nations Relief and Works Agency
USAID	United States Agency of International Development
USEPA	United States Environmental Protection Agency
VAD	Village Affairs Department
VDC	Village Development Committees
WHO	World Health Organization
WRAP	Water Resources Action Programme
WWTP	Wastewater Treatment Plant

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## EXECUTIVE SUMMARY

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### A. Background

This report is in response to a proposal submitted by Catholic Relief Services (CRS) to the U.S. Agency for International Development (USAID) for the funding of an Integrated Rural Development and Capacity Building Project in the West Bank. The project is being implemented through the cooperative efforts of CRS and four Palestinian counterpart organizations and is offering training and technical assistance in the areas of water, agriculture, and women's initiatives. With a budget of \$9.2 million over a five-year period, the project aims to improve the social and economic well-being of about 20 villages in the neediest rural areas of the West Bank.

This report provides an overview of CRS' Integrated Rural Development and Capacity Building Project and assesses its present and future activities in terms of their impacts on the environment and according to USAID regulations.

An environmental review procedure defined in USAID's regulation 22 CFR 216.3 must be carried out when an Initial Environmental Examination (IEE) of the proposal recommends a positive threshold decision. These procedures identify potentially significant impacts on natural resources, social and economic parameters, and cultural resources. The objective is to avoid or minimize potential adverse environmental impacts of the project by considering project alternatives, modification of project elements, or other mitigative measures.

PRIDE provided a five-person team to carry out the programmatic environmental assessment (PEA) for the CRS project as well as concurrently perform the same task for three other proposed nongovernmental organization (NGO) projects. The assessment took place from July 13 to September 30, 1994.

### B. Environmental Impacts

#### B1. Water Resources

Based on past CRS experience, water resource development projects in West Bank villages not served by piped water will have a positive impact by helping their populations:

- Meet domestic and agricultural water needs.
- Increase water consumption (e.g., take baths more often) and improve household sanitation and public health (e.g., add new flush toilets).
- Lower the cost of water supply.

- Reduce the dependency on unsanitary and costly water provided by tank trucks.
- Reduce time wasted to secure water.
- Provide low-cost backup water supply when local populations cannot afford to pay the water bill.

CRS recognizes the importance of ensuring water supply of adequate quality for both drinking and agricultural purposes. CRS has clearly documented the mitigation measures necessary to provide water supply of adequate quality.

## **B2. Sanitation**

Impacts from sanitation projects include the following:

- Public health is expected to improve due to reduction of odors, flies, and mosquito vector problems.
- Although some of the sanitation activities will tend to reduce groundwater pollution, the potential for groundwater pollution is expected to remain high.
- Proposed disposition of treated wastewater by reuse in agricultural irrigation may introduce harmful pathogens into the soil.
- Groundwater protection measures should be applied, including lining of structures and landfill areas (clay, plastic, etc.).
- Wastewater reuse in irrigation should be applied after sufficient retention time in the septic tank-subsurface draining techniques (SDT) system.
- Protective measures should be applied during operation of wastewater and solid waste disposal systems.

## **B3. Agricultural Development**

Agricultural development activities by CRS, through its sectoral and block grants, are directly linked to its efforts in water development for agricultural purposes. These activities include land development, crop diversification, construction of earthen access roads for agricultural purposes, and fencing of cultivated areas for selected impact areas (villages).

There are no significant environmental impacts foreseen for the agricultural development activities proposed by CRS. These include any activities that would require mitigations and monitoring measures on endangered flora and fauna, migratory birds, and historical sites.

CRS does not promote the use of chemical fertilizers and pesticides and, in fact, discourages their use by advocating the use of natural and biological pest controls (i.e., integrated pest management (IPM) techniques) and the use of natural fertilizers. However, there may be a secondary effect in its agricultural development activities that would result in higher pesticide and chemical fertilizer usage.

CRS and its partners must be aware of USAID's environmental procedures (22 CFR 216.3(b)), policies, practices, and recommendations related to pesticide uses, as well as local agricultural extension recommendations, as to type, usage rates, application methods, etc., which include the ultimate safe disposal of used pesticide and fertilizer containers.

#### **B4. Environmental Awareness Campaigns**

The proposed project will provide block grants to some institutions to conduct environmental awareness campaigns. These campaigns are environmentally friendly activities and require no mitigation measures.

#### **B5. Women's Activities**

The women's training activities planned by CRS in basic literacy, job-related skills, promotion of credit models for loans, and management similarly are environmentally friendly activities and will require no mitigation actions.

### **C. Conclusions and Recommendations**

The findings of this PEA indicate that the proposed CRS activities pose no significant negative environmental impacts except for those activities related to new water resources development and the potential use of pesticides.

If a new water resource is proposed for development, CRS must submit to USAID, in advance, an independent engineering and environmental study. However, at this time with no Palestinian national and regional environmental authorities in place, no further depletion of water resources is recommended. Exceptions may be made on a case-by-case basis in certain localized areas within the West Bank, but no exceptions should be made for the Gaza Strip area.

No adverse impacts are foreseen on threatened flora and fauna nor archaeological and cultural sites under the development practices proposed. Any future indication of negative impacts would require a separate, site specific, environmental assessment (EA) in accordance with USAID environmental procedures.

USAID plans to provide two (4 1/2-day) training workshops given by the Environmental Policy and Training (EPAT) project concerning USAID's environmental procedures. However, USAID should consider allowing PRIDE to proceed to the next logical step, that is, to further develop field-level guidelines on assessing levels of

environmental impacts related to commonly funded activities, especially those being undertaken by NGOs and others requesting funding from USAID.

**SECTION I**

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**INTRODUCTION**

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## SECTION I INTRODUCTION

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### A. Program Background and Objectives

In response to increased poverty and underdevelopment in the northern and eastern parts of the West Bank, the U.S. Agency for International Development (USAID) is funding an Integrated Rural Development and Capacity Building Project in the West Bank. The project is being implemented through the cooperative efforts of Catholic Relief Services (CRS) and four Palestinian counterpart organizations and is offering training and technical assistance in the areas of water, agriculture, and women's initiatives. With a budget of \$9.2 million over a five-year period, the project aims to improve the social and economic well-being of about 20 villages in the neediest rural areas of the West Bank.

This report provides an overview of CRS' Integrated Rural Development and Capacity Building Project and assesses its present and future activities in terms of their impacts on the environment and according to USAID regulations.

### B. Programmatic Environmental Assessment Objectives

As a prerequisite for funding assistance, an environmental review procedure defined in USAID's regulation 22 CFR 216.3 must be carried out. These procedures identify potentially significant impacts on natural resources, social and economic parameters, and cultural resources. The objective is to avoid or minimize potential adverse environmental impacts of the project by considering project alternatives, modification of project elements, or other mitigative measures.

A programmatic environmental assessment (PEA) differs from an environmental assessment (EA), in that a PEA covers multiple projects of a similar nature at multiple sites, whereas an EA covers a specific project at a specific site.

A PEA is implemented after an initial environmental examination (IEE) of the project results in a positive threshold determination. The IEE for the above-listed project was completed on September 23, 1994, and established that the project could result in potentially significant environmental impacts in light of the diversity of the types of projects and subprojects to be funded and geographic locations of communities where interventions will occur.

An in-country scoping session is then required in which the originator of the project and persons having expertise relevant to the environmental aspects of the proposed project participate. Participants may also include representatives of host governments, public and private institutions, the USAID mission staff, contractors and other interested parties. A scoping session report and scoping statement is then prepared for the Asia/Near East Bureau Environmental Officer's (BEO) review and approval. The scoping statement includes (1) a determination of the scope and significance of issues to be analyzed in the PEA, including

direct and indirect effects of the project on the environment; and (2) identification and elimination from detailed study of the issues that are not significant or have been covered by earlier environmental review, or approved design considerations, narrowing the discussion to a brief presentation of why they will have no significant effect on the environment.

This report has been prepared for USAID and Catholic Relief Services as a result of the positive threshold decision of the IEE and the BEO's approval of the scoping statement on August 2, 1994. Within the PEA, potential environmental impacts that may result from activities of the project, as well as mitigations of those impacts, are discussed. In addition, the abilities of CRS and its partner institutions to perform "environmental reviews" of projects and subprojects are examined.

### C. PEA Methodology

The first stage of the PEA was carried out in Washington, D.C., during August 30-31, 1993, among Near East Bureau environmental and West Bank/Gaza Strip staff, to develop a preliminary list of perceived negative environmental impacts requiring further discussion. The perceived environmental impacts considered were:

- Disruption or destruction of aquatic and terrestrial habitats
- Excessive soil erosion and transport of debris off-site
- Exposure of village inhabitants to environmental health problems
- Disruption or destruction of cultural and agricultural resources
- Potential effects due to earthquakes or flooding
- Worker or occupant accidents
- Increased point-source discharges of wastewater
- Increased exploitation of fresh and potable water sources
- Increased loading on landfills and other improperly sited solid waste disposal sites with potential for both surface and groundwater contamination
- Increased use of electricity

As part of the prescoping research, site visits were conducted at eight West Bank villages where CRS has been involved in the past. A table summarizing the findings of these site visits is provided in Annex A.

On October 6, 1993, a scoping session was conducted by Paul des Rosiers of USAID/Washington and was attended by 29 individuals representing USAID, SCF, American Near East Refugee Aid, Catholic Relief Services, Palestinian Hydrology Group, Birzeit University, An-Najah University, German Development Bank (GTZ), Jerusalem

Water Undertaking, United Nations Development Programme, United Nations Relief and Works Agency, Municipality of Nablus, Bethlehem Water Department, El-Bireh Municipality, and Hijjawi Engineering Center. The significant issues raised and explored during the scoping session were:

- Institutional arrangements must be identified, particularly in the long term, including specific individuals and expertise, and their types within the councils.
- Pesticide-related subprojects in the region, if any, need to be noted, including their effects on groundwater and potable water; this will require analytical expertise that may be beyond the scope of the project.
- Advantages and disadvantages of reuse alternatives for treated wastewater need to be stated.
- Point-source problems arise from introduction of water and sewage infrastructure.
- Geohydrology of the West Bank comprises sedimentary formations (e.g., limestone and dolomite) and wastewater can percolate into groundwater resources rapidly.
- Sewage sludge management needs to be considered carefully.
- There is a lack of experienced engineers and technicians to perform the requisite operations and maintenance (O&M) upon the incoming technology.
- Major problems in the West Bank include shortages of potable water (less than 70 percent of needs are currently supplied).
- Old, deteriorated water supply networks need to be upgraded, repaired, and replaced (more than 50 percent losses).
- Regional entities need to produce meaningful environmental master planning.
- Public awareness education concerning hygiene and sanitation is badly needed.
- Education of women is essential and must be accomplished by female teachers and instructors.
- Monitoring capabilities for the West Bank need to be established: proper sampling techniques and sample storage, chain-of-custody, and analytical measurement techniques.
- Projects conceived using an Israeli master plan have little long-term sustainability.
- New projects for the West Bank need to be presented to donors in an organized manner coincident with a national priorities plan.
- Environmental matters need more emphasis during project development and design.

- Technical assistance to CRS and associated counterpart nongovernmental organizations (NGOs) needs to be used to reinforce, strengthen, and upgrade weaknesses that may exist.
- Solid waste and landfill impacts, including siting, should be addressed in a meaningful way and must receive comprehensive coverage in the PEA.
- Communications should be improved and sensitivity training should be provided to the local citizenry regarding environmental perspectives and their meaningfulness to the individual.
- Training of CRS staff (and other private voluntary organizations) should be considered. (The United States Environmental Protection Agency can provide an international training course in country covering the principles of environmental assessment).
- Septage removed from pits by village-owned vacuum tankers must be properly treated before disposal.

The scoping session report and scoping statement were presented to the USAID Affairs Officer for review and submission to the Bureau Environmental Coordinator (BEO) for review, and was approved on August 2, 1994.

The following steps describe the procedures used in implementing the PEA.

- Review of all documentation pertaining to the activities of the CRS Institutional Project.
- Study of CRS prior projects supported by USAID.
- Conduct site visits considered representative of CRS projects and subprojects, including both previous USAID-funded project sites and proposed project sites.
- Evaluation of CRS' program planning, implementation, monitoring, and evaluation procedures.
- Development of recommendations for technical assistance, interventions, and training programs designed to improve CRS' institutional capacity to perform environmental reviews.
- Development of recommendations on whether each CRS activity is managed in an environmentally responsible manner.
- Development of recommendations on design, administrative, policy, and other adjustments that can be made to the project to address site-specific "environmental review" requirements.

- Identification of all irreversible environmental impacts, including those discussed during the scoping session, and how these can be avoided or mitigated through proper and early design, siting adaptations, or reductions in number.
- Development of a preliminary system for assessing and monitoring environmental issues within the CRS program context.
- Provision of a workable scheme to ensure adequate monitoring of mitigative activities and reporting to USAID/Jerusalem.
- Collection of all necessary data.



**SECTION II**

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**PROGRAM DESCRIPTION**

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## SECTION II PROGRAM DESCRIPTION

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### A. Program Overview

Since 1967, opportunities for Palestinian industries, public services, financial institutions, and infrastructure development have been severely limited by policies imposed by the Israeli Civil Administration (CIVAD). Until the signing of the peace accord between the Palestine Liberation Organization and Israel in September 1993, no national level institution planned socio-economic development for the Palestinians. Although the Palestinian Authority (PA) recently gained autonomy in Gaza and Jericho, the rest of the West Bank remains under the authority of the CIVAD. In preparation for Palestinian autonomy throughout the West Bank, CRS plans to strengthen the capacity of local nongovernmental organizations (NGOs) and villages to manage rural development activities in a participatory and coordinated effort.

#### A1. Expected Achievements

CRS' rural development activities are expected to achieve the following primary outputs: to increase the availability of potable water, to improve sanitation, to educate the community in environmental health, to increase land that is agriculturally productive, to increase water for agricultural production, and to increase women's income through economic initiatives. To achieve maximum success, these activities will be implemented through an integrated approach within the rural communities.

In addition to the above-listed achievements, CRS plans to work with local institutions to develop their capacity to undertake rural development projects in the West Bank. Unlike earlier CRS programs, this new program emphasizes community representation and participation to ensure the long-term success of rural projects. Accordingly, community participation and capacity building are addressed on both the institutional level and the village level.

#### A2. Capacity Building on the Institutional Level

As mentioned earlier, CRS has established a cooperative relationship with four Palestinian counterpart organizations: the Palestinian Hydrology Group, the Palestinian Agricultural Relief Committee, the Union of Agricultural Workers, and the Association of Women's Committees for Social Work. The organizations and their activities are described in detail below.

