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AGENCY FOR INTERNATIONAL DEVELOPMENT
Washington, D.C. 20523

MOROCCO PROJECT PAPER

Water Resources Sustainability
PROJECT NUMBER: 608-0222

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AGENCY FOR INTERNATIONAL DEVELOPMENT

PROJECT DATA SHEET

1. TRANSACTION CODE

A A = Add
C = Change
D = Delete

Amendment Number

DOCUMENT CODE

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COUNTRY/ENTITY

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3. PROJECT NUMBER

608-0222

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USAID/Morocco

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Water Resources Sustainability

6. PROJECT ASSISTANCE COMPLETION DATE (PACD)

MM DD YY
018 219 012

7. ESTIMATED DATE OF OBLIGATION

(Under "B." below, enter 1, 2, 3, or 4)

A. Initial FY 95

B. Quarter 4

C. Final FY 010

8. COSTS (\$000 OR EQUIVALENT \$) =

A. FUNDING SOURCE	FIRST FY 95			LIFE OF PROJECT		
	B. FX	C. L/C	D. Total	E. FX	F. L/C	G. Total
AD Appropriated Total DA	1,200	100	1,300	11,400	600	12,000
(Grant)	(1,200)	(100)	(1,300)	(11,400)	(600)	(12,000)
(Loan)	()	()	()	()	()	()
Other 1.						
U.S. 2.						
Host Country					4,000	4,000
Other Donors)						
TOTALS	1,200	100	1,300	11,400	4,600	16,000

9. SCHEDULE OF AID FUNDING (\$000)

A. APPROPRIATION	B. PRIMARY PURPOSE CODE	C. PRIMARY TECH CODE 1. Grant 2. Loan	D. OBLIGATIONS TO DATE		E. AMOUNT APPROVED THIS ACTION		F. LIFE OF PROJECT	
			L. Grant	2. Loan	1. Grant	2. Loan	1. Grant	2. Loan
(1)	N/A							
(2)								
(3)								
(4)								
TOTALS								

10. SECONDARY TECHNICAL CODES (maximum 6 codes of 3 positions each)

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Improve water management and address pollution problems by identifying and implementing demonstration projects which focus on the policy/regulatory and institutional framework, technology, and community participation.

14. SCHEDULED EVALUATIONS

Interim MM YY MM YY Final MM YY
011 919 011 012

15. SOURCE/ORIGIN OF GOODS AND SERVICES

000 941 Local Other (Specify)

16. AMENDMENTS/NATURE OF CHANGE PROPOSED (This is page 1 of a _____ page PP Amendment.)

USAID/Morocco approves proposed methods of implementation and financing.

Keith Romwall
Keith Romwall, Controller

17. APPROVED BY

Signature

Michael Farbman

Title

Mission Director

Date Signed

MM DD YY
018 310 915

18. DATE DOCUMENT RECEIVED IN AID/W. OR FOR AID/W DOCUMENTS, DATE OF DISTRIBUTION

MM DD YY
| | | | |

B

 USAIDUNITED STATES AGENCY FOR INTERNATIONAL DEVELOPMENT
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PROJECT AUTHORIZATION

Name of Country: Morocco

Name of Project/Activity: Water Resources Sustainability

Number of Project/Activity: 608-0222

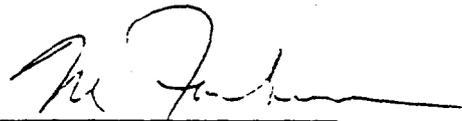
1. Pursuant to Section 117 of the Foreign Assistance Act of 1961, as amended, I hereby authorize the Water Resources Sustainability Activity ("the Project") for Morocco ("the Cooperating Country") involving planned obligations of not to exceed Twelve Million United States Dollars (\$12,000,000) in grant funds over an eight-year period from the date of authorization, subject to the availability of funds in accordance with the USAID/Operating Year Budget (OYB) process, to help in financing the foreign exchange and local currency costs of the Project. The planned life of the Project is eight years from the date of initial obligation.

2. The Project consists of assistance to improve Morocco's management of water resources and address pollution problems by identifying and implementing demonstration projects which focus on the policy/regulatory and institutional framework of water resource management, the technologies involved, and community participation in the management of water resources.

3. The Project Agreement, which may be negotiated and executed by the Officer to whom such authority is delegated in accordance with USAID regulations and delegations of authority, shall be subject to the following essential terms and conditions, together with such other terms and conditions as USAID may deem appropriate:

Source and Origin of Commodities, Nationality of Services

Commodities financed by USAID under the Project shall have their source and origin in the Cooperating Country or in the United States, except as USAID may otherwise agree in writing. Except for ocean shipping, the suppliers of commodities or services shall have the Cooperating Country or the United States as their places of nationality, except as USAID may otherwise agree in writing. Ocean shipping financed by USAID under the Project shall, except as USAID may otherwise agree in writing, be financed only on flag vessels of the United States.



Michael Farbman
Director, USAID/Morocco

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GLOSSARY

CPS	Country Program Strategy
CY	Calendar Year
EDM	Energy Demand Management Project
ENR	USAID/Morocco Office of Environment and Natural Resources
EP3	Environment Pollution Prevention Project (regional)
FY	U.S. Fiscal Year (Oct 1 - Sept 30)
GDP	Gross Domestic Product
GOM	Government of Morocco
GtZ	German Development Agency
HG	Housing Guarantee Program
IBRD	International Bank for Reconstruction and Development
IEE	Initial Environmental Examination
MOE	Ministry of Environment
NGO	Non-Governmental Organization (see PVO)
OFM	USAID/Morocco Office of Financial Management
PRIDE	Project in Development and the Environment (regional)
PVO	Private Voluntary Organization
RP	Results Package (Project Paper)
RRA	Rural Rapid Appraisal
SO	Strategic Objective
TA	Technical Assistance
TDY	Temporary duty - Short-term USDH support
TRM	Tadla Resources Management Project
USDH	U.S. Direct Hire (USAID staff)
USE	Undersecretary of State for Environment
UNDP	United Nations Development Programme
WRS	Water Resources Sustainability Results Package

I. SUMMARY

Both water availability and quality in Morocco have reached an alarming state. Water availability per capita has steadily declined and within the next twenty-five years (at current rates) will be reduced by 50%. All renewable water resources will be fully utilized. Water quality has been declining rapidly, due to uncontrolled water pollution.

The Government of Morocco (GOM) has clearly identified water as the focus of its strategy to protect the environment, as laid out in the action plan of the National Council of Environment, to be coordinated by the Ministry of Environment (MOE).

The MOE was recently created, and although it understands its mandate to coordinate national environmental activities, monitor the situation, and develop necessary policy and regulatory frameworks, help is needed on many fronts. There is no policy/regulatory framework in place; appropriate technology for water resource management has not been identified or tested; MOE staff, farmers, and other water users have not had the proper training in water management and resource preservation.

The Water Resources Sustainability (WRS) Results Package (also called the Project Paper) proposes to assist Morocco in the improvement of water management and address pollution and erosion problems by identifying and implementing demonstration/pilot projects which focus on the policy/regulatory and institutional framework, technology and community participation. WRS will build on the work and lessons learned from many earlier USAID projects relating to agricultural, industrial, and urban water use, as well as energy demand management. The Activity (also called the Project or WRS) will use technical assistance, training and pilot activities to: strengthen the national capacity to manage policies, regulations and activities relating to water; foster communication and participation on water-related matters between government, private sector and communities; and introduce replicable, viable technologies to address local water quality and quantity and soil erosion problems. Building on the successful work of several earlier USAID initiatives, an institutional contractor will carry out a program that will: a) strengthen environmental institutions and increase the efficacy of water-related policies and regulations; b) increase public and governmental awareness and capability of dealing with water resource needs; c) demonstrate and replicate appropriate technologies for managing water quantity and quality; and d) involve local government, the GOM, private sector, private voluntary organizations, associations, and communities in the identification, testing and sustaining of concrete solutions to water resource problems in a collaborative environment.

Through the two components "Water Resources Management Systems" and "Demonstration/Pilot Activities", the contractor will help (1) the MOE attain a position of credibility and trust as the key coordinator on water resource concerns; (2) the MOE develop an integrated comprehensive approach to water management; (3) the GOM develop a policy/regulatory framework for controlling and monitoring water resource uses; and (4) Moroccan development of at least three demonstration/pilot activities resulting in sustainable, replicable water resource management. Over a period of seven years, using an estimated \$16 million, resources will be used in roughly the following proportions.

<u>Activity</u>	<u>Resources</u>
1. Water Resources Management Systems	\$5,338,000
2. Demonstration/Pilot Activities	5,661,000
3. Evaluations	160,000
4. Contingency	<u>837,000</u>
USAID Total	11,996,000
5. GOM Counterpart Resources	4,000,000
Total Project Costs (rounded)	\$16,000,000

II. BACKGROUND

Over the past eight years, USAID/Morocco has attacked problems concerning water (waste water management, industrial and agricultural pollution, soil conservation, etc...) in many ways, working in several sectors and with different ministries. In addition to completing a number of environmental investigations, studies, and analyses, the Mission has undertaken three projects which are environmental in nature. These projects seek to resolve different problems -- one attacks unwise energy consumption and pollution prevention at the enterprise level, another works to rationalize water use and prevent agricultural pollution in a major irrigation system, and the third responds to various environmental needs of other ongoing projects. In addition, our Housing Guarantee (HG) program deals with a number of urban environmental issues including sewage and potable water systems. At the time of their design, however, the Mission's projects had other purposes, but environmental concerns were secondary and they were not justified on environmental grounds. They were not intended to be particularly complementary, had little program and budgetary flexibility, and were unrelated to higher level environmental objectives.

III. STRATEGY

A. Statement of Problem/Opportunity

Morocco's economic and social development is jeopardized by a wide range of environmental issues which threaten broad-based economic growth, human health and the integrity of critical ecosystems. Indeed, the basis of existence for a majority of the country's poor people is inextricably intertwined with Morocco's environment.

Major cities have high levels of mobile source air pollution, unmanaged sewerage fouls the air and water, and a notable lack of safe and reliable solid waste disposal leads to the unhealthy and unsightly presence of garbage on vacant lots. Industries pollute the air and discharge dangerous effluent into water sources with impunity. In the countryside, mismanagement of range and forest lands leads to severe erosion and desertification, over-application of agricultural chemicals pollute ground water and rivers, and soil salinization is becoming a serious problem in irrigated perimeters and along the coastal belt. These problems are exacerbated by a decided lack of public awareness of environmental problems, and sustainable solutions are less likely to be found without active public participation.