CRS staff with experience and technical training in agriculture, enterprise development, and women's development are working with the counterparts in their respective areas of technical expertise. While CRS has primary responsibility for managing the program, CRS works closely with the counterparts on a technical level. Under the terms of its agreement with CRS, each counterpart is required to appoint an administrative coordinator

and a technical coordinator to work with CRS in planning, designing, implementing, monitoring, and evaluating the projects. The counterpart organizations do the actual fieldwork with support from and monitoring by CRS staff.

By involving the counterparts in all phases of project implementation, CRS hopes to develop the local organizations' management systems and increase their ability to undertake rural development initiatives independently. As the counterparts gain more and more experience in project implementation, CRS hopes to decrease its involvement in project management activities. To achieve this objective, CRS will provide training to key counterpart staff in accounting systems, personnel management, record keeping, and proposal writing. The terms of CRS' partnership agreement with the counterparts require that they maintain separate accounts for accurate financial reporting and accountability, keep detailed records of technical work, prepare and submit quarterly reports, and give CRS ready access to all project-related information. By the end of the project, the counterpart organizations are expected to take over the Integrated Rural Development Program.

### **A3. Capacity Building on the Village Level**

On the village level, the counterparts work with the local communities through village development committees (VDCs). VDCs are developed by the counterparts to ensure community participation and coordination; VDCs are monitored by CRS staff. The degree of success of project implementation at this level depends on the VDCs' participation in the planning stage, on their ability to participate on a technical level, and on the involvement of women in the decision-making process. The VDCs participate in all stages of project development, including needs assessment, design, implementation, monitoring, and evaluation.

Within the VDCs, user groups are given responsibility to operate, maintain, and sustain their group's activity in areas of water, agriculture, health, and women. The VDC's role is to oversee the various groups' activities and to maintain liaisons with the counterparts. Further discussion of project implementation through the VDCs is given below.

## **B. Institutional Partners/"Counterparts"**

### **B1. Palestinian Hydrology Group**

The Palestinian Hydrology Group (PHG) started in 1987 with the primary objective of filling a gap in water resource planning and management capabilities among the Palestinians. Since its creation, PHG has grown into a professional nongovernmental organization with 14 full-time engineers plus administrative staff spread among three office locations:

- Jerusalem office (five engineers), covering the central and southern parts of the West Bank
- Nablus office (five engineers), covering the northern part of West Bank
- Gaza office (four engineers), covering the Gaza Strip

In addition to its full-time employees, PHG relies heavily on volunteer work, primarily at the grassroots level. Volunteers are reimbursed for transportation expenses. PHG has a Board of Directors and an Executive Committee.

The Board of Directors sets general policies and strategies. It has 11 members, including two employees (the Director and Projects Manager of PHG). The other nine members of the board are respected public figures from academia and NGOs; among other things, they help secure project funding for PHG. The Board of Directors meets quarterly to review activity and financial reports.

Direct management of PHG is entrusted to the five-member Executive Committee, which also includes the Director and Projects Manager. The Executive Committee meets once every 15 days.

The Palestinian Hydrology Group is currently working in five different areas:

- Drinking water
- Agricultural water
- Database development
- Public awareness
- Environmental assessment

PHG is active in rainwater collection and spring development projects in villages without potable running water. PHG has assisted in building 2,170 water cisterns in many of the 198 West Bank villages deprived of running water (37 percent of the West Bank population). Ranging in size from 70 to 100 cubic meters, these cisterns have improved the villagers' standard of living by reducing the burden of purchasing water from tanker trucks and increasing the supply of water for domestic, agricultural, and livestock uses. Recently, PHG has signed a five-year agreement with Catholic Relief Services to work on the potable water network component of CRS' Integrated Rural Development and Capacity Building Project.

In the area of irrigation, PHG has developed water catchment ponds near greenhouses in Gaza and Atteel, West Bank. PHG is working on these projects with (1) Oxfam under funding from the British Overseas Development Agency; (2) Save the Children Federation under funding from the U.S. Agency for International Development; and (3) NOVIP, a Dutch NGO. PHG has also worked with Oxfam on developing irrigation near springs and promoting drip irrigation as a replacement for open-channel irrigation.

PHG is implementing a major data collection and monitoring project in collaboration with Newcastle University (England) with funding from the European Community and the British Overseas Development Agency. Using a number of criteria, the Project Team selected one of 27 catchment areas north of the 32nd parallel in the West Bank as the target area for a long-term data collection and monitoring program. Data on hydrology, hydrogeology, and meteorology will be collected and entered into a geographic information system (ARC/INFO). The Project Team has acquired the data management system EUREKA to conduct data analysis.

The public awareness program is new; it emphasizes training of children as well as train-the-trainers programs for women (using water wisely, septic tanks, cisterns, etc.). Program highlights include an environmental awareness campaign sponsored by the United Nations Relief and Works Agency (UNRWA), including posters and leaflets.

PHG's environmental assessment program focuses on groundwater quality. Laboratory analyses are performed at PHG's laboratory in Gaza, which was financed by a grant from the Canadian International Development Agency (CIDA). The laboratory performs water quality analyses for Save the Children Federation. In the future, it will conduct analyses for the Water Resources Action Programme (WRAP), the Azhar University, and UNRWA. PHG is responsible for a groundwater monitoring program for 37 wells in Gaza.

## **B2. Palestinian Agricultural Relief Committee**

Established in 1983, the Palestinian Agricultural Relief Committee (PARC) is a non-governmental organization working with small farmers and villages in the West Bank and Gaza. Initially formed in response to a lack of adequate agricultural extension services, it has grown from a small grassroots organization into an institution with an extension unit; training projects; service projects; an agricultural service center; income-generating projects; an agricultural information center; women's unit; a planning, monitoring and evaluating unit; an agricultural information center; and a public relations unit. Because of its technical expertise, its success in working on the village level, and its institutional growth over the years, PARC is an ideal participant in CRS' institutional development project. In its 1993 annual report, PARC acknowledges the need to build toward long-term institutional stability and effective organizational planning. Its partnership with CRS is just one of several partnership programs that PARC is undergoing to expand its activities. Other organizations from which PARC receives donor support and technical assistance include the Arab Thought Forum, the French Ministry of Agriculture, Save the Children Federation, Veterinaires Sans Frontieres, and the Swedish Organization for Individual Relief.

### **B2a. Extension Unit**

For more than 10 years, PARC has provided assistance to small farmers offering a comprehensive program in plant and animal production, as well as planning and marketing of agricultural products. PARC's Extension Unit consists of eight veterinarians, 13 agronomists, five bee-keeping specialists, six regional coordinators, and 50 volunteers working in 145 villages in the West Bank and 23 locations in Gaza. Before staff join the extension unit, PARC members attend in-house training programs to gain hands-on experience working with farmers. The unit conducts field studies, research, and experiments on specific problems facing the crop and animal production sector. The goal of the unit is to improve the technical skills and financial status of the farmers by improving livestock and plant production quality and simultaneously reducing costs.

Examples of animal production projects include a national campaign to fight brucellosis; experiments on alternative fodder sources, such as the use of olive pulp to fatten sheep and goats; veterinary service centers; and, extension visits. Plant production projects include developing improved varieties of plants for cultivation and new varieties of pesticides

and fertilizers; alleviating problems of limited water resources and high soil salinity by introducing crop varieties, improving soil drainage, and constructing water collection pools; and establishing food-processing cooperatives in cooperation with the women's cooperatives.

### **B2b. Training Projects**

In addition to agricultural extension work, PARC is also involved in a number of training projects. Training is provided for agronomists, women from rural areas, farmers and PARC administrative and managerial staff. Since 1993, PARC offers a two-year training program for 13 agronomists in Jericho and 10 agronomists in Gaza. PARC has established an agricultural training institute in the West Bank and will establish two more (one in Gaza and a second one in the West Bank) for training in food processing, beekeeping, and agricultural machinery. Training for women is conducted through PARC's Women's Unit and is directed at women in rural areas to enhance their skills in a number of areas, including: handicrafts, literacy, management and operation of cooperatives, beekeeping, fattening calves, cultivating medicinal herbs, and management of small income-generating projects, such as, egg and poultry farming and drying herbs. Finally, training for PARC staff in administration and management is done locally and abroad.

### **B2c. Service Projects**

PARC's service projects include: a beekeeping unit with training in carpentry and honey production; experimental and demonstration stations researching fertilizer, greenhouse cultivation, and crop varieties; land reclamation/development projects; construction of agricultural roads; seedling nurseries; distribution to farmers of improved strains of vegetable seedlings; teaching farmers to cultivate fodder; planting fruit trees; poultry cooperatives; and, vaccination campaigns to inoculate animals against epidemic and insect related diseases. To cover some of the expenses of these services, PARC charges minimal fees for veterinary, training, and nursery services. PARC also generates income through its pickle factory, banana plantation and vegetable fields in Jericho.

### **B2d. Agricultural Service Center**

PARC's Agricultural Service Center is administratively and financially independent. The center provides seeds, fertilizer, pesticides, equipment and seedlings to farmers at reasonable rates; markets the products of women's cooperatives; standardizes and improves labeling and packaging of products; assists cooperatives in their organization, financial management, and quality control; and, exports agricultural products abroad. In 1993, the Center was able to export olive tree seedlings, eggplant, bell pepper, hot pepper and almonds to Belgium, despite Israeli restrictions imposed on Palestinians for exporting. Eggplants and peppers were also exported to France. Dried "molokhiya" (a green leaf vegetable) and cracked wheat were exported to Panama. Almonds, thyme, loofah, dried mint and couscous were shipped to Germany.

### **B2e. Women's Unit**

The Women's Unit works in 130 locations in the West Bank and Gaza. With a staff of 25, including nine agronomists and 15 extension workers who are women, the unit's activities are aimed at improving the financial and social status of women in the rural areas. The unit's staff enroll in training courses and coordinate their activities with other women's groups and organizations, including the Committee on Nonviolence Against Women, Family Planning and Protection Society, Medical Relief Committees, Palestinian Counselling Center, Bisan Research and Development Center, Ma'an Center for Development, World University Services, and the YMCA. Activities include extension and social services, cooperatives, and credit.

In the rural areas, women do most of the work on the family farm. The Women's Unit's extension programs in animal and plant production and food processing are, therefore, closely linked with PARC's overall extension, training, and service programs. Through these programs, PARC aims at improving women's social position and offers courses in social awareness and assertiveness and training in handicrafts, first aid, physical fitness, nutrition, pastry making, bee keeping, gardening, knitting, cosmetics, and sewing.

In an attempt to create working opportunities for women, PARC has established income-generating cooperatives for women. The cooperatives provide women the chance to manage their own activities, including marketing, accounting, and purchasing commodities; to meet to analyze and discuss all sorts of issues; and to gain new skills and experience in agriculture, handicrafts, and food processing. In addition, PARC established a Women's Revolving Fund, offering a credit line of \$2,000-\$5,000 for women in plant and animal production and food-processing activities. The goal of this program is to alleviate women's financial hardships by encouraging them to manage their own projects and take responsibility for marketing, management, production, and loan payments.

### **B2f. Research and Information Activities**

Other activities in which PARC is involved include a Planning, Monitoring, and Evaluating Unit, an Agricultural Information Center, and a Public Relations Unit. The Planning, Monitoring, and Evaluation Unit undertakes feasibility studies, project evaluations, information gathering, and strategic planning for the organization. The Agricultural Information Center maintains an agricultural library and is a source of information for farmers and research institutions. The center publishes and distributes information to farmers on crop and animal production, household economy, and food processing. It also publishes an English-language newsletter aimed at local and international NGOs, research institutions, and centers and governments looking for information on the Palestinian agricultural sector. Finally, PARC's Public Relations Unit works to coordinate efforts with local organizations, foreign NGOs, and governments working in the West Bank and Gaza. Staff members attend conferences, plan tours for visiting organizations and individuals, and prepare project proposals and progress reports.

### **B3. Union of Agricultural Work Committees**

The Union of Agricultural Work Committees (UAWC) was established in 1986 as a private voluntary organization. UAWC has its headquarters in Shufat, near Jerusalem, a branch office in Gaza, and 87 committees throughout the West Bank and Gaza. UAWC has a staff of three administrators, five veterinarians, and 29 agricultural engineers, but volunteers form the backbone of the organization. Each committee, for example, has about 30 members who are farmers, agricultural workers, agricultural engineers, and veterinarians.

UAWC has implemented 22 projects in the West Bank and 15 projects in Gaza that include providing technical assistance to farmers in cow, sheep, and poultry raising; seedling nurseries; agricultural marketing; greenhouses; veterinary clinics; and bee keeping. Other activities include:

- Agricultural relief campaigns: assistance has been given to farmers in the distribution of egg-laying chickens, vegetable and olive seedlings, inoculation of animals against disease, and pesticide spraying of village crops and trees.
- Technological development: UAWC has developed its own grape-pressing machine to replace machines bought in Israel and a manual honey sorter which is more effective than the traditional method used. Both machines are sold to farmers at cost.
- Human resource development: a cooperative training school was established to improve members' knowledge of farming techniques and their management of cooperatives.
- Environmental education: in cooperation with Birzeit University's Center for Environmental and Occupational Health Sciences, UAWC offers a two-year educational program for farmers in the Jordan Valley on the use of pesticides. Research is being conducted to assess the level of pesticide use by Palestinian farmers; field visits to farmers and workshops are held to educate farmers on a number of agricultural issues. Plans are under way for UAWC to open pilot farms for organically grown produce.
- Land reclamation and development: in an attempt to prevent land from being confiscated by Israeli authorities, UAWC launched a campaign to plant trees on barren land and replace uprooted trees. With the aim of raising money from individuals and organizations worldwide, a total of 20,000 dunums of land will be reclaimed by planting fruit and olive trees.

### **B4. Association of Women's Committees for Social Work**

The Association of Women's Committees for Social Work (AWCSW) was established in 1981 as a grassroots organization and has over 250 branch committees throughout the West Bank and Gaza. With its headquarters in Ramallah, the AWCSW's Executive Committee consists of 21 representatives from different areas of the West Bank and Gaza.

AWCSW is one of four women's committees in the West Bank and Gaza that fall under an umbrella organization called the Women's Higher Council. The Women's Higher Council was formed in 1988 in an effort to unite Palestinian women's committees into one forum. The women's committees follow similar programs and goals, however, their differences lie in their political ideologies and party affiliations. Many of their activities, which are aimed at improving the social and economic well-being of Palestinian women, are also political. Women are encouraged to involve themselves in political parties and to express their political views. AWCSW's goal is to participate in drafting laws for the new Palestinian Authority to ensure equal opportunity for women in the family, the workplace, and the future Palestinian government; and to promote the implementation of democratic principles in elections, national institutions, the media, and the education system.

Over the last 12 years, more than 10,000 women in the cities, villages, and refugee camps have participated in AWCSW's activities. Activities have included:

- A newsletter, books, booklets and a magazine called *Al-Falastinia*. These publications discuss topics, such as the issue of Palestinian women prisoners, early marriage of Palestinian girls, marriage, divorce, and health issues.
- Coeducational summer camps, three nurseries, and 128 kindergartens in rural areas for over 5,000 children from lower-income families who cannot afford private preschool classes.
- Sewing training centers, home embroidery projects, and small sewing factories in the Balata refugee camp near Nablus and the West Bank villages of Kufr Na'maeh and Jericho. The Balata factory makes children's clothing and adult underwear and is a self-supporting women's industry.
- Literacy classes for rural women who have never received an education.
- Leadership training classes for women in the villages and refugee camps to encourage independence and decision making on a personal and political level. Counseling is also offered to strengthen women's self-respect and self-confidence.
- A counseling center in Jenin that provides legal counseling to women on marriage and divorce issues, seminars on health, and assistance to women with handicapped children.
- Palestinian cultural exhibitions and bazaars.

In preparation for the future, the AWCSW is focusing its activities on helping women start their own small businesses; training them in new skills, such as administration, clothing design, and physical therapy; and teaching them about the benefits of political participation.

## **C. Program Implementation on the Village Level**

### **C1. Impact Area and Selection of Targeted Villages**

CRS' rural development activities will target the poorest and neediest villages of the West Bank. The villages to the north of the 32nd parallel of historic Palestine have received less development aid than other areas of the West Bank. Their health services, water, and agricultural production are generally lower than the towns and villages in the central and southern areas of the West Bank because of their relatively remote geographic location.

Agricultural production is the primary means of livelihood for most of the villages in the north and northeastern parts of the West Bank. Although 120,000 people used to work in Israel, travel and work restrictions imposed since 1993 have limited employment opportunities for the Palestinians. Palestinians from remote villages have less access to jobs in nearby towns and generally have much lower incomes. As a way of stimulating job earnings and increasing agricultural production, CRS' development assistance will focus on potable water networks, spring development, water catchments, land reclamation, agricultural roads, and women's enterprise development.

In selecting villages for development assistance, CRS and its counterparts have developed primary and secondary criteria as a means to screen the 212 villages located in the impact area. CRS and the counterpart organizations are reviewing data and surveys made available by the counterparts to assess the needs of the villages and to select 20 villages out of the 212 to receive technical assistance. The 20 villages that meet the criteria will undergo extensive research to assess their needs by using the Participatory Rapid Appraisal technique, which is described below.

### **C2. Criteria for Areas of Intervention**

Secondary sources of information provided by the counterpart organizations will be used to assess the villages according to the primary criteria. The primary criteria as outlined in CRS' proposal are:

- The village should be located in the area north of the horizontal 32nd parallel on the historic map of Palestine.
- The village has no potable water network.
- If a water project is implemented, it should be feasible; that is, the village should have an appropriate source of water or it can be connected to a nearby source. Acceptable sources of water in order of priority based on community preference and cost-effectiveness are: (1) a local source of water inside the village, (2) a nearby source of water under Palestinian authority, and (3) a nearby Mekorot (Israeli Water Authority) pipeline (Note: when an existing Merkorot waterline is nearby, it may not be advisable to develop a new water source.)
- The village population is within the range of 1,000-5,000 inhabitants.

- There is a need and a potential for agricultural development in the village.

After identifying villages that match the primary criteria, field surveys will be conducted to assess villages according to the following secondary criteria:

- The village should be cooperative and ready to form a village development committee. The village should have no or little political and social obstacles that could hamper development activities.
- The village should be ready to allow for a greater participation of women in the development process.
- The village is capable and willing to contribute at least 25 percent of the total cost of any planned project.
- The village's agricultural land is or could be endangered by nearby Israeli settlements.

### **C3. Participatory Rapid Appraisal**

Villages that pass the two sets of criteria above are subjected to the Participatory Rapid Appraisal (PRA). PRA is a research technique used by development researchers for needs assessments, feasibility studies, project or program evaluations, identification and prioritization of projects, and a general analysis of topics, questions, or problems. PRA was introduced in the early 1980s as an alternative research technique to more conventional social surveys that relied on extensive data collection and analyses based on carefully chosen variables. This technique uses a qualitative rather than quantitative approach to evaluating a community's needs and offers a low-cost, quicker alternative to development research. PRAs are particularly suited to homogeneous rural communities like the ones being assessed by CRS and its counterparts because they share common knowledge, beliefs, and values.

CRS has trained its counterpart organizations in PRA techniques. In their training, a village called Farkha was used as an example to which the PRA technique was applied. Farkha is a village 30 km southwest of Nablus with a population of 1,000. It has a local committee of volunteers who represent all the families of the village; it is with these committee representatives that the counterparts work. By relying on community participation in all aspects of the study, the collection of information, and the analysis of the findings, the counterpart organizations are able to assess the needs of Farkha and discuss appropriate options for program implementation.

Annex B gives a summary of the findings from Farkha as discussed at PRIDE/CRS' Evaluation Workshop. Also outlined are the types of activities proposed to address the village's needs. Information gathered through the PRA technique covers many issues, including the availability of water resources, types and amount of agricultural production, literacy rates for men and women, educational opportunities, road networks, household income, level of unemployment, solid waste disposal techniques, and the availability of telephone and health services. Once the data are collected and analyzed, discussions on project implementation begin. In Farkha, recommended activities include establishing a

water network, land reclamation to increase agricultural production, repairing agricultural roads, repairing cisterns and springs, and public awareness training for women.

#### **C4. Village Development Committees and Subproject Planning**

The village development committees (VDCs) represent and promote the interests of the local communities. Committee members are chosen by the villagers according to family status, political status, or merit. CRS requires that the VDCs have a clear organizational structure and set of bylaws that reflect democratic decision making and accountability. The involvement of minority groups and women in the decision-making process is an important factor in successful project implementation and is encouraged. CRS avoids working with village representatives appointed by the Israeli authorities.

Members of VDCs are trained in project planning and implementation on the village level. They have ultimate responsibility for maintaining and upgrading projects, as well as planning future development projects and raising the funds necessary for them. Within the VDC, subuser groups are formed, representing the direct beneficiaries of different types of projects. The water group or agriculture group, for example, would be responsible for operation and maintenance of the water projects and agriculture projects, respectively. In all projects, the beneficiaries are asked to contribute part of the financing thus giving them a sense of ownership and responsibility. The VDCs work closely with the counterpart organizations on the village level. CRS, on the other hand, facilitates and monitors the process while ensuring that members of the committees receive any training support needed.

#### **D. Integrated Rural Development Activities**

##### **D1. Water Resource Development**

**Water resources development for safe drinking water and agriculture purposes.** The World Bank reports on *Developing the Occupied Territories* (September 1993), *Water Conservation in Palestine* (Center for Engineering and Planning, March 1994), and numerous other publications set forth the general issues related to further water resources developments for both drinking and agricultural purposes.

There is agreement that the West Bank has development issues that have a heavy impact on the environment. These environmental impacts are complicated by the lack of transferred authority, control, and enforcement. Therefore, it is necessary that full project and program file documentation be completed according to USAID's environmental assessment requirements. Creating and writing the "Analysis of Alternatives," including the "No Action Alternatives" (which may, in some cases, be the best justification that can be made for certain programs, projects, and/or activities etc.), are important elements in the documentation file.

Additionally, recognizing the scarcity of water and inevitable population growth in the region, the conservation of existing water resources is imperative. Therefore, full water conservation measures must be instituted before new water supply development can be justified.

About 42 percent of all West Bank villages have no piped water supply. Faced with this lack, West Bank residents have historically relied on springs, rainwater cisterns, and collection ponds to satisfy domestic and agricultural uses.

#### **D1a. Potable Water Network(s)**

If a village is without a potable water network, if investigations indicate that one would be feasible, and if the village meets CRS criteria areas of intervention (Section C2), a potable water network is planned and designed for that village. For a network to be feasible, an appropriate source of water must be available in the village or nearby. Appropriate sources include local source of water inside the village, nearby source of water under Palestinian authority, and nearby Mekorot (Israel Water Authority) pipeline.

#### **D1b. Water for Agriculture**

CRS and its counterparts will focus on developing water for agriculture mainly from spring development, water catchments, and other sources after basic drinking water requirements are met, and where the need and a potential for village agricultural development exist.

#### **D2. Sanitation**

The Integrated Rural Development Project intends to deal with the sewage disposal problems by providing financial support for purchasing a village-owned vacuum tanker for emptying the pits at reduced prices. This activity is planned for only 2 of the 20 selected villages. Neighboring villages will be encouraged to replicate similar projects. An economic feasibility study of such a project has been made and it proved to be profitable.

Cost recovery for this project is being sought. However, if profits are realized, they should be reinvested in village development. The VDC will monitor and manage the project. The two sanitation projects will be considered pilot activities that would be thoroughly evaluated before being replicated.

Providing such services locally at reduced prices is expected to decrease incidence of cesspit overflow and increase the number of households with outflows going to cesspits.

#### **D3. Agricultural Development**

The historical importance of the agricultural sector and its role in development is a common assumption among Palestinians that needs to be reconfirmed. In the West Bank, the economy is largely agriculturally based (livestock and rainfed farming) and focused on local markets.

Available agriculture data for both West Bank and Gaza are very limited and sometimes conflicting. However, some of the best baseline data currently available are in the World Bank report, *Developing the Occupied Territories* - Volumes 1 through 6, September 1993.

In 1991 West Bank Palestinian farmers cultivated approximately 500,000 hectares with 30 percent lying fallow. This is a 6 percent decrease in cultivated land since 1973. The Gaza farmers cultivated only 0.16 million dunums in 1991. With almost one-third of the land used for marginal cultivation, grazing, or fallow, and an increasing undeterminable area of land under cultivation, it is difficult to ascertain an accurate estimate of cultivated land in either the West Bank or Gaza.

Land holdings in the West Bank Jordan Valley are large with absentee owners living in Jordan. The West Bank farms are usually small, with 90 percent having fewer than 50 dunums (1 dunum = 0.1 hectare). Family-owned farms in the olive-growing areas rely on "tenant" farmers who share a percentage of the crop. Livestock operations are usually overseen by family or laborers.

While most Palestinians live in the western hilly areas where farming is limited primarily to rainfed operations, the most promising agricultural land is in the Jordan Valley. However, Palestinians are not allowed to take water from the West Bank of the Jordan River; in some cases, electrified fences deny them or any of their livestock access to the water. Water must be trucked in for the livestock in that area. This exclusion to the access of water is imposed by the CIVAD even though there are numerous large Israeli settlement farms with large pumping operations every few kilometers. This policy for water appropriation and usage is a major impediment to Palestinian agriculture development.

### **D3a. Farm Labor**

With a drop in employment opportunities for Palestinians in the Arabian Gulf since the Gulf War (1990-1991), Palestinians returning to agriculture development are concentrated in the western hills of the West Bank. However, without the availability of any appreciable amount of water, agriculture development in this area will be restricted and further need for farm laborers will be minimal.

Gaza, with its dense population, has an abundance of casual labor, especially with the recent limitations imposed by Israel on employment and labor movement. These unemployed laborers could be used to help alleviate the shortage of short-term laborers needed in the West Bank Jordan Valley for irrigated vegetable cropping, animal husbandry, and seasonal tree crop picking.

### **D3b. Technology**

Appropriate agriculture technology is available to the Palestinian farmer through agriculture extension at all levels. Agricultural crop production in the West Bank is much more advanced compared with some of their Arab neighbors. There are protected crops produced in polyethylene greenhouses, and high tunnels, and drip-irrigated crops planted through polyethylene mulch.

Introduction of new growing technologies, new crop cultivators, and water management techniques has also increased agriculture development, but further advanced methodology must be introduced to keep pace with the cost-competitive systems of other countries.

Upgrading of land preparation, planting practices and, most importantly, irrigation water quality and the judicious use of pesticides and herbicides need to be addressed before exports markets will become available to the Palestinian farmers.

Further and existing agricultural development is keyed to water resources balancing, water conservation, and the use of treated wastewater. However, associated with treated wastewater reuse are environmental impacts, mitigation requirements, monitoring activities, and their related costs. Treatment is mandated to eliminate the widespread use of untreated wastewater in agriculture. This is a common but dangerous practice causing the transmission of waterborne diseases and contributing to poor public health.

CRS rural agricultural development activities include (1) increasing land that is agriculturally productive and (2) increasing water for agricultural production.

#### **D4. Women's Activities**

Rural women carry most of the responsibilities on the farm and at home. They contribute to agricultural production, take care of livestock, poultry, and bees, collect water, and attend to most of the household duties, including food production. Their participation in CRS' development activities is, therefore, crucial. Since CRS and its counterparts are still in their first year of project activity, which involves collecting and analyzing data through PRAs, specific projects for women have not been decided. It is known, however, that women in the villages need training. Training will be implemented throughout the project's five-year period by establishing training centers for women in the villages. Based on the counterparts' experience in working with women in villages, training will likely involve literacy classes; leadership and empowerment training classes; mechanical training; counseling on issues of health, marriage, and women's rights; food processing; and establishment of income-generating projects.

CRS' program for women is ambitious. Women in the rural villages have had minimal educational opportunities. As the data collected in Farkha show (see Annex B), most girls do not continue their education beyond elementary school. Whereas boys can continue onto secondary schools and higher education outside the village, families are reluctant to allow their girls to do the same. For many families, sending their girls to school is culturally unacceptable as well as a financial drain. School fees and supplies cost money and fewer hands are available to work on the farm. Counseling on women's rights to and the benefits of education and political participation will necessarily involve changing men's and women's traditional attitudes.

The issue of increasing women's participation in society is a sensitive one in some villages and a potential obstacle in achieving success in CRS' program. In identifying villages for development assistance, the counterpart organizations screen the villages for a minimum amount of women's representation and participation in the community. Without an existing amount of participation from the village women, it would be too difficult for the counterpart organizations to bring women into the development process. In cases where villages are willing to allow women's participation in the development process, the women are able to take part in site visits and in project decisions. There is some indication, therefore, that opportunities for success exist.

**SECTION III**

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**ENVIRONMENTAL SETTING**

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## SECTION III ENVIRONMENTAL SETTING

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### A. Physical Environment

#### A1. Physiography

##### A1a. Geography

The West Bank and Gaza Strip have a land area of 6183 square km. The West Bank, including the neutral and military zones around Jerusalem but excluding the 210 square km comprising the surface area of the Dead Sea within the West Bank boundaries, has a total surface area of 5,606 square km. It has a maximum length of 137 km along the longitudinal axis between Zububa in the north and the southernmost boundary line south of Al Samu. The width varies from 31 km along the latitude connecting Jerusalem with the northern tip of the Dead Sea to 58 km along the latitude starting from Qalqilya along the western boundary and intersecting the Jordan River northeast of Zubeidat.