Add to this Morocco's reliance on rainfall for industrial, domestic, and agricultural water use. As a mainly arid country (average

rainfall is less than 300 mm or 12 inches a year!), water resources are limited. The variability in rainfall in the recent past, with several drought years, has had very severe results. Declining water levels in reservoirs and in aquifers threaten drinking water supplies and pollution levels have literally killed stretches of

Box 1: Why was water chosen as the focal point of this Results Package?

This Results Package focusses on solving water problems for three reasons: 1) the urgent need to improve water resources management in Morocco; 2) the applicability of the information and experience gained under this project to other environmental problems; and 3) the contribution of the water focus to meeting Mission strategic objectives.

Urgent need to improve water management. Credible estimates of water availability and quality in Morocco reveal alarming trends. A continuation of current practices is expected to result in a decrease in water available per capita from 833 cubic meters in 1990 to 411 cubic meters in 2020. By 2020, virtually all renewable water resources will be fully utilized, and groundwater mining will be significant. As a result, economic activity could be significantly curtailed by the year 2020, and Morocco will be defined as a "chronically water-stressed" country. Irrigation is currently allocated approximately 85 percent of the available water supply, but this is expected to drop to 77 percent by the year 2020, as industrial and urban demand continues to rise. If current irrigation expansion plans are implemented, this implies a reduction of over 3000 cubic meters per hectare, and will clearly have a significant impact on the already stressed rural economy.

Contributing to this problem is severe soil erosion in many parts of the country. The siltation of dams has diminished storage capacity by approximately 8 percent. The siltation rate is expected to continue at a rate of one percent per year; this results not only in storage losses, but in decreased conveyance capacity in primary and secondary irrigation canals, which is estimated to approach 25 percent.

Deterioration of water quality poses an equally significant threat. In the most important basin (the Sebou) polluted to the point where potable water delivery has had to be suspended on a number of occasions due to pollution loads. Chrome-laden discharges from tanneries contribute significantly to water pollution in the Sebou basin. The other major basin (the Oum er Rbia) is equally stressed. In rural areas, only about 14 percent of the population has access to a safe and reliable drinking water supply.

Water shortages are also expected to interfere with the GOM's efforts to reduce its fiscal deficit. By the year 2000, government investment in water resources mobilization and distribution is expected to comprise 2 percent of the GDP. This represents a doubling of the current government contribution to this sector.

Clearly, now is the time to address the impending water crisis. The March 1995 analysis of options for USAID investments in the environmental sector ("Environmental Options Assessment for Morocco", PRIDE Project) concluded that the water problem should be among USAID/Morocco's highest investment priorities. USAID has the comparative advantage to provide effective assistance in this area.

Applicability to other environmental problems. Because water is a factor in many environmental problems, activities involving water can be designed to have relevance to other environmental sectors. This Results Package utilizes demonstration projects in water reuse, pollution prevention, and soil erosion control to develop improved mechanisms for technology selection, policy development, and public participation, as well as to generate the data and field experience needed to apply these technologies and policy development approaches on a larger scale. The knowledge and experience gained, particularly on the technology selection/policy development/public participation process side, is readily applicable to other environmental issues in which economics and environmental protection are both important. Thus by addressing water issues, the MOE will be strengthened in its capacity to address the range of environmental problems under its jurisdiction.

Contribution to meeting Mission Strategic Objectives. USAID/Morocco has one Strategic Objective and three Program Outcomes related to the environment. The Strategic Objective is "improved water resources management in the agriculture, urban, and industrial sectors." The Program Outcomes are 1) improved policy, regulatory, and institutional framework; 2) improved environmental technologies; and 3) broadened public participation for environmental action. The approach to addressing water issues envisioned by this Results Package design takes an integrated approach to simultaneously producing these three Program Outcomes, as discussed in detail in Box 2.

important rivers. The World Bank predicts that Morocco will become a water deficit country by the year 2020 unless drastic remedial

action is taken. Key statistics on the water problem are presented in Box 1 above.

To assist the Mission to prioritize and rationalize its approach to the environment sector, an "Environmental Options Assessment" was conducted in early 1995 (the summary is provided in Annex D). The purpose of the study was to provide the Mission and the Government of Morocco (GOM) with an updated analysis of national environmental problems, a prioritization of these problems according to their economic, health and ecosystem effects, and several alternative courses of action to address these problems. The detailed information obtained through the Options Assessment provided the Mission with the data necessary to develop a high-impact, prudent environmental strategy. The result was the articulation of an Environmental Strategic Objective, and related Program Outcomes and performance indicators to measure progress.

The theme of water -- the lack of prudent water management and the negative effects of water pollution -- runs throughout the Options Assessment and was incorporated into the Country Program Strategy. Water thus provides the common and unifying theme for all activities under the WRS RP. USAID-funded activities that assist the public and private sectors to more effectively manage Morocco's limited water resources are timely and will: support gross domestic product growth and help minimize pollution; help the GOM strengthen its ability to deal with water problems; increase local groups' awareness of these problems and participation in their solution; and will have a high and positive impact.

B. Goal and Purpose

The Project goal is to improve Morocco's water resource management in the agricultural, urban, and industrial sectors. The overall purpose of the Water Resources Sustainability Results Package is to: **improve water management and address pollution problems by identifying and implementing demonstration projects which focus on the policy/regulatory and institutional framework, technology, and community participation.**

Achievement of the objectives of the project will result in an overall improvement in the way Morocco -- both the public and private sectors -- deals with problems of water quantity and quality.