The West Bank contained eight administrative districts in 1967. In 1968, their number was reduced to seven and their borders were redrawn by the Israeli administration, enlarging the Tul Karem and Jenin districts at the expense of Nablus, partitioning the rural parts of the Jordanian/Jerusalem District between those of Bethlehem and Ramallah, and including in the entire geographical region of the Lower Jordan Valley in the Jericho Jordan Valley District.

The Gaza Strip extends over an area of 367 square km. It has an average maximum length of 45 km between the boundary near Beit Hanoun in the north and Rafah in the south. The width varies from 6 km near Deir Al Balah in the center to 13 km near Rafah. [Center for Engineering and Planning, 1992]

##### A1b. Topography

The area of the West Bank and Gaza Strip is divided into five distinct physiographic zones on the basis of topography. These zones are the Jordan Valley zone, Eastern Slopes zone, Central Highlands (Mountainous) zone, the Semi-Coastal (Fertile) zone, and the Coastal zone. [Al Khateeb et al, 1993; Center for Engineering and Planning, 1992]

**The Jordan Valley zone.** This zone extends along the western bank of the Jordan River from the point where the boundary intersects the river in the north to the northern tip of the Dead Sea in the south. It has an area of approximately 400 square km and lies within 0 to 400 meters below sea level. The Jordan Valley zone has a "natural greenhouse" characteristic and good fertile agricultural land is available. Average rainfall ranges from 50 to 250 millimeters/annum; and its major products are bananas, off-season vegetables, and citrus.

**The Eastern Slopes zone.** This zone lies between the Jordan Valley in the east and the Central Highlands in the west. It extends from the areas east of Jenin in the north to the Dead Sea in the south and includes the slopes along its western shore. This zone has an area of approximately 1500 square km with altitude varying from 800 meters above sea level to 50 meters below sea level. The major crops are barley and legumes and the annual rainfall is around 250 millimeters/annum.

**The Central Highlands zone.** This zone extends from Jenin in the north to the Hebron in the south. It has an area of about 3500 square km and altitudes exceeding 1000 meters above sea level. The rainfall in this zone ranges from 450 to 700 millimeters/annum and the major crops are olives, stone fruits, and grapes.

**The Semi-coastal zone.** This zone represents an extension of Palestinian Mediterranean coastal lands and comprises parts of the Jenin and Tulkarem sub districts. It has an area of approximately 400 square km, and altitudes ranging from 100 to 300 meters above sea level. This zone is characterized by fertile lands with shallow groundwater. The rainfall is plentiful and often reaches over 600 millimeters/annum. The major crops are vegetables, citrus, field crops, olives, and stone trees.

**The Coastal zone.** This zone extends along the southern part of the Palestinian Mediterranean shore to the north and south of Gaza City. It has a total area of 367 square km and altitudes ranging from 20 to 40 meters above sea level. It is characterized by sandy soils and very shallow aquifers. Annual rainfall ranges from 200 millimeters in the south to 400 millimeters in the north and the major crops are citrus and vegetables.

## **A2. Climate and Meteorology**

The West Bank and Gaza are part of a subtropical zone with summer and winter climates and brief transition periods between the two seasons. The summer is generally warm and dry, with the hottest month being August and temperatures ranging between 18 to 38 degrees Celsius. The months of June through August are dry and generally have no rain. The winter is cool and wet with the coldest month being January with temperatures ranging between 5 degrees to 10 degrees Celsius. [Al Khateeb, 1989] About 70 percent of the average rainfall in the West Bank and Gaza Strip falls between November and March, and includes heavy rainstorms. In January and February, snow occasionally falls at the higher elevations of the central highlands, especially around Jerusalem. [Center for Engineering and Planning, 1994]

The average annual rainfall on the West Bank has been estimated between 2,000 and 3,000 million cubic meters (MCM) while the amount of rainwater in Gaza is estimated at about 125 MCM/year. Roughly 75 percent of the rainfall evaporates, the remaining water infiltrates the soil and recharges the groundwater reservoirs or appears as short-lived runoff in rivers and streams. [World Bank, 1993]

### A3. Air Quality and Noise

Air quality and noise pollution pose serious problems to the environment. Vehicle emission standards and controls are nonexistent in the West Bank and Gaza and are well above acceptable international guidelines, particularly during rush hour in the city centers.

Smoke and odors from burning household rubbish and other solid wastes in the open streets, and uncontrolled effluent discharges from settlements, cities, and villages further aggravate the degradation of the air quality. In industrial areas, the natural and industrial dust from stone quarries causes heavy inversion layers, especially on the hot and still summer days.

Noise pollution from traffic, construction sites, and infrastructure rehabilitation is an ongoing problem.

### A4. Water

#### A4a. Resources

Rainfall is the main source of water in the West Bank and Gaza, replenishing surface and groundwater supplies. Rainfall on the highlands recharges the groundwater aquifers draining to the east and west. The western slopes are gentler than the eastern ones and receive considerably more rain, hence they have a much higher recharge rate than the eastern aquifers draining towards the Jordan Valley.

**Surface water.** The only perennial river in the West Bank is the Jordan River. No agreement among the riparians has been reached to share this resource. Prior to 1967, the Jordan River was a source of water for the Palestinians. The Palestinians have been denied access to the Jordan River water by the Israelis since 1967-1968. Peace Agreement discussions, however, are now taking place related to the Jordan River and other water resources shared by Palestine, Israel, Jordan, and others in the region. There are about 300 springs near the base of the mountain ranges. Only about 120 of these flow year-round, while the remaining ones flow only during the winter rainy season. The total annual discharge of all springs is estimated to reach about 100 MCM, but only half of this amount is freshwater. The other 50 MCM has a high salt content and originates mainly from the springs along the northern and western shore of the Dead Sea.

**Groundwater.** The structure of the aquifers in the region is complex. The aquifers spanning the West Bank and Israel are not only richer but the water quality is much higher than that of the aquifers spanning Gaza and Israel. Usually, distinction is made among three main aquifers underneath the West Bank and Israel.

The largest aquifer is the western aquifer, which extends to the Mediterranean coast. Its annually renewable recharge is generally estimated at 335 MCM, whereas the eastern aquifer yield is estimated at only 105 to 125 MCM/year. Together with the annual recharge of the northeastern aquifer estimated at about 140 MCM/year, the total annual recharge of the aquifers amounts to about 580 to 600 MCM. [World Bank, 1993]

Water rights for both the Jordan River and groundwater supplies are agenda items under discussion as part of the Peace Agreement. While several plans exist for sharing water, it is not possible now to predict the outcome. It is clear, however, that water is a critical resource and will remain a subject of extreme importance.

#### A4b. Supply

As illustrated in Table III-1, 58 percent of West Bank communities, or 74 percent of the population, are supplied by piped water networks that deliver a higher quality of water than that taken from other sources, such as cisterns or springs. Households that have access to piped water, on average, consume more water and maintain a higher standard of personal and household hygiene than those who are not covered by the piped water network.

**Table III-1**  
**Access of West Bank Communities to Piped Water**

Community Access to Piped Water	Number	Percentage
With Access	307	58
Without Access	220*	42

Source: Infrastructure and Health Services in the West Bank: Guidelines for Health Care Planning, The Health Development Information project, 1993.

\* Including 10 communities in the Hebron district where piped water services had been disconnected.

In the 307 communities where piped water is available, an average of 98 percent of the households are connected to the network. However, there are considerable variations in the availability of piped water between the eight West Bank districts. For example, in the Jenin district, only 47 percent of the population are covered by piped water networks; in contrast, there is 100 percent coverage in the Jerusalem district. In general, the central region of the West Bank, where 92 percent of the population is covered by piped water networks, enjoys better coverage than either the north, with 86 percent coverage, or the south, with 55 percent coverage. Actual water availability and delivery percentages, however, are much lower due to water shortages in systems operations.

In the West Bank, 42 percent of the rural communities (26 percent of the population) do not have access to piped water networks. As Table III-2 indicates, the most common source of water for these communities comes from rainfed cisterns, where little is known about the water quality. In all West Bank rural communities, with the exception of two, rainfed cisterns are used as either the main or secondary source of water for domestic use, even where households have access to piped water networks.

**Table III-2  
Non-Piped Water Supplies in West Bank Communities**

Main Source of Water	Number of Communities	Percentage
Cisterns Only	171	78
Cisterns and Springs	31	14
Springs Only	3	1
Cisterns Fed by Piped Spring Water*	13	6
Tanks	2	1
<b>Total</b>	<b>220</b>	<b>100</b>

Source: Infrastructure and Health Services in the West Bank: Guidelines for Health Care Planning. The Health Development Information project, 1993.

\* Thirteen communities had piped networks that carried water from local community springs to household cisterns, which were also used for storing rainwater.

**Table III-3  
Sources of Piped Water in West Bank Communities**

Source of Piped Water	Number of Communities	Percentage
Mekorot	195	63.5
Municipalities and Local Springs	50	16.4
Jerusalem District Water Undertaking	51	16.6
Bethlehem District Water Undertaking	11	3.5
<b>Total</b>	<b>307</b>	<b>100</b>

Source: Infrastructure and Health Services in the West Bank: Guidelines for Health Care Planning The Health Development Information project, 1993.

The major supplier of piped water in the West Bank is Mekorot, the Israeli Water Authority. Mekorot directly supplies 63.5 percent of the piped water networks in rural communities of the West Bank. The remaining 36.5 percent of the piped water networks are controlled by the only two Palestinian authorities in the West Bank, the Jerusalem District Water Undertaking and the Bethlehem District Water Undertaking. These two water authorities provide water directly to communities in the central region of the West Bank or to local city councils who serve as water sub-distributors within their own communities.

## A5. Soils

Soil physiognomy in the West Bank and Gaza Strip are affected by parent rock and local climate and display a wide range of soil types. In mountainous areas, the topsoil is washed off faster than new soil can form from the bedrock beneath. The young soil usually has no chance to mature and age; therefore, most soils in these areas are classed as young.

In the Tulkarem and part of the Jenin subdistricts, soils are characterized by heavy terra rossa and alluvial types. Most of these soils are suitable for farming. Much of the remaining soils in the West Bank are light gray to grayish brown. These soils are not particularly fertile but they may be enriched by manure and chemical fertilizers.

In the coastal region, besides the barren dune belt along the shore, are coarse-grained hamra soils, which are adaptable to farming because of a fine textured layer of mineral coating each grain. [Center for Engineering and Planning, 1992]

## A6. Geology

The predominant geology and outcrops in the West Bank are carbonate sediments from the Cretaceous Age. Old and young rocks are barely visible. Jurassic and Lower Cretaceous rocks, limestone, chalky limestone, marls, and sandstone are visible in the core of the Judean Anticline in the extreme north of the West Bank. In Gaza, the geology typical to the coastal aquifer is sand, sandstone, and pebbles.

## A7. Terrestrial and Aquatic Resources

**Wildlife resources.** High population pressure and intensive land use in the Gaza Strip and West Bank since the end of the 19th century have prevented wildlife populations from flourishing. Overgrazing, hunting, and agricultural and industrial activities have disturbed the natural habitat of most of the indigenous fauna. The overgrazing of land by the Palestinian sheep and goat herds push the wildlife further and further into the desert. The pollution of springs and streams from direct dumping of sewage effluent from the settlements and the random dumping of village garbage and trash near or in waterways are destroying the natural water holes for most wildlife, as well as many domestic livestock.

Some 56 mammal species have been recorded in the Gaza Strip, but only rodents and small insectivorous mammals, such as shrews and hedgehogs, have recently been observed in any numbers. The present situation for other larger mammals remains unclear due to the lack of recent surveys and investigation, but they are thought to be present in very small numbers or not at all. In contrast, nonindigenous rodents such as the brown rat and the house rat are abundant in disturbed, densely populated areas.

Amphibians and reptiles have also experienced a decline in supporting habitats. Intensive human use of water resources has contributed to the drying up and pollution of much of the moist environments amphibians require. Land use and agricultural practices have disturbed most of the suitable habitats for terrestrial reptiles, but adequate data on the present occurrence of local reptiles are lacking.

The near absence of natural vegetation and biotopes and the intensive land use of the region curtail the suitability of the area as a breeding and overwintering place for birds. However, the West Bank and Gaza are a historical migratory resting stop for a large number of birds on their way to and from the European, Asian, and African continents. Migratory birds that rest in the West Bank include European goldfinch, heron, storks, kingfishers, yellow and white wagtails, ducks, pelicans, and vultures, some of which remain over winter.

The destruction of wetlands; pollution of springs, rivers, and lakes; the enormous quantities of plastic and trash dumps; and especially the uncontrolled use of fertilizers and pesticides have led to a dramatic drop in the bird population. This, in turn, has led to the extinction of entire species, as well as a large number of species of birds being endangered.

**Aquatic resources.** Due to the pollution of the Jordan River, indigenous fish are on the decline and many fish caught there are considered unsafe to eat. Cattails and rushes can still be seen in marshy areas and along streams and rivers, but are sometimes found to be dying out in areas near uncontrolled sewage dumping. Water hyacinths, known for their water purification properties, are still found but in small numbers.

**Marine and coastal resources (fisheries).** Fish production around the Gaza coast has declined in recent years. In a 10-year span, catches have dropped by 3,000 tons/annum. The low nutrient levels in Nile water discharge after the closure of the Aswan High Dam may have contributed to this disruption in catch size.

Recent regulation of the fishing industries may have also contributed to reduced production. Hours for fishing near beaches have been restricted and fish auctioning has been moved to an area 500 meters from the beach. In addition, the fisheries industry is hampered by outdated equipment and vessels.

However, the lack of a suitable fishing port in the Gaza Strip has been the greatest impediment to the industry, although some jetties traditionally used for loading and unloading general cargo still exist and are being used in fair weather. Support facilities for the sector are basic; infrastructure is limited to some ice production, fish auction halls, and boat building and engine repair facilities.

There is no aquaculture in either Gaza or West Bank, even though the demand for fish is high. Substantial technologies that utilize brackish water resources or raise fish from human wastewater exist. Wastewater treatment technologies based on macrophytes, which produce products that can be effectively used for animal feeds, may have potential at a fraction of the costs of traditional wastewater treatment systems. These systems are, however, very land intensive.

**Plant communities.** There are many wildflowers in the West Bank, 80 percent blooming from February to May with some flowers reaching their peak as late as July. The rains transform what looks like desert most of the year into green and colored fields with many types of wildflowers.

However, without an awareness campaign some of these flowers, plants, and trees—some indigenous only to the West Bank area—will disappear. Contributors to this problem are open grazing for sheep and goats, expansion of agricultural and housing areas, decreased wetlands, pollution of the waterways, and the lack of designated wildlife conservation areas with specific conservation guidelines.

**Endangered species.** Although information is often fragmentary and inaccurate, data indicate many animals are on the decline. Due to the lack of formal studies and any real designated areas dedicated to wildlife protection, it is very difficult to obtain any reliable data upon which to base quantitative estimates of declines. At present, animals that used to be seen in the West Bank area but now have disappeared include the Syrian bear, the wolf, the Syrian woodpecker, the crocodile, and the ostrich.

According to Imad Atrash, a Palestinian environmentalist, plant life has also suffered and the following should be placed on the local endangered list: sumac, salvia (sage), thyme, Palestinian pistachio tree, carob tree, ficus tree, wild orchid, iris, crocus, mountain lily, and desert tulip. Many of the ancient olive orchards are being cut down to make way for settlements and infrastructure projects. With the great abundance of olive wood being used in the tourist industry for wood carvings, there should be some immediate control over the cutting of trees.

**Nature conservation areas.** There are no Palestinian nature conservation areas in either the West Bank or the Gaza Strip. There are 48 Natural Reserves and National Parks in Israel, with only 5 of these lying within the West Bank and Gaza. As of this date, it has not been determined whether these parks and reserves will be turned over to the National Palestinian Authority (NPA) Ministry of Tourism.

In the Gaza Strip, some small areas remain of nature conservation value near the outlet of the Wadi Gaza. The near pristine flora and fauna of the nearby dunes and salt marshes merit special care and consideration to preserve their condition. Although the vegetation of the mobile dunes is grazed by a few remaining Bedouin herds, it remains the only example of desert flora in the Gaza Strip. Around 500-1000 meters from the coastline, inland between the resorts of Gush Katif and Neve Dekalim, is an outstanding example of this valuable landscape and floristic and faunal diversity. No activities planned for Save the Children Fund (SCF), American Near East Refugee Aid (ANERA), or CRS will affect this area around Wadi Gaza.

There is a great need for many parks for both wildlife protection and for nature conservation. Only when these areas are designated can the real wildlife awareness campaigns and the preservation of the Palestinian nature heritage begin.

**Public awareness.** Environmental awareness in this region is still in its infancy. This, combined with the degree of political tension and lack of government and nongovernment resources, has produced environmentally unfriendly practices. Only one environmental organization, Children for the Protection of Nature, currently exists in the West Bank and Gaza. This organization was funded, in part, by SCF. The organization's program has spread to over 40 schools in Gaza, Hebron, Bethlehem, Jerusalem, Ramallah, Jericho, Nablus, Jenin, and other places throughout the West Bank and Gaza.

The organization promotes the preservation of the environment through an educational program aimed at Palestinian children. Educational activities include classroom lectures, poster campaigns, and a quarterly magazine issued by Education for Awareness and Involvement in Cooperation with the Department of General and Higher Education—NPA. Teachers organize summer camps that target environmental awareness programs with participation in intensive lectures, field trips, and archaeological visits. These activities have attracted attention abroad, notably in Italy, where children exchange environmental and economic information with Palestinian children.

There are no recent lists or studies on wildlife found in the West Bank, with the exception of those of Imad Atrash of the Children for the Protection of Nature program. He is attempting, through an environmental awareness program introduced to the Palestinian school system and with the help of the International Development Research Centre, to study and identify indigenous animals, birds, and fish that are present in the West Bank, as well as those in danger of extinction.

## **B. Cultural and Aesthetic Conditions**

### **B1. Archaeological, Historical, and Cultural Sites**

Three cities—Nablus, Bethlehem, and Jenin—have been identified as zones that may be affected by the project. These cities and the surrounding areas have been inhabited for thousands of years and contain sites that have deep religious significance for Christians, Jews, and Muslims. Also located within these zones are many historical sites, including ruins from the Romans, Byzantines, and Crusaders.

There are several examples of historical, cultural, and archaeological sites located within these three cities. El-Kabir Mosque, said to be the site where Joseph's blood-stained coat was presented to his father as proof of the death of his favorite son, lies in the project area. The Church of the Nativity, considered to be one of the oldest churches in the world and believed to be the birthplace of Christ, and the Milk Grotto Chapel, where it is believed that Mary, Joseph, and the baby Jesus sought shelter on their way to Egypt also lies within the project area. In addition, the three cities are home to the tomb of the matriarch Rachel, the ruins of an ancient Roman amphitheater, the convent of Jacob's Well, and the traditional site of Joseph's Tomb. Just outside the city of Nablus are the remains of the biblical city of Shechem.

The activities proposed in this report are limited in scope and size, and are not anticipated to affect any of the above-referenced historical, cultural, or archaeological sites. The establishment or upgrading of wastewater treatment facilities and the creation of roads will not disturb the groundwater levels at these sites; therefore, there will be no damage caused by rising water levels. Construction activities are not anticipated to cause any adverse impacts, since there are no known sites where construction or upgrading activities are planned. However, should a new site be discovered during the course of project activities, the appropriate authorities would be contacted immediately.

## **B2. Aesthetic Settings**

As an earlier section of this report outlines, the West Bank and Gaza have a wide variety of topography, top soil, and vegetation cover. However, an unfortunate but common element in the West Bank and Gaza's landscape is increasing desertification, which is caused by several factors, such as:

- Drought due to changes in climatic conditions, especially the decrease in rainfall and increase in mean temperature.
- Deforestation resulting from urbanization, clearing land for Israeli security purposes, tourism and olive tree carvings, firewood and charcoal production, etc.
- Damage to mountain farm terraces constructed and maintained by previous generations of villagers but neglected by current farmers.
- Uncontrolled domestic livestock grazing, especially sheep and goats, which destroy wild plant life and planted vegetation.
- Pollution of wetlands due to uncontrolled irrigation and use of water sources with high salinity.
- Casual picking of wild plants and endangered plant species and/or collecting and selling for income.
- Quarry areas and stonecutting workshops and industrial plants too close to agricultural lands, causing the agriculture to die from the dust in the air.
- Soil erosion near stone quarries as a result of transporting stones by heavy trucks.
- Construction of roads and residential areas to support the agricultural areas.
- Forest fires, set by accident or on purpose.
- Overpumping of groundwater that leads to increased soil salinity, decreasing land productivity, or total destruction of agricultural land, especially in Gaza.

The landscape's aesthetic condition is also affected by poor solid waste management due to:

- Institutional weakness in residential garbage collection.
- Increasing quantities of industrial and commercial solid waste.
- Lack of modern techniques in solid waste handling and disposal, such as recycling, reuse, sanitary landfill, etc.
- Improper garbage disposal site selection due to lack of institutional enforcement.

## C. Socioeconomic Conditions

### C1. Demography

A census of the population has not been taken in the West Bank and Gaza since 1967. Instead, population data are based on estimates and statistical models and are often inconsistent and inaccurate. For example, in 1980 and 1987, the Central Bureau of Statistics and the Ministry of the Interior (MOI) published population estimates of the West Bank showing differences of more than 40 percent as shown below:

Organization	Region	Year	Population Estimate
Central Bureau of Statistics	West Bank	1980	704,000
MOI	West Bank	1980	871,000
Central Bureau of Statistics	West Bank	1987	858,000
MOI	West Bank	1987	1,252,000

The Central Bureau of Statistics estimates represent "present population" at the end of a calendar year. Births and deaths are estimated by using parallel figures from within Israel and neighboring countries because of underreporting of actual deaths. MOI figures are based on population registration (identity card) data. MOI figures, therefore include residents who are temporarily or permanently living abroad, and their children who are registered for summer visits only. Underreporting of deaths tends to inflate the population data.

### C2. General Land Use

Land use and development depend on a number of factors, including prevailing soil characteristics, climate, population distribution and density, availability of water and other natural resources, type and level of economic activity, and regulations imposed by the Israeli authorities on Palestinians. Of the total land area of the West Bank and Gaza Strip, it is estimated that 2,300 square km (37 percent) are easily cultivable, 2,250 square km (37 percent) have a limited capacity for cultivation (but may be reclaimed), and that some of the remaining areas that are not suitable for cultivation could be developed into good grazing lands. Table III-4 shows major land use components in the year 1990. [Center for Engineering and Planning, 1994]

**Table III-4.  
Land Use Components in the West Bank and Gaza, 1990**

Land Use	Area (km)	Percentage
Cultivated Lands	1,945	31.5
Forests	30	0.5
Built-up Areas: Palestinian Communities	200	3.2
Israeli Settlements	70	1.1
Roads	10	0.2
Grazing and Desert	3,928	63.5
Total	6,183	100.0

### C3. Economy

**Overview.** For the past 25 years, lack of employment opportunities have made it necessary for Palestinians to look for work either in Israel or abroad. Since 1967, Palestinians have been a large and relatively cheap source of manual labor for Israel. In March 1993, in response to unrest caused by the Intifada, Israel closed its borders to most of the Palestinian workforce. Employment opportunities decreased drastically at that time and less than half the number of workers are currently allowed to work in Israel. Outside Israel, especially in the Arabian Gulf countries, Palestinians make up a highly educated and skilled workforce. Remittances to the West Bank from Palestinians living and working abroad have been an important stimulus to the Palestinian economy. However, since 1991, work opportunities for Palestinians decreased substantially in the Gulf because of their political support of Iraq during the Gulf War. Without the remittances from Palestinians working in Israel and the Gulf, increasing unemployment in the West Bank and Gaza, and increasing prices for land and real estate, the Palestinian economy is in a state of crisis.

In the public sector, municipalities do not have enough funds to sustain basic public services. Water services are interrupted for several days at a time. Power outages are frequent. The quality of drinking water is often below World Health Organization standards. And garbage collection services have broken down, leaving it in the streets.

With regard to public services, taxes and fees are collected by either the Israeli Civil Administration (CIVAD) or the municipalities. Whereas the municipalities are able to collect earnings from some public utilities, many revenue-generating taxes—such as fuel and vehicle—go to the CIVAD and are not reinvested in the municipality. The result is poor

quality services or total lack of public services for Palestinians. For example, road construction and maintenance is poor, and roads in the West Bank and Gaza, except those designated as "Israeli settlement security roads," are old and in disrepair. The municipality's lost revenues and its inability to borrow have been the primary reasons for this.

Both revenues and spending by the CIVAD and the municipalities are low by international standards, at about 16 percent of gross domestic product (GDP)—or a mere 12 percent of gross national product (GNP)—between 1987 and 1991, with no clear trend. On the other hand, statutory income tax rates are significantly higher in the West Bank and Gaza than in Israel.

The lack of revenue available for public services is supplemented by aid from other organizations and donors. Many organizations operating in the West Bank and Gaza provide quasi-public services. Foremost among these is the United Nations Relief and Works Agency (UNRWA), which provides basic services to approximately 40 percent of West Bank residents and 60 percent of refugees. UNRWA has spent \$100 million annually in recent years, equivalent to 4.5 percent of GDP, 85 percent to education and health.

Before Jordan broke off administrative ties to the West Bank in 1988, Jordanian aid amounted to an estimated \$50 million/year, dropping to \$15 million thereafter. Aid from other Arab governments provided an estimated \$15 million/year in 1988-1989. Other Arab nongovernment organizations (NGOs), United Nations Development Program, the European Community, and a large number of non-Arab NGOs have also provided resources and services to the West Bank and Gaza. These funds are treated as near-government capital inflows and spending.

Economic development is hindered by a number of factors: depleted land and water resources in the face of an increasing population; increased loss of land to Israeli settlements; restricted access of Palestinian sheep and goat farmers to land designated as military land or a nature reserve; and restricted access to water.

The lack of real zoning regulations and public land utilization policy has created uncertainty and has become a barrier to industrial expansion. The freeze on the building of housing on land beyond the municipal boundaries has distorted land prices. Aquaculture (fish production) is carried out by Israelis on land controlled by them along the Jordan River. However, Palestinians are not allowed to implement this activity.

The economics of the West Bank and Gaza are characterized by an unusual dependence on external sources of economic growth. In the future, policies will be central to a reorientation in the pattern of development.

## **C4. Transportation, Telecommunications, and Power Networks**

### **C4a. Transportation**

The existing transportation facilities in the West Bank and Gaza are inadequate for future economic development. In recent years, investments in transport infrastructure have been primarily designed to increase Israeli security and incorporate the Israeli settlements in the West Bank with the Israeli economic and social structure.

These policy objectives have resulted in the construction of modern and high-standard roads linking the settlements with major centers in Israel, often bypassing the Palestinian cities, towns, and villages. On the other hand, the road networks serving the majority of the Arab population have been largely neglected. As a result, two weakly connected road networks have emerged that serve two sets of distinct transport demands. Sea and air transport services are nonexistent.

### **C4b. Telecommunications**

The communication services have been affected much like the transportation sector. Postal and telephone services that link the main and secondary urban areas are extremely inadequate and deficient, particularly in the rural areas. By the year 1990 some 14,000 people were engaged in transportation and communications activities, accounting for only about 5 percent of the total labor force.

### **C4c. Power Networks**

The majority of the electric power is supplied by Israeli companies. The major Palestinian producers of electric power (including the Jerusalem District Electric Company) and several municipalities are linked up with the Israeli grid and purchase electricity from the Israeli Electric Corporation. The total amount of purchased electrical power is estimated at around 700 million kilowatt-hours/year. The Palestinian producers of electrical power were restricted in developing their power stations. While about 95 percent of the urban population enjoys continuous electrical power supply, only about 45 percent of the rural areas have continuous electric supply. The rest of the population that has access to electricity is supplied with power for only a few hours a day. In general, the demand for electricity is satisfied in urban areas, but not in rural areas. Less than 5 percent of the supply of electric power is locally produced. [Center for Engineering and Planning, 1992]

## **C5. Public Health and Safety**

At the time this report was prepared the main parties concerned with public health services in the West Bank and Gaza Strip included CIVAD, the NPA, UNRWA, private voluntary organizations (PVOs), and private for-profit providers, such as hospitals and clinics, private doctors, and private laboratories.

In the Gaza Strip and Jericho area, the public health services are the responsibility of the NPA, UNRWA, and other private parties. In the rest of the West Bank, they are the responsibility of the CIVAD, UNRWA, and private parties.

According to a World Bank report (September 1993), the public health conditions in the West Bank and Gaza Strip are similar to those typically found in lower-middle-income countries. The total fertility rate was estimated in 1987 to be 7.2 births/woman for the Gaza Strip and 6.5 for the West Bank. The population growth in the West Bank was 4.4 percent in 1992 and 5.0 percent for the Gaza Strip. [Health in Judea and Samaria and Gaza, 1992-1993, Ministry of Health, Jerusalem, May 1993] The infant mortality rate is 40 to 45 infant deaths per thousand live births. Life expectancy is 65 to 66 years. Data are not available about life expectancy of men and women separately.

Moderate and severe malnutrition is virtually unknown. Food supplies are adequate in quantity and fairly well distributed. The customary diet is rich in proteins and fiber and low in animal products, but provides too little of some micro-nutrients, particularly iron. Weaning practices are generally also sound.

The types of diseases found in the Gaza Strip are somewhat different from the West Bank. The two areas are distinct in terms of environmental conditions, economic circumstances, social situations, and social services. However, the reports that are available do not reveal major differences, except in the area of chronic adult-onset diseases.