Specifically, working with its main partner, the Ministry of Environment, the WRS will use technical assistance to: strengthen the capacity of the Ministry of Environment to coordinate and manage issues/activities surrounding water; foster better communication and coordination between the Ministry and other Ministries and with local governments and the private sector; implement demonstration activities that introduce new and improved environmental technologies and identify policy and regulatory issues to be addressed; help identify and strengthen Non-Governmental Organizations (NGOs) working in environment; and, provide training for the public and private sectors.

A major objective of the WRS will be to leverage GOM and donor support. Already the GOM has used lessons learned from USAID's Tadmra Resource Management Activity in implementing its \$275 million World Bank loan-financed "PAGI II" Project for the entire irrigation sector in Morocco. In partnership with the MOE, the WRS will

introduce new technologies and ways of doing business that will result in water savings and improvements in water quality. The three demonstration activities (discussed in the Plan of Action and in the Technical Analysis, Annex A) tentatively have been identified, in part, because the GOM is currently considering major investments in these subsectors. The Plan of Action contains a number of elements (e.g., participation of all concerned actors in demonstration activities, wide dissemination of demonstration project results) which maximize the probability that resources will be leveraged into larger projects in other areas of Morocco. The project will also assist the MOE to determine optimal specific uses of World Bank and other donor funds.

C. Relationship to Strategic Objective

The WRS will become the centerpiece of the Mission's Environmental Strategic Objective, which was approved by USAID/W as part of USAID/Morocco's CPS in April, 1995. As such, the results expected from implementation will be crucial to the realization of related Program Outcomes and many of the performance indicators will be measured through this activity.

The Environmental Strategic Objective is, "to improve water management in the agricultural, urban, and industrial sectors." Through implementation of the WRS, watershed management and water use for agriculture will be improved -- thus, conserving water at the source, and reducing the severe erosion which leads to silting up of water storage and conveyance facilities, and interferes with marine fisheries in some areas. Work will be undertaken to improve, on a demonstration basis, wastewater treatment and reuse systems in selected areas. Industrial pollution issues and the effect of effluents on rivers and the ocean will also be addressed.

There are three Program Outcomes under this Strategic Objective. The first, "improving the policy, regulatory, and institutional framework," involves strengthening of the partnership between USAID and the Ministry of Environment. From both an environmental and an economic perspective, Morocco needs to develop enforceable regulations involving water use and industrial effluent pollution. Concurrent with the development of regulations and an overall policy using "state-of-the-art" technical assistance, will be the strengthening of the ability of the Ministry of Environment itself to conceive of the required policy framework and regulations, in collaboration with the wide range of parties which can influence their successful implementation (e.g. private sector, local governments and communities, water users, NGOs), and to be able to implement and enforce them. This objective will require close collaboration between USAID, the contractor, and the MOE. USAID will provide targeted training and help develop methods of enforcement.

The second Program Outcome is "improving environmental technologies." Through the WRS, new, mainly low-cost pollution prevention, alternative sewage treatment and reuse techniques, and other water management related technologies will be introduced on a pilot basis. Successful demonstrations could lead to a significant transfer of U.S. technology and related equipment.

The third Program Outcome, "increasing public participation in environmental action," will involve developing partnerships with local governments, the private sector, NGOs and other community-

based groups. The objective of these partnerships will be to develop increased awareness about what individuals and communities can do to save water and to assure its quality, and to take part in collaborative problem-solving to choose appropriate demonstration technologies and to develop regulatory frameworks.

The WRS contains performance indicators which are general for all activities conducted under this RP. In addition, all activities under the WRS will be examined in light of the broader indicators in the Mission's Country Program Strategy benchmarks. These indicators include the following.

- reductions in the amount of harmful residues in water
- increased water conveyance efficiency
- reduction in the rate of erosion
- national capacity increased to assess and respond to environmental issues
- policies and regulations adopted for water quality norms and standards, water pricing, fuelwood use for industrial and commercial enterprises
- industrial and domestic effluent norms and standards
- broadened market for environmental services
- increased recycling of chrome in tanneries
- increased promotion, dissemination and adoption of state-of-the-art, cost effective environmental technology (especially from the US)
- strengthened local environmental NGOs and other community groups
- environmental training and education programs established

D. Broad Institutional Setting

The institutional setting for the implementation of environmental activities in Morocco is new. The MOE is newly created; NGOs are just starting to emerge; local governments are just beginning to learn how to utilize recently mandated decentralization of power; other donors are beginning to design new programs; and, in some cases, the private sector is supporting environmental action. The implementation of this Results Package will involve working with partners from many overlapping general institutions -- all of them newly committed to making the environment their principal focus. These organizations/participants include the GOM, local government, NGOs and other community-based groups, other donors, the private sector, and the contractor.

1. GOM

USAID has worked closely with GOM counterparts in environmentally-related activities over the past several years. The collaboration has been project-related, and projects have not been tied to a higher order environmental strategic objective. In urban affairs, the Mission has collaborated closely with the Ministry of Housing and other semi-autonomous housing agencies. Environmental activities have included creation of an environmental unit in the city of Tetouan, the incorporation of Initial Environmental Examinations (IEEs) into the GOM's housing development schemes, the provision of clean neighborhoods, trash collection, electric lights, and the laying of pipe that moves sewage out of neighborhoods (up until now, sewage has been dumped directly into nearby rivers or the sea).

BOX 2: What is the relationship among the three Results Package objectives and how does the design further these objectives?

The philosophy underlying this Results Package design is that sustainable environmental policy change in a democratic society must be grounded in at least three things: 1) field experience with improved technologies; 2) collaboration among parties with diverse interests who can affect the implementation of new environmental policies, and 3) strong, capable environmental protection institutions. The WRS Results Package design uses water supply and water quality demonstration projects as vehicles to generate the field experience and data, to develop and test means for collaboration among diverse interests (participation), and to strengthen the capability of the Ministry of Environment to effect sustainable policy change.

Field experience with new, improved environmental protection technologies is critical, because governments (national or local), as well as potential financiers (public and private), must have solid data and information on which to base decisions that impact environmental quality and economics. There is little locally-relevant data and information in Morocco for many promising environmental protection technologies. Thus, the GOM and other potential financiers are (appropriately) hesitant to support many technologies on a broad scale. This Results Package will undertake significant demonstration efforts in three promising technology areas related to water (treatment and reuse, pollution prevention in tanneries, and soil erosion). The data, experience, and information developed will stimulate further investments in these technologies by the GOM and others.

Collaboration among parties having diverse interests in developing environmental policy is also essential. Too often, improved environmental policies are not implemented because they fail to consider and address the problem from all important angles, and because they lack the support of parties which have sufficient power to frustrate their implementation. This is particularly true in developing countries, where economic interests hold most of the cards, and environmental and community interests have very little power. Many representatives of economic interests, however, clearly understand the importance of protecting the environment, both from a long-term economic standpoint, and from a health/quality of life standpoint. The best bet for protecting both economic interests (obviously critical in Morocco) and environmental interests is to engage representatives of these interests in collaborative problem-solving. In this way, the policy-maker (i.e., the MOE) can access the experience, expertise, and perspective of all parties (business and industry, professional and trade associations, farmers, communities, local government, NGOs), and fashion policies which best meet their interests (thus increasing the chances that the policies will be successfully implemented and adhered to). This Results Package will develop and test such collaborative tools for policy change, by using these tools extensively in each demonstration project. Thus each demonstration will both develop and test the technological tools, and the collaboration tools, needed to effect sustainable policy change.

Strong institutions capable of developing and enforcing effective environmental policies are also necessary if policy change is to be sustainable. The Moroccan MOE is a new institution, formed in early 1995, as discussed in detail in this RP text. As such, it needs significant assistance to enhance its effectiveness. This is particularly true given the fact that several other Ministries (of agriculture, public works, industry and mines and energy), have their own environmental cells, which see themselves as the appropriate focal point of sectoral environmental matters. Presently, there is not an environmental law which consolidates and clarifies the MOE role in environmental protection. The MOE will probably be most influential and effective by playing a role of information

While working with various technical Ministries on a wide spectrum of environmental problems, the Mission also forged a relationship with the GOM's fledgling environmental agency, formed in 1992 as the Undersecretariat of State for Environment, located in the Ministry of Interior. This relationship has led to close cooperation and development of some draft environmental policies and regulations. It has also fostered frequent discussions of potential USAID involvement in the environment sector. In February, 1995, the Ministry of Environment (MOE) was created for coordination and oversight of environmental issues and programs.

Continuing discussions with the new Ministry (virtually all professional and other senior staff were transferred directly to the new Ministry from the Undersecretariat) have further cemented this relationship. The Ministry has fully participated in the articulation of USAID strategy and the Environmental Strategic Objective. The signalling of the water issue as the most pressing overall environmental problem facing the country was the natural

conclusion of the Ministerial discussions and is consistent with the priority given to this sector in Morocco's Environmental Strategy. USAID will continue to work closely with the Ministry of Environment as it implements the WRS RP, and the Ministry is committed to participating fully.

In 1995, the Ministry of the Environment released its "National Strategy for the Protection of the Environment and Sustainable Development." To deal with the underlying proposition that environmental menaces will slow down or even arrest Morocco's recently promising economic growth, it proposes a strategy whose advantages are more than twice its costs, and which permits an annual increase in GDP of about 4% per year through 2020, if followed.

Water is the focus of the strategy -- in particular, preserving and ameliorating the state of the resource. It also deals with air pollution, industrial and municipal wastes, soil degradation, and coastal and urban environmental mismanagement, and sets "quality" objectives along with projected costs and benefits. It delegates the role of coordinating the national environmental strategy, through a program of action, to the Ministry of the Environment within the context of the National Council of the Environment.

The MOE clearly understands its mandate: to coordinate environmental activities in the country, to monitor the environmental situation, to develop the necessary environmental policy and regulatory frameworks, and to provide direct guidance relative to priority areas for both external and internal investment. The MOE is trying to ensure that it is the central clearinghouse for overall environmental policy and for environmental information. USAID will work, within the context of the WRS, to assist the MOE achieve its objectives by:

- strengthening its capability to facilitate the development of effective environmental policies, including involvement in policy development of parties who can affect the successful implementation of these policies, such as local governments, the private sector, water users, NGOs and community-based groups;
- helping it to clearly define and articulate its role as the overseer and coordinator of nationwide policy, programs, and regulations concerning the environment; and
- training its staff in environmental program planning, budgeting, monitoring and evaluation, both in Morocco and in the United States.