**Gaza.** The World Bank reports high prevalence rates for cardiovascular diseases, hypertension, diabetes, and cancer—diseases usually associated with highly developed countries. Gastrointestinal and respiratory infections are reported as major problems in the Gaza Strip but not in the West Bank. High rates of respiratory, skin, and gastrointestinal infections continue to be reported by residents of refugee camps due to crowded housing and poor environmental sanitation. Communicable childhood diseases such as mumps, whooping cough, tetanus, measles, and polio have been largely controlled through a successful child immunization program.

Living conditions in the Gaza Strip are much worse than per capita incomes would lead one to expect. Nearly three quarters of the population are registered refugees, and 55 percent of these people live in refugee camps operated by UNRWA. Most of the camps have no organized sewage collection system, and none has an adequate system of sewage treatment for collected wastes. All the camps are provided with solid waste collection facilities, but none is served by a proper disposal site. The solid wastes are accumulated at surface disposal sites without further treatment.

Outside the refugee camps, about a third of the population is served by a solid waste collection system. Surface disposal sites are available rather than properly designed sanitary landfill. Wastes often leach into the aquifer, contaminating drinking water supplies.

More than half of the households in the refugee camps in the Gaza Strip are served by a piped water supply in the dwelling, and two-thirds have access to some source of piped water. More than 90 percent of the time, the water is disinfected at the source. Inadequate water supply, poor water quality, and unsanitary disposal of liquid and solid wastes nonetheless contribute to a high incidence of gastrointestinal and parasitic infections. In addition, the fluoride content of the groundwater in the area north of Gaza City is reported to be (naturally) high enough to lead to the mottling of teeth and bone diseases.

**The West Bank.** In the West Bank the natural environment is generally healthier than that of the Gaza Strip. Population densities are much lower, potable water supplies are safer and more abundant, housing is less crowded, and incomes are, on average, substantially higher. Additionally, only about 9 percent of the population lives in refugee camps, and the camps themselves are much smaller.

In the West Bank, approximately 70 percent of the households (including villages, towns, and refugee camps) are connected to a water supply system. The percentage of the West Bank population that actually has access to piped water supplies is 73.2.

In rural areas 42 percent of the communities (26 percent of the population) of the West Bank do not have access to piped water and depend on rainwater harvesting and spring water for their domestic use. Any additional water is supplied by tankers. [M. Barghouthy, 1993]

Less than 2 percent of the residential areas in the West Bank, where less than 10 percent of the population lives, have wastewater collection and disposal systems, and only 21 percent of the residential areas have solid waste collection and disposal services. [M. Barghouthy, 1993]

Hospital services are primarily operated by the government but nongovernmental hospitals also provide important services, especially in the West Bank. The number of hospital beds decreased from 2.2 per 1000 inhabitants in 1975 to 1.1 per 1,000 inhabitants in 1991, compared to 6.1 beds per 1000 inhabitants in Israel and 4.2 per 1000 in Jordan.

Cisterns are often a preferred source of drinking water, even when a piped water supply is available. People prefer the taste of cool water from the cistern to the warm, chlorinated, and sometimes salty municipal supply. Cistern water also lathers better for washing because of its lower hardness.

In 1993, SCF commissioned the Water and Soil Research Unit of the Department of Chemistry at Bethlehem University to conduct a sampling and analysis campaign for rainwater cisterns in West Bank villages. The Water and Soil Research Unit analyzed 20 samples for total coliform and fecal coliform: 10 samples from three northern West Bank villages and 10 samples from three villages in the Southern West Bank. The analysis indicated high total and fecal coliform per 100 milliliters, often "too numerous to count." Furthermore, the "differential tests" conducted by the laboratory showed a variety of coliform bacteria, including *Klebsiella pneumonia*, *Klebsiella oxytoca*, and *E. coli*. These types of bacteria are known to cause throat infections and gastrointestinal diseases. Based on these results, the Water and Soil Research Unit strongly recommended that water from these sources not be used for drinking, washing vegetables or fruits, or dishwashing unless boiled or chlorinated.

The causes or sources of water contamination in rainfed cisterns include:

- Dirty catchment area (house roof, reservoir roof, ground) due to the presence of plant debris (leaves), animal waste (pigeons, goats, sheep, etc.), and other human activities (washing clothes, drying crops).

- Removal of water from the cistern using a contaminated bucket.
- Seepage of contaminants from nearby cesspits.
- Lack of a "lip" around catchment to prevent animal waste from falling in.

Also, according to SCF, some villagers poured small amounts of diesel into the cistern to kill insects, mosquitoes, and worms and prevent them from entering the water. As a result, these people were drinking water contaminated with diesel.

Data are not available on the incidence of waterborne diseases that could be linked to the poor quality of water from rainfed cisterns, springs, or canals. Nevertheless, data strongly suggest that water not supplied publicly is often not fit for drinking without prior heating or chlorination. This appears to be true for most rainfed cisterns and for contaminated springs and canals.

#### **C6. Tourism and Recreational Areas**

Tourism and related services have traditionally constituted a major source of national income. [Center for Engineering and Planning, 1992]. Tourist sites are scattered throughout the West Bank. The most important cities are:

- **Jerusalem.** A holy city for three of the world's religions. Important sites include Al-Aqsa Mosque, the Church of the Holy Sepulchre and Via Dolorosa, and the Temple Mount.
- **Jericho.** Considered the world's oldest city, it has many historic sites.
- **Bethlehem.** The birthplace of Jesus, and one of the most important sites of Christianity.
- **Hebron.** Regarded as a holy city by Muslims, Christians, and Jews.
- **Nablus.** The first-century city of Neopolis and the site of Joseph's Tomb and Jacob's Well.
- **Gaza.** One of the five great Philistine cities. It has several important sites of archaeological and religious importance, including Sampson's Tomb.

## C7. Industrial Activities

The Palestinian industrial sector has, for more than a decade, been characterized by prolonged stagnation resulting from a combination of internal and external constraints. Although the sector's average annual contribution to the GDP increased from around \$50 million in the mid-1970s to around \$150 million in the late 1980s, its relative share of GDP has remained at an average of about 8 percent. The total number of persons employed in industry in the West Bank (excluding olive oil presses and stone quarries) remained constant at 16,000 to 17,000. The combined West Bank/Gaza Strip industrial sector constituted a mere 1.4 percent of Israel's industry. The West Bank industry is the least productive sector in the region's economy. The West Bank and Gaza industry remains underdeveloped, small-scale, and traditional.

Simcha Bahiri [Industrialization in the West Bank and Gaza Strip, WBDP, 1987] explored the constraints on industrial development of the West Bank and recorded "economic, administrative, political, and cultural" barriers that have resulted in a continuation of the backward, underdeveloped nature of industry despite a relatively rapid rise in the consumption of industrial goods. Table III-5 shows the types of industries and the production account of all industrial units.

## C8. Agricultural Activities

Historically, the agricultural sector in the West Bank and the Gaza Strip has played a major role in the economy. The current situation of this sector is not sustainable and reflects distortions in labor markets, external markets and trade arrangements, and the impact of policies and regulatory constraints.

**Table III-5**  
**Industries and Percentage of Production**  
**in the West Bank and Gaza**

Type of Industry	Percentage of Production
Textile, Clothing, Leather	30
Metal Production	24
Wood Works	20
Food, Beverage, Tobacco	9
Non-Metallic Minerals Production	12
Pharmaceuticals, Plastics, and Others	5

Source: Center for Engineering and Planning, 1992.

Based on available information (thought to be incomplete), the land area of the West Bank under cultivation covers 5.8 million dunums, and the area of the Gaza Strip is 360,000 dunums. In the West Bank, approximately 4 percent of the total land area is irrigated, with slightly more than 1.5 million dunums under cultivation. In the Gaza Strip, 165,000 dunums are under cultivation by Palestinian farmers, two-thirds of which are irrigated. Gaza and the West Bank display some differences in crop and production patterns.

The climate in the West Bank and Gaza allows production of early crops in the Gaza Strip and the Jordan Valley. Precipitation is the major source of water in the West Bank and Gaza, although it is relatively modest and highly variable. Less than 10 percent of the arable lands in the West Bank and Gaza are irrigated; field crop yields are highly susceptible to changes in precipitation and variations in weather patterns. While the area under irrigated cultivation has increased, improved technology and production techniques have reduced water usage per crop and area unit. In the West Bank, irrigated land under cultivation by Palestinians has remained constant since 1967, while the area under cultivation in the Gaza Strip has increased by 50 percent. The total water used for irrigated agriculture in 1990 was between 145 and 165 MCM, with the West Bank accounting for 80 to 95 MCM and the Gaza Strip for 65 to 70 MCM.

Until the mid-1980s, agriculture in the West Bank and Gaza lost workers, many of whom took up employment in Israel. However, an increasing number of people are seeking employment in agriculture—the traditional depository of surplus labor—due to rapid population growth, return from Gulf employment, limited employment opportunities in other sectors, stricter implementation of Israeli policies, and the effects (since 1987) of the Intifada.

Most Palestinians live in areas with modest agricultural potential like the western hilly areas, where rainfed tree planting, field crops, and livestock operations prevail. The least populated areas, the Jordan Valley and the semi-coastal region, have the most promising agricultural potential. The agroecological zones of the West Bank are outlined in Table III-6 on the following page.

About 60 different types of crops are grown in the West Bank and Gaza, including citrus fruits, vegetables, olives, field crops, grapes, almonds, plums, apricots, apples, figs, dates, strawberries, etc.

Irrigation techniques differ according to location, availability of water, and type of irrigated crop. Sprinkler irrigation and drip irrigation are used.

**Table III-6**  
**Agroecological Zones in the West Bank and Gaza**

<b>Agroecological Zone</b>	<b>Rainfall</b>	<b>Soil</b>	<b>Crops</b>
Semi-coastal	600	Alluvial and heavy terra rossa	Variable
Central Highland	High	Shallow soil depth	Grapes, olives, vegetables, grains
Eastern Slopes	Low	Steep mountains	Grazing
Jordan Valley	200	Sandy and calcareous	Semitropic Vegetables
North Coastal	Moderate	Sandy and alluvial	Citrus, strawberries
Middle Coastal	Modest	Sandy and loess	Vegetables, citrus
South Coastal	200	Sandy and loess	Vegetables

### **C9. Pesticide Use**

The excessive and uncontrolled use of pesticides is the characteristic phenomenon of the agricultural sector in the West Bank and Gaza. According to a survey conducted by the Center for Environmental and Occupational Health Sciences and the Agricultural Work Committees Union, the following preliminary results were obtained.

- The quantities of pesticides used are in excess of the required dose. In the Jordan Valley, Jenin, and Tulkarem areas, the applied quantities for vegetable cultivated lands are 4 to 6 kg/dunum, while in the Gaza Strip applied quantities are 4.5 to 7.5/dunum. A normal average would be 1 to 2 kg/dunum.
- Incorrect application methods by the farmers were reported, including improper spraying techniques, eating and smoking during spraying, and not following required safety precautions.
- Pesticide stores do not meet required specifications. Stores are close to houses; many have little or no ventilation; material from larger containers are repackaged to smaller ones without safety measures; and the small containers are sold without instruction labels. Contamination of animal feed and veterinary medicines sold in the same stores is prevalent.
- The safety period required between the application of pesticides and picking of agricultural products is ignored.

- The Hebron area consumes about 10.5 tons annually of Hexanol, Hexaconazole, and Lindane. The mixture is used as a cattle dip to remove and destroy parasites.
- Most of the instruction labels for application methods and doses are written either in Hebrew or English rather than in Arabic.

According to the Ramallah Marketing Cooperative, most of the pesticides used in the Ramallah area are manufactured and registered in Israel, and the remainder (less than 10 percent) are of European origin.

In the Gaza Strip, due to intensive agriculture, farmers use methyl bromide (a potentially carcinogenic material) as a soil sterilant or seed treatment to destroy insect larvae in grain or as a method of weed control. [A. Wihaidi, Dept. of Agriculture, GS]

Among the pesticides used in the West Bank are Roager, Resek, Adiman, Mostang, Lepacede, and Dorspan. The Israeli Ministry of Agriculture, Department of Plant Protection and Inspection's January 1993 report *Pesticides for Plant Protection—Registered for Use and Sale in Israel* has over 370 products listed by common names.

#### **D. Institutional Setting**

##### **D1. Palestinian Environmental Protection Authority**

Environmental regulations and guidelines for the NPA are slowly being developed. At present, however, agreement has not been reached on the placement of the environmental program in a ministry. Administration and enforcement of environmental regulations can only be addressed after such decisions are made.

##### **D2. Agricultural Department**

As a result of the Peace Accord Agreement signed by the Palestinian Liberation Organization (PLO) and Israel in Cairo on May 5, 1994, the Department of Agriculture's divisions in the Gaza Strip and the Jericho area are now run by the NPA.

The NPA Department of Agriculture consists of several divisions, including the Water Division, the Agricultural Extension Division, and the Veterinary Division. The Water Division has overall jurisdiction over water resources in the Gaza Strip, which are entirely underground. At the present time, it is responsible for allocating water resources to the various uses, namely drinking water and agriculture. The Water Division undertakes the water quality analyses.

In the West Bank, excluding the Jericho area, the Central Agricultural Organization is a unit of Israel's Civil Administration based in the Ramallah district. The West Bank is divided into the six districts of Hebron, Ramallah, Jordan Valley, Nablus, Jenin, and Tulkarm. Each district office has an extension unit, a veterinary service, a forestry unit, a regional experimental station, and an administrative office.

### **D3. Civil Administration**

The CIVAD is a branch of the Israeli Military Government responsible for civil affairs administration in the West Bank (except for the Jericho area). It is headed by the chairman of the CIVAD in the West Bank area.

Civil services are provided to West Bank inhabitants through about 35 departments. Each department is headed by an Israeli military officer, but services and activities are performed by Palestinian employees.

One of the important departments that belonged to the CIVAD is the Department of Environment. It was responsible for all environmental affairs within its jurisdiction, including water quality analyses, wastewater treatment plant design and performance, industrial activities control, pesticide use control, and air pollution control. The department has its head office in Ramallah and six district offices in Hebron, Bethlehem, Ramallah, Nablus, Jenin, and Tulkarm. Forty-one environmental inspectors and four engineers are employed in addition to an administrative staff. However, the department is still under Israel control and as of the writing of this report has not been transferred to the NPA. However, with the large area of responsibility and little true enforcement powers, the Department of Environment has not been very effective.