WRS will have to be the "property" of the Ministry of the Environment, other Ministries and other groups involved in RP demonstration projects. The main, formal vehicle for environmental collaboration and coordination is presently through a yearly National Council of the Environment session and monthly steering committee meetings. This modality for including other relevant ministries in a collaborative working relationship with the MOE will be evaluated during the first year of the WRS and improvements or alternative arrangements made, if called for.

2. Local Government, NGOs, and Communities

The centrally-funded Project in Development and the Environment (PRIDE) recently completed an extensive review of the legal

framework for local government roles in environmental management (*Regulatory Integration of Environmental Control Strategies in Two Pilot Cities in Morocco*, April 1995). In summary, Moroccan laws and other legal instruments speak clearly with respect to some local powers, and somewhat ambivalently with respect to others. Local governments clearly have the authority to create an Environmental Impact Assessment system to evaluate new industries for their environmental effects. The law is ambivalent, however, on broader environmental matters. Local governments have the general authority to act in matters of public health, but the authority to require specific actions is unclear. For example, they could have the authority to administer an effluent charge system, with the joint approval of the Minister of Interior and the Minister of Finance. Facilitating cooperation is an appropriate role for the Ministry of the Environment.

In any case, local government should play a key part in the implementation of environmental activities involving water, because of water's crucial role in the local economy. Since local governments are responsible for many public services and are physically close to where the water is being used, they are well placed to participate in and administer water management activities. They are also the first governmental point of access for water users having need for government assistance or intervention. It is critical that local governments have significant involvement in the demonstration projects under this Results Package.

Under the Energy Demand Management/Clean Technology (EDM) Project, the Mission has worked with many enterprises which sought help in lowering the amounts of pollution they cause in their manufacturing processes. Using these industries as a base, the WRS will network with private sector entities with the objective of assuring their input into policy and regulatory decisions and appropriate technology choices that are made regarding water quantity and quality throughout the period of the RP, including the demonstration projects. The cement industry and tannery associations established and nurtured under the EDM project are excellent vehicles for this purpose.

NGOs are beginning to emerge as forces of change in Morocco. They are, however, not yet developed to the extent that they are in many other countries. Enlisting and encouraging development of NGOs as partners who can identify local problems and opportunities and implement programs are crucial to the success of this activity. Although USAID has worked with NGOs in urban activities and has also had preliminary discussion with environmental NGOs, more work needs to be done on both the identification of viable NGOs, and on involving them in helping to address environmental problems. At this time, few, if any, environmental NGOs are developed to a sufficient level to respond with action to water-related (or any other) environmental problems. The WRS contractor will be required to seek out NGOs with potential and work with them on establishing and following through on local activities related to WRS demonstration projects.

Professional associations and specialized community groups are increasing in number and strength in Morocco. They too will be involved in WRS demonstration projects, where they are (or can be) a force in successful implementation of the technology and related environmental policies.

3. Other Donors

USAID has kept in close contact with other donors in Morocco to enhance our understanding of what is happening in the environmental sector of the country. The Mission also significantly contributed to the World Bank's pre-feasibility study of the environment which led to the creation of the Undersecretariat of State for the Environment in 1992.

The World Bank has recently initiated an environmental management project with the GOM (approximately \$6 million in loan funds, with a total project cost of \$10.8 million). The Bank-funded components of the project consist of the following:

- Strengthening of technical and administrative capacity (\$1.87M);
- Restructuring National Council of the Environment (\$0.25M);
- Enhancing of the legal and regulatory framework, including training (\$0.97M)
- Designing of an enforcement/compliance system (\$0.97M);
- Promotion of an environmental education and awareness program (\$0.9M); and
- Establishment of a National Environmental Information Network (\$2.17M).

The Mission has worked closely with United Nations Development Programme in the articulation of the GOM's strategy, and has provided technical assistance to review the environmental situation in Rabat and Safi as part of a regional studies series. UNDP has been instrumental in setting up the MOE's "observatory", which is charged with monitoring Morocco's environmental situation.

The Mission has had, and continues to have, frequent contacts with the German GtZ (the other major bilateral donor), which is primarily involved in the testing and promotion of renewable and alternative energy, and in setting up the MOE's analytical laboratory.

Until now, other donors have not been fully engaged in working on water quality and quantity problems -- USAID will fill this gap in external assistance with the WRS activity. At the same time, with the WRS, USAID will become the largest grantee donor in the environment in Morocco. This means that USAID's ability to leverage and influence policy will be significant relative to other donors. Through its work within the Ministry of the Environment, the WRS will systematically keep abreast of other donor activities and will use every opportunity to leverage assistance and to assure that there is no overlap of activities. Other donors may be invited, on an ad hoc basis, to participate in formal discussions and committee deliberations related to the WRS activities.

4. Conclusion

The congruence of the new political commitment to the environment (manifested by the creation of a new Ministry of the Environment), private sector interest in pollution prevention, growing involvement and strength of local governments and community groups/NGOs, and the widely recognized urgency of the water crisis (evidenced by the special address on this subject by King Hassan II of Morocco on May 16, 1995) creates favorable conditions for USAID/Morocco investment in the environment sector. These conditions, coupled with the extremely positive working relationship USAID/Morocco presently has

with the new MOE, will facilitate successful implementation of the WRS Results Package.

IV. PLAN OF ACTION

The Water Resources Sustainability Results Package is a seven-year, \$16 million (USG \$12 million, GOM \$4 million) effort in support of USAID/Morocco's environmental Strategic Objective. In order to achieve the Strategic Objective, and the intermediate Program Outcomes, USAID will contract for services to (a) strengthen environmental institutions in the country and increase the efficacy of water-related rules, policies, and regulations, as well as promote "strategic" thinking in the water sector, (b) demonstrate efficacy of new technologies and new techniques of managing water quantity and quality, (c) involve local governments, the private sector, NGOs, professional associations, and community groups in solving environmental problems collaboratively with the MOE, and (d) train GOM staff and private sector personnel on environmental issues, especially water-related problems.

The Results Package is comprised of two components: "Water Resources Management Systems" and "Demonstration/Pilot Activities". Both components will be implemented through a single contract, competitively procured. A minimum of ten percent of total contract costs will be made available to Gray Amendment firms, organizations, and/or universities.

The description, results, deliverables, and performance monitoring for each Results Package component are presented below, followed by a sustainability assessment. Specific results, deliverables, and performance indicators will be developed for each demonstration/pilot activity. Institutional development and training will be provided under both components.

Examples of criteria that will be used to select specific demonstration projects include the following; cost-effectiveness, replicability/relevance to Moroccan environmental problems, client participation, leverage of other resources, and health and economic implications.

A. Component One: Water Resources Management Systems

1. Description

Currently, Morocco has over 300 environmental laws on the books. These laws are rarely, if ever, enforced or even followed. This is because they were written in the early 1900's and are not relevant to modern day environmental problems. This is especially true with regard to water. There are no enforceable regulations or national policies on water use and management. Therefore, water use is not controlled in any way. In addition, water prices are subsidized; there is no incentive to save the resource and manage it well.

WRS will feature constant dialogues with the MOE and the Steering Committee, particularly in the policy and regulatory domain, as well as in comprehensive water strategy development. As a result of issues surfacing in the demonstration projects, policy/regulatory priorities will be identified and work on them will begin. The dialogue will promote:

- mutual understanding of the specific work to be undertaken;
- ownership of results on the part of all the stakeholders; and
- new, more effective ways of bringing new regulations up to Parliament or vetting them with other Ministries.

The expanded dialogue with the MOE also will result in the mutual determination of ways in which the Ministry can become stronger in its identification and prioritization of water-related problems throughout the country, which will make the MOE more efficient in its role as national coordinator of environmental activities. Such strengthening may involve management workshops, seminars, training of professional staff, field visits, and formalization of periodic meetings between the MOE and other ministries. See Annex D for further discussion of the policy framework.

An important aspect of this strengthening is training for professional staff of the Ministry. This training will include identification and management of water-related programs, environmental assessment and analysis, environmental audits, concentrating on water pollution aspects of industrial processes, environmental policy, etc. Training will be given in the United States and in Morocco. U.S. training will: (1) introduce MOE staff to the newest, state-of-the-art techniques in water management; (2) introduce the U.S.' way of doing business; and (3) increase the potential for the engagement of U.S. environmental businesses in Morocco -- both environmental services and equipment. General environmental training and public awareness, not specific to WRS, can be provided through the Training for Development Project.

Project activities relating to water resources management, as well as ad hoc technical assistance for priority concerns identified by the MOE and Steering Committee, are expected to continue throughout the life of the project. Their performance will be coordinated by the contractor. The contractor will (1) assist the MOE in formulation of policy norms and standards for water resource management and other priority environmental areas, (2) help coordinate all project related environmental activities with concerned GOM offices, local governments, donor community, and the private sector, (3) determine the priority (and ability) of providing assistance for ad hoc requests, (4) coordinate training efforts and public awareness activities related to the project, and (5) report to USAID and the Steering Committee on progress to date and planned activities.

2. Results

Result A: The Ministry of Environment attains a position of credibility and trust through effective facilitation of efforts of businesses, communities, government, and other interests to promote both jobs and environmental protection.

Result B: The Ministry of Environment is better able to think strategically about the water sector and to promote an integrated, comprehensive approach to water management which includes both supply and demand management.

Additional results, similar to the above, will be identified as specific demonstration projects are planned.

3. Deliverables

The Deliverables for Water Resources Management Systems are as follows:

- A framework and associated procedures for collaborative selection of technology and development of environmental regulations, standards, norms, etc., which ensue from the demonstration efforts under this Activity;
- A "lessons learned" report on development of the framework, including each demonstration effort as a case study, with a complete discussion of the various approaches to collaboration tried, what worked and what did not, and why, in sufficient detail to allow a competent party to engage in similar efforts starting from substantially higher on the "learning curve" than did this project;
- MOE and other appropriate GOM staff trained and experienced in policy development through collaborative technology selection/formulation of regulations, standards, norms, etc; and
- Training materials for collaborative technology selection/development of regulations, standards, norms, etc., appropriate to audiences from local, regional, and national governmental regulatory bodies or cells, and to audiences from the regulated community and other interested parties who are likely to participate in the future in collaborative development of regulations, in Arabic and in French.