The Village Affairs Department (VAD) used to be a department of the CIVAD under the direction of the social welfare officer. Currently, the VAD is a coordinator between international NGOs, such as ANERA and CRS, and other CIVAD offices. As an intermediary organization, VAD studies the proposals submitted by NGOs, estimates the cost of the proposals, and writes recommendations on behalf of the NGOs to the inspector to approve the proposals. The inspector is responsible for ensuring that the NGO's fieldwork is carried out in rural areas before approval is issued. VAD's responsibilities are mainly in the rural areas; however, they have some responsibility over NGO projects in municipal areas. The VAD has one main office in Nablus with a director, two engineers, and one secretary. As a result of the agreement between Israel and PLO, negotiations have cleared the way for VAD to be transferred to the NPA soon.

### **D4. Applied Research Institute of Jerusalem**

Founded in 1990, the ARIJ is a nonprofit organization dedicated to promoting sustainable development in the occupied Palestinian territories and the self-sufficiency of the natural resources.

Although initially conceived to confront issues facing the agricultural community, ARIJ has since broadened its agenda to include a wide spectrum of environmental concerns. Early research priorities focused on cultivation in marginal lands, livestock production, agro-industries and marketing, and water management and utilization.

As water issues gained precedence, the Water Research and Dryland Farming Units were created to better identify research goals and implement project objectives. Recently, the Environmental Research Unit was established in the West Bank and Gaza. It assists in the formulation of strategy options, policy guidelines, and national standards and legislation.

A precursor to these objectives is the development of a comprehensive environmental database that will serve the region as a foundation for in-depth research. Additionally, ARIJ has instituted a resource center that publishes and makes available to the local community a wide range of scientific data, literature, and periodicals.

ARIJ receives technical and financial support from a variety of international governmental and nongovernmental organizations who grant funding on a project basis. ARIJ projects are currently being funded by the Ford Foundation, the Canada Fund, and the International Development Research Center.

ARIJ is concerned with environmental studies in Palestine related to the following topics:

- Water
- Environment
- Rainfed farming
- Wastewater irrigation

ARIJ has published several studies with local and international institutions, such as Harvard University, International Center for Agricultural Research in Dry Areas (ICARDA), Global Environment Facility, etc. ARIJ is now working on a water allocation system project that will develop a land use system and environmental information system. ARIJ is also working on a pesticide survey project. At this time 29 researchers are employed by ARIJ part time.



**SECTION IV**

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**ENVIRONMENTAL IMPACTS**

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## SECTION IV ENVIRONMENTAL IMPACTS

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### A. Environmental Impacts of Water Resources Development

Based on past CRS experience, water resource development projects in West Bank villages not served by piped water will have a positive impact by helping their populations:

- Meet domestic and agricultural water needs.
- Increase water consumption (e.g., take baths more often) and improve household sanitation and public health (e.g., add new flush toilets).
- Lower the cost of water supply.
- Reduce the dependency on unsanitary and costly water provided by tank cars.
- Reduce time wasted to secure water.
- Provide low-cost backup water supply when local populations cannot afford to pay the water bill (Impact Area IV southeast of Bethlehem).

An evaluation of CRS' site selection procedure indicates that there should be no significant environmental impacts for the water, potable water networks, spring development, water catchments, and reclamation resources activities proposed by CRS. That includes any activities that would require mitigation and monitoring measures on endangered flora and fauna, migratory birds, and historical sites. However, if any problem should arise at a particular site, an investigation by an appropriate and qualified authorities will be required.

### B. Mitigation Measures for Water Resource Development Projects

CRS recognizes the importance of ensuring water supply of adequate quality for both drinking and agricultural purposes. CRS has clearly documented the mitigation measures necessary to provide water supply of adequate quality.

Currently, villagers may request that the Civil Administration test their cistern water for coliform contamination. If fecal coliform counts are found to exceed 3 FC/100ml, CIVAD provides the cistern owner with chlorine tablets (high-test hypochlorite) to treat the water. In addition to being dependent on CIVAD for supplying chlorine tablets, cistern owners lack sufficient training in proper dosage techniques based on cistern size and water consumption rates. Moreover, not all cistern owners approach CIVAD to test the quality for their rainwater cistern.

In accordance with Section 216.3(a)(8) of the USAID environmental procedures, CRS' water resource development projects "should be designed to include measurement of

any change in environmental quality, positive or negative, during their implementation.” This will require recording baseline data at the start of the project. Environmental indicators of water resource development projects may include, at the household level:

- Sources of water supply: percentages of water from rainfed cisterns, springs, tanker trucks, municipal piped network.
- Total water consumption (in baseline year) and percentage breakdown (domestic, irrigation, livestock).
- Water consumption rates (per day or per year).
- Water quality (total and fecal coliform counts, total dissolved solids, nitrates, etc.).
- Incidence of waterborne diseases.
- Average cost of water supply (per cubic meter) and breakdown of cost (energy for pumps, charges paid for private tanker truck deliveries, charges for network supply, cistern maintenance costs, etc.).
- Average amount of time spent to secure water (per cubic meter).
- Sewage disposal method: cesspit, septic tank, sewer network, etc.
- Information on septage pumping and disposal (if applicable): who performs service, annual frequency and cost, disposal method.

### **C. Management and Monitoring of Water Resources Development**

- Conduct a lessons-learned workshop:
  - Participants (maximum 15 to 20) to include select beneficiaries of previous CRS water development projects.
  - Objective is to exchange ideas on success stories and past difficulties (e.g., increased sanitation problems) and ways for dealing with them.
- Provide training in the siting, design, and maintenance of cisterns (including sand filter).
- Conduct a public health education program focusing on mitigation measures to maintain water quality.

**Table IV-1  
Selected Potential Impacts and Possible Measures  
For CRS Development Projects**

Development Activity	Potential Impacts	Mitigation Measures	Monitoring Measures	Management Measures
<b>Water Resources</b>				
Piped water networks	Increased sewerage volume from increased usage	Increase sanitation disposal facilities	Monitor level of usage and disposal efforts	Design proper sanitation facilities
Spring development	Health effects due to pathogens	Control watershed use	Measure water quality	Report levels, provide hygiene education
<b>Agriculture</b>				
Increased use of pesticides and fertilizers	Health effects on human and wildlife populations	Use approved products, change to biological controls	Monitor levels of usage and measure water and soil quality	Ban use of unapproved products, train in use of substitutes
Expanded use of land for agriculture	Loss of wildlife habitats	Investigate before planning	Plan habitat areas and enhance	Ban development on land used as wildlife habitats
<b>Sanitation</b>				
Wastewater disposal	Pollutants introduced to irrigated crops and groundwater	Provide wastewater treatment and disposal facilities	Measure water quality	Report levels, provide training in reuse of treated wastewater
Solid waste disposal	Groundwater contamination, unsightly trash accumulation, especially plastics, disease carrying vectors—rats, mice, etc.	Provide sanitary landfills	Monitor operations	Provide environmental education, training in waste reduction, and recycling
<b>Construction</b>				
Civil works (such as rural roads)	Worker health and safety	Provide protective clothing and equipment	Monitor adherence to worker safety codes	Report adherence, train in worker safety



**SECTION V**

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**IMPACTS OF SANITATION DEVELOPMENT**

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## SECTION V IMPACTS OF SANITATION DEVELOPMENT

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### A. Environmental Impacts of Sanitation Development

- During the construction phase, workers may be subject to work-related accidents, such as soil collapsing during excavation works. Because they may come into direct contact with sewage, workers may be subjected to health risks and infection with communicable diseases.
- Public health is expected to improve due to reduction of odors, flies, and mosquito problems.
- Although some of the sanitation activities will tend to reduce groundwater pollution, the potential for groundwater pollution is expected to be high.
- The proposed disposition of treated wastewater by reuse in agricultural irrigation may introduce harmful pathogens into the soil.
- Improved sanitation systems may lead to increased water consumption and, as a result, increased wastewater production.
- Increased establishment of point sources for wastewater discharge may change land characteristics through increased construction and may expand the area of groundwater pollution by increasing contamination through leaching into the groundwater aquifer.
- Improper solid waste disposal site selection may lead to serious soil and groundwater pollution problems. This depends on many factors including leachate and whether leachate is transmitted through stormwaters in sewer treatment facility, etc.
- Improper operation of the wastewater disposal systems may subject workers to communicable diseases.

### B. Mitigation Measures for Sanitation Development

- During construction phase, workers should use protective clothing. Attempts will also be made to reduce the incidence of accidents at the site.
- Groundwater protection measures should be applied, including lining of structures and landfill areas (clay, plastic, etc.).
- Wastewater reuse in irrigation should be applied after sufficient retention time in the septic tank-SDT (subsurface draining technique) system.

- Protection measures should be applied during operation of wastewater and solid waste disposal systems.

**C. Management and Monitoring of Sanitation Development**

- The health of construction workers should be monitored before, during, and after the construction work.
- The soil and groundwater quality at the irrigation sites and solid waste disposal sites should be monitored regularly to check the buildup of biological or chemical contaminants.
- Septic tank-SDT systems should be restricted to areas with sufficient land areas to minimize change of land characteristics.
- Owners and workers should be trained to operate the disposal systems safely.
- The wastewater effluent quality from septic tank-SDT system should be monitored regularly.
- The water conservation program should be applied to minimize wastewater production.

**SECTION VI**

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**IMPACTS OF AGRICULTURAL DEVELOPMENT**

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## SECTION VI IMPACTS OF AGRICULTURAL DEVELOPMENT

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### A. Environmental Impacts of Agricultural Development

Agricultural development activities by CRS, through its sectorial and block grants, are directly linked to its efforts in water development for agricultural purposes. These activities are land development, crop diversification, construction of earthen access roads for agricultural purposes, and fencing of cultivated areas for selected impact areas (villages).

Potential partners for agricultural development are the Union of Agricultural Workers Committees, the Palestinian Agricultural Relief Committee, the Palestinian Farmers Union, and the Palestinian Hydrology Group.

Water sources will vary with each kind of site, i.e., wells, springs, collection ponds, etc. As indicated in Section II, D3.—“Agricultural Development,” further and existing agricultural development is keyed to water resources balancing, water conservation, and the use of treated wastewater.

As pointed out in Section III, C8.—“Agricultural Activities,” in addition to the lack of water, agricultural activities have been discontinued on some land due to restrictions imposed on the use of land as well as poor economic opportunities. However, with the use of improved irrigation technology, the area irrigated per cubic meter of water has increased.

Agriculture has always been an important factor in employment, but its future importance will depend on resolving the above-mentioned issues and constraints, in addition to the overall economics of agricultural activities.

### Pesticide and Fertilizer Uses

CRS does not promote the use of chemical fertilizers and pesticides and, in fact, discourages their usage by advocating the use of natural and biological pest controls (i.e., integrated pest management techniques) and the use of natural fertilizers. However, there may be a secondary effect in its agricultural development activities that will result in higher pesticide and chemical fertilizer usage (see Section III, C9.—“Pesticide Use”).

CRS and its partners must be aware of USAID's policies, practices, and recommendations related to pesticide uses [reference USAID Handbook 3, Appendix 2 D, Environmental Procedures, Part 216.3 (b) Pesticide Procedures], as well as local agricultural extension recommendations, as to type, usage rates, application methods, etc., which include the ultimate safe disposal of used pesticide and fertilizer containers. Furthermore, the USAID regulation allows only USEPA- or WHO-approved pesticides.

**B. Mitigation Measures for Agricultural Development****Mitigation measures for land reclamation**

- Recognize and control excessive soil erosion.
- Identify and take necessary actions related to potential seismic activities and seasonal flooding.
- Avoid misuse and mismanagement of pesticides and fertilizers.
- Secure all permits and licenses in advance.
- Review the “environmental check list” to ensure that no unknown environmental impacts will result from reclamation and development.
- Provide environmental awareness in preproject and postproject activities.

**Crop diversification**

- Avoid misuse and mismanagement of pesticides and fertilizers.
- Provide adequate agricultural extension to allow and maintain crop diversification.
- Confirm processing and marketing costs in addition to actual production costs.

**Construction of earthen access roads for agricultural purposes**

- Recognize and control excessive soil erosion and seasonal flooding.
- Provide operations and maintenance guidelines and program.
- Secure all permits and licenses in advance.

**Fencing of cultivated areas**

- Evaluate type of fencing related to need and purpose(s).
- Allow adequate access for both vehicles and humans.
- Provide for adequate operations and maintenance.

**C. Management and Monitoring of Agricultural Development****Land reclamation**

- Make baseline study and report including preproject and postproject evaluations and continued monitoring and reporting.

- Investigate alternative plans, actions, and programs to include cost and acceptability.
- Periodically (with USAID's semiannual report period as a limit [6 months]) monitor changes from original baseline study/report taking corrective action if results are not positive or beneficial in nature.
- Look for both positive and negative indicators.
- Hold monthly management meetings that are open to all so that discussions of ongoing and proposed activities, programs, and projects can take place.
- Provide environmental awareness in preproject and postproject activities.
- Coordinate with national, regional and local authorities.
- Share information and "lessons learned" with others (PVOs, NGOs, etc.).



**SECTION VII**

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**IMPACTS OF AWARENESS CAMPAIGNS**

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## SECTION VII IMPACTS OF AWARENESS CAMPAIGNS

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### A. Environmental Impacts of Environmental Awareness Campaigns

The proposed project will provide block grants to some institutions to conduct environmental awareness campaigns. These campaigns are environmentally friendly activities and require no mitigation measures. Their effects on the environment are positive, as outlined below:

- Improve solid waste collection and disposal. This will prevent odor problems and breeding of rats and other vermin that can transfer disease and endanger the public health. Proper disposal of solid waste can also prevent leachate production and hence prevent pollution of groundwater.
- Improve sewage collection and disposal with reuse options. This can prevent infiltration of sewage into the ground and hence prevent pollution of scarce groundwater aquifers. In addition it will prevent the breeding of disease-carrying mosquitoes and other insects that can endanger the public health.
- Enhance water conservation and efficient use of water supply resources.
- Ensure mitigation measures to protect and implement sustainable projects.
- Prevent soil erosion and use rain harvesting as a new source of water supply.
- Protect fauna and flora.
- Improve the standard of living and hence improve the women's role in relation to their environment.

### B. Mitigation Measures for Environmental Awareness Campaigns

The environmental awareness campaigns are still relatively new to the West Bank and Gaza Strip. Recently interest in protecting the environment has increased and some grassroots organizations, PVOs, schools, and NGOs have been established to protect and increase awareness of the environment. In addition the Water Resources Action Program is taking the lead and has initiated a national awareness campaign in coordination with all Palestinian NGOs, grassroots organizations, women's societies, UNRWA, UNDP, local universities, and others interested and active in the fields of water and sanitation programs. In the past, many PVOs and NGOs did not give enough attention to the environmental awareness campaigns and hence mitigation measures involved prioritizing the importance of such campaigns and coordinating with other institutions active in this field. Another mitigation measure would be the incorporation of water and sanitation projects.

**C. Management and Monitoring of Environmental Awareness Campaigns**

- Establish local, regional, and national environmental groups to care and enhance environmental activities.
- Establish national environmental guidelines and enforce their implementation in the various development projects.
- Enhance and support environmental health education through coordination with the educational ministry.
- Encourage the environmental assessment of each project proposal from the early stages as a prerequisite for funding.
- Provide environmental training for the PVOs and other institutions involved with rural development.

**SECTION VIII**

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**IMPACTS OF WOMEN'S ACTIVITIES**

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## SECTION VIII IMPACTS OF WOMEN'S ACTIVITIES

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### A. Environmental Impacts of Women's Activities

The women's training activities planned by CRS in basic literacy, job-related skills, political participation, and management are environmentally friendly activities. By increasing their education, literacy, and awareness, women are more likely to understand the issues related to the environment, health, and sanitation. By encouraging women's active participation in the community, they can take a more active role in teaching other members of the community to respect the environment. Training of women should be conducted by women out of respect for the generally conservative values of the rural villages.

Discussions on negative environmental impacts in women's activities are premature at this stage but potential impacts can be discussed based on past experience. For example, in agricultural income-generating projects for women, attention should be given to the use of pesticides. PARC is aware of the potential health risks associated with pesticide use and should ensure that women are informed on how to use them correctly. Past experience has also shown that the chemical methyl bromide women use to clean the beehives can be harmful to their health. Other negative health impacts can result from raising animals inside the home, which is common in the rural areas. And finally, the plastic greenhouses for which women are responsible could pose a potential disposal problem. Animals' health could be at risk by eating the plastic. The economic benefits to women are significant and women's social status is improved as a result of their ability to earn income. Nevertheless, measures need to be taken to ensure that women are informed about health and sanitation issues related to their water and agricultural projects.

### B. Mitigation Measures for Women's Activities

As noted earlier, women's education and training in environmental and health issues are important because they have a primary role in educating their children and the community at large. Mitigation measures should, therefore, be to incorporate environmental issues in women's training programs. In agricultural income-generating projects, for example, women should be taught to use internationally approved pesticides and chemicals in agricultural production and bee keeping. Surveys should be conducted by the counterpart organizations on a regular basis to monitor the use of pesticides. If pesticide use is identified as a problem, educational campaigns on potential health risks should be planned in the community.

### C. Management and Monitoring for Women's Activities

Despite these potential negative impacts resulting from agricultural activities, the socioeconomic benefits to women are important. Women's social status is improved as a result of their ability to earn an income in agricultural production. The negative impacts can easily be mitigated and should not be a reason to prevent CRS from pursuing agricultural

income-generating projects for women. Training for these projects should, however, highlight the potential problems that can result from agricultural activities.

**SECTION IX**

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**CONCLUSIONS AND RECOMMENDATIONS**

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**SECTION IX**  
**CONCLUSIONS AND RECOMMENDATIONS**

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**A. Summary of Findings**

The findings of this PEA indicate that the proposed CRS activities pose no significant negative environmental impacts except for those activities related to new water resources development and the potential use of pesticides. For the latter activities, we have made basic recommendations for water development and use of pesticides that should be followed to avoid or mitigate negative environmental impacts. Therefore, we recommend the following CRS activities.

**B. Recommendations for CRS Activities**

**B1. Water Resources Development for Drinking and Agriculture Purposes**

**B1a. No Water Development Planned**

Even if no water resources development activities are planned, to protect the severely strained supplies in Gaza, CRS should confirm in writing to USAID that it will fund no activities that increase the withdrawal of existing sources either through the rehabilitation or new construction of wells.

**B1b. Rehabilitation of Existing Water Sources**

If an existing water resource facility is being expanded, such as spring development or well rehabilitation, the PVO should submit to USAID an advance engineering and environmental study that confirms that there is to be no further depletion of water as a resource in that area, with a water balance study performed before the project activity is allowed to proceed. USAID will investigate and confirm these reports and give additional guidance if necessary so that funding can be approved on a case-by-case basis.

**B1c. New Water Source Development**

If a new water resource is proposed for development, the PVO must submit to USAID an advance independent engineering and environmental study in addition to the requirements given in B1b. above. USAID will investigate and confirm the data and reports, including "no action" alternatives on a case-by-case basis. However, at this time with no Palestinian national and regional environmental authorities in place, no further depletion of water resources is recommended. Exceptions may be made on a case-by-case basis in certain localized areas within the West Bank, but no exceptions should be made for the Gaza Strip area because of its present critical and potentially highly devastating negative environmental impact. In this case the "no action" alternative is preferred.

**B1d. Monitoring**

Set up baseline data collection for preproject and postproject analysis and evaluation at the local household level per Section IV, B.

**B2. Rainwater Cistern Development**

Unless water in rain cisterns is regularly tested and monitored to meet drinking water quality standards, it must not be used for drinking and cooking. The following mitigations measures for rainfed cisterns should be used when and where applicable.

- Build household sand filtration tanks
- Build a settling tank at the entrance to the cistern so that solids are deposited before entering the cistern
- Clean up the rainwater catchment area (house roof, reservoir roof, ground) at least once a year (before the rainy season)
- Direct the first rainfall away from the cistern
- Either use an electric or hand pump to remove water from the cisterns or ensure that the bucket used to remove water is free of contaminants
- Locate the cistern far enough from water contamination sources, such as cesspits and animal sheds
- Minimize human and animal activity near and around the cistern
- Protect the cistern at all times with a clean cover
- Test the water periodically and, if the water is found to contain fecal coliform, boil or chlorinate it before using it for drinking.

**B3. Collection Ponds for Agriculture Use**

No adverse impacts are foreseen under normal development practices.

**B4. Spring Maintenance**

No adverse impacts are foreseen under normal development practices.

**B5. Rehabilitation of Existing Wells in Gaza**

Per Section II, D1d.—“Rehabilitation of Wells in Gaza,” “CRS should not fund development activities, such as increasing the depth of an existing well or drilling a new well.” USAID and CRS should have this defined in a written agreement.

**B6. Sanitation**

With increased water supply, and therefore increased consumption, the impact on increased effluent must be mitigated as indicated in Section IV, B. of this report.

**B7. Small-scale Sewage Collection and Treatment**

- Septic tank coupled with subsurface drainage (SDT)
- Offset pour-flush latrine

No adverse impacts are foreseen under normal development practices.

**B8. Garbage Collection and Disposal (Solid Waste)**

No adverse impacts are foreseen under normal development practices.

**B9. Land Reclamation (Development) and Crop Diversification Involving the Use of Pesticides**

No CRS activities funded by USAID will involve the purchase or distribution of pesticides. CRS activities will be limited to educational outreach efforts aimed at improving and decreasing the use of pesticides. Should CRS advise farmers to switch pesticides, only USEPA pre-approved or registered materials will be recommended. Methods of application and safety procedures will follow USEPA guidelines. CRS will submit in advance to USAID a list of any proposed pesticides to be recommended, as well as the proposed rates of application and safety procedures. USAID will confirm that the materials are on the approved USEPA list and give any additional guidance as necessary.

**B10. Construction of Earth Access Roads for Agricultural Purposes**

No adverse impacts are foreseen under normal development practices.

**B11. Fencing of Cultivated Areas**

No adverse impacts are foreseen under normal development practices.

**B12. Environmental Awareness Campaigns**

No adverse impacts are foreseen under normal development practices.

**B13. Women's Activities**

No adverse impacts are foreseen under normal development practices.

**B14. Threatened Flora and Fauna**

No adverse impacts are foreseen, but any future indication of threatened species will require further study.

**B15. Archaeological and Cultural Sites**

No adverse impacts are foreseen under normal development practices. Should a new site be discovered during the course of project activities, the appropriate authorities should be contacted immediately, and a separate EA would be required.

An evaluation of CRS' site selection procedures indicates there should be no significant environmental impacts on the water, potable water networks, spring development, water catchments, and reclamation resources activities proposed by CRS. This includes any activities that would require mitigation and monitoring measures on endangered flora and fauna, migratory birds, and historical sites. However, if any problem arises at a particular site, an investigation by a qualified authority will be required.

**C. General Guideline Recommendations**

Although we have determined that "no adverse impacts are foreseen under normal development practices for certain planned CRS activities," we have given general guideline recommendations in the text of the report that should be followed when and where applicable.

The approach used by the PRIDE team in carrying out the EAs and PEAs under this assignment was designed to be flexible and, therefore, adaptable to local conditions. The approach was found to be well suited to evaluating the wide-ranging activities proposed by the NGOs involved. It is recommended that the approach be replicated for future environmental assessments.

USAID plans to provide training workshops on USAID environmental procedures. The structure, content, and target audiences for these workshops should be carefully considered and highly focused, and the workshops should be conducted at the earliest possible time consistent with the planning and arrangements necessary to accomplish this. In addition, USAID should consider allowing PRIDE to proceed to the next logical step, which is to further develop field-level guidelines on assessing levels of environmental impacts related to commonly funded activities, especially those being undertaken by NGOs and others requesting funding from USAID. These field-level guidelines would also help identify those

activities in which additional technical and special expertise and assistance would be needed to make an accurate environmental assessment.

**D. Unforeseen Significant Adverse Impacts**

CRS and its partners must be aware that due to the programmatic aspects of a PEA, there may be unforeseen significant adverse impacts that are site specific. Therefore, each new site must be investigated according to USAID's Environmental Procedures 22 CFR 216.6 (see Section IV of this report) and if any adverse and/or negative impacts are suspected in any impact category, further investigation is required by a qualified specialist in that field. If the investigations at a specific site confirm the need for changes in recommendations, this PEA report should be amended to reflect the new investigations and findings.



ANNEX A

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**DATA TABLES**

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**ANNEX A  
DATA TABLES**

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Table 1

The table below shows the distribution of the Palestinian population by subdistrict:

**WEST BANK POPULATION BY SUBDISTRICT 1987**  
(Total West Bank)

<b>Town</b>	<b>WBDP 1987</b>	<b>Population 1987</b>
<b>Jenin</b>	15.2%	162,000
<b>Nablus</b>	17.8	190,000
<b>Tulkarem</b>	15.6	167,000
<b>Ramallah</b>	17.7	189,000
<b>Jericho</b>	2.0	21,000
<b>Bethlehem</b>	10.7	114,000
<b>Hebron</b>	21.0	224,000
<b>Total West Bank</b>	100.0%	1,067,000

Table 2

The following table shows the total workers in industry in the West Bank:

**TOTAL WORKERS IN INDUSTRY BY SUBDISTRICT 1987**

District	Percentage
Jenin	3.67
Nablus	28.73
Tulkarem	19.25
Ramallah	15.70
Bethlehem	20.79
Hebron	11.68

Source: Meron Benvenisti & Shlomo Khayat, 1988.

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CRS WORKSHOP

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**ANNEX B  
CRS WORKSHOP**

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**Define the Word "Environment":**

- Everything surrounding
- Natural ecosystems: water, air, soil
- Physical surrounding
- Earth's surroundings and human beings
- Factors affecting man, direct and indirect
- Everything affecting us, affected by us
- Natural balance for survival of humans
- System of nature/resources
- Nature affecting anything—life on earth in the long term—now and in the future
- Effect ---> result
- Space
- Biosphere

**Impacts:**

- Public health
- Physical environment
- Socioeconomic
- Institutional
- Biological environment

**Measures:**

- Mitigation
- Monitoring
- Management

**Village Profile:**

- Population 1,000-5,000
- No water network

**Agriculture:**

- Land available but not used
- Natural springs

- Effective local partnership
- Women's participation attitudes and readiness
- Proximity to settlements environment impacts
- Need for agricultural roads
- Soil erosion

#### **Farkha:**

- North of West Bank, 30 km southwest of Nablus, 850 m above sea level
- Population 1,000 persons, 7.8 persons/household (HH)
- 122 houses
- 5,500 dunums total area; 750 dunums can be reclaimed; 1,500 dunums are unused
- No running water
- No village council
- Local committee (represents all families)
- Rainwater cisterns + tank water: 60 m<sup>3</sup> /HH/yr, \$3/m<sup>3</sup>
- Current water consumption: 40 l/p/d
- 2 main springs @ 1.5 m<sup>3</sup> /hr; 2 km
- Fetch water on donkeys
- 2 km dirt roads; 1 km asphalted roads (8 m wide)
- 1 phone line
- No clinic
- No water quality tests
- 1 coeducational elementary school: 54% boys and 46% girls
- 3 classrooms/2 classes per room
- High dropout rate for girls
- Rainfed crops: olives (100 tons/yr), almonds, figs, barley, and wheat
- Dairy products
- 11% of graduate students female (1 woman out of 13 are graduate students)
- 85% of women work at home and/or in field
- Women participate actively with CRS
- 2 solid waste dumps
- Cesspits, one per house, 8-20 m from cisterns
- 20% of houses empty cesspits twice a year; on average it is done once every 8 years
- Top soil is clay; limestone underneath topsoil
- Debris from construction in the old part of the city
- Income levels probably low
- 80 persons work in Israel
- 20 families supported by Social Affairs
- Electricity, but weak
- Families used to receive average remittances of 100 JD per month before Gulf War (750 members of villagers live abroad); now they receive 50 JD per month



## IRD Project

- Average budget per village: \$350,000

### Activities Include:

- Water network, Mekorot
- Land reclamation and development
- Agricultural roads
- Spring rehabilitation and development
- New rainwater cisterns for agriculture
- Awareness and training programs for women:
  - Women's rights (education)
  - "Right age for marriage"

Water per/yr HH/yr	
- 60 m <sup>3</sup>	tanks
- 70 m <sup>3</sup>	cisterns
- 30 m <sup>3</sup>	springs

### Environmental Impacts of Water-related Activities

- Economic: reduce the cost of water supply: from \$3 -- 0.8/m<sup>3</sup> for water from tanks, \$1.25 (spring), and \$0.15 (pump cisterns)
- Time saved by women in fetching water, giving them more time to work at home and/or be with children
- Safe water for drinking
- Reduced rheumatism cases for women? and reduced number of miscarriages (4-5/yr)
- Improved hygienic conditions
- Potential for increase in sanitation problems
- Empowerment of women to participate in village development
- Land reclamation --> more work for women in agriculture
- Increase agricultural production
- Diversified rainfed crops
- Irrigation if spring development

### Environmental Impacts

- Collaborative effort of several institutions
- Production and marketing facilitated through agricultural roads
- Soil conservation
- Reduced illiteracy among women
- Exchange between villages and NGOs
- Reduced agricultural production costs
- Increased local capacities for village committees to plan and manage
- Need to coordinate IRD activities
- Increased risk from septage disposal
- Decreased soil erosion

### **Mitigations**

- Village Committee—continued discussion and management of projects
- Technical training on village level
- Tariff for maintaining water network
- National authority—will work with them
- Training village committee in management and bookkeeping to ensure payment for water
- People ready to pay—past experience shows this e.g., Sinjil project, people paying past 2 years and with high income, people must be able to pay
- Need to pump water from cesspits, to avoid polluting groundwater
- Scientific research needed