4. Performance Monitoring

Performance monitoring is crucial to the determination of whether sufficient progress is being made to warrant continuation and to measure success. Because of their complexity and structure, the performance monitoring tables for this component and Component Two have been grouped in Annex B. See Annex B for full details.

B. Component Two: Demonstration/Pilot Activities

1. Description

The demonstration/pilot component is a key vehicle through which policy development, technology selection and application, and public participation are accomplished. The three demonstration projects tentatively identified at this stage for feasibility studies are: (1) water treatment and reuse in small to medium-sized communities in the Agadir area; (2) pollution prevention in tanneries in Fes; and (3) soil erosion control in the Oued Laou watershed. For additional details, see Annex D. These and any additional demonstration projects may be conducted if requested, if initial studies and activities are successful and if funds are available.

The project activities concerning water resource management will be conducted in a series of discrete stages, each with their own performance indicators and crucial decision points. Success of one or more of these pilot activities will lead to replicability and selection of other pilot activities, as financial resources become available.

Given that the United States is one of the leading producers of improved environmental technology and that a steady stream of new methods of mitigating environmental problems is being developed, the U.S. will be the primary source of new equipment and management techniques under the WRS RP. This could potentially mean the development of a reasonably sized market for U.S. equipment and services in Morocco in the years to come.

USAID will work closely with the MOE, local governments and community groups in determining appropriate pilot equipment and technology applications. The purpose is to leverage future GOM budgetary support, private sector investment, and donor funding by demonstrating the effectiveness and cost savings of these new techniques and equipment in solving water management problems.

During meetings early in 1995, the GOM National Council of the Environment identified water resources management as the Nation's top environmental requirement and the need for models for saving water and improving quality as key means in attacking water resources problems. In March 1995, the MOE and other GOM ministries determined that three pilot activities directed at water savings and water quality merited feasibility studies to determine if full demonstration activities should be conducted. This decision followed site visits to Agadir (water reuse), Chefchaoun (soil erosion) and Fes (tannery pollution). The preliminary decision was based the following criteria (which are slightly different from those laid out later in this section for the Project).

- All three demonstrations respond directly to water savings and water quality.
- All address problems which threaten the economy, ecosystems, and human health.
- All respond to major environmental concerns ; chrome pollution, water loss, and soil erosion.
- All use technology transfer, not new research requirements.
- All provide for technology (appropriate) selection, policy development, and public/private participation.

USAID's main approach to dealing with industrial pollution is from the pollution prevention perspective. The viability of "clean technology/pollution prevention" has already been proven in several developing countries. For example, USAID's Environmental Pollution Prevention Project (EP3) has worked at four manufacturing plants in Tunisia and in Chile to identify pollution prevention opportunities for leather tanning companies.

Wastewater treatment and reuse is increasingly a feature of water management in developing countries. For example, most of the wastewater produced by the city of Amman, Jordan, is treated in low-cost, low-maintenance aeration lagoons, and used in the Jordan Valley for irrigation. A USAID project is working to upgrade the quality of that wastewater, to allow for use on a wider variety of crops, with less dilution by fresh water needed. An experimental project in Agadir, Morocco, uses advanced biological treatment to render municipal wastewater suitable for irrigation.

USAID already has successful experience working with local government partners, particularly in its urban housing and environmental infrastructure activities. The Mission also has worked with the municipalities of Safi and Rabat on regulatory and policy issues. In addition, the Tadla Resources Management Project (TRM) has worked with water users associations. WRS presents a great opportunity to enlarge this partnership with stakeholders through the implementation of pilot projects to demonstrate new technologies or new techniques for improving water quality or availability. Such a pilot activity will also be an opportunity for the WRS to fully involve women in activity implementation. In rural areas, it is the women who work with domestic water and there is unnecessary waste and unnecessary use of unclean water in day to day

life. Simple training can save water, and can decrease water-borne diseases significantly. See Annex D for further details.

Little is presently being done to ameliorate severe soil erosion. This issue must be addressed in any comprehensive water management strategy for Morocco. As discussed in Box 1, soil erosion is a major contributor to water scarcity in Morocco, with storage capacity already reduced by approximately 8 percent, and an estimated one percent per year further reduction anticipated. Morocco has one of the highest soil erosion rates in the world, with estimates as high as 3500 tons/km²/year.

Water erosion of soil is a function of climate, soil, slope, and farming practices. Because Morocco has a warm, dry climate, its soils are low in organic matter, and thus are fragile, and do not absorb water quickly. Because of the moisture constraint, farmers plant crops at wide distances and keep fields free of weeds. The result is rapid surface runoff and serious soil erosion on slopes. This not only causes siltation of water storage and conveyance facilities, it also leads to significant quantities of water being discharged to the sea, rather than percolating into the groundwater. The ocean discharge is laden with soil, impacting coastal fisheries, particularly in the Oued Laou coastal area.

The soil erosion control demonstration, if seen as feasible after thorough analysis, will be implemented by the contractor. All reporting requirements and performance monitoring requirements applied to water-related technology demonstrations will also be applied to soil erosion control. Three agricultural institutions in Morocco (the Ecole Nationale d'Agriculture de Meknes, the Institute National de la Recherche Agronomique, and the Department of Education, Training, and Extension) are capable of providing the close field oversight and support necessary for successful implementation of this activity.

Technical and managerial training will be offered by mutual agreement to MOE staff, representatives of other ministries, and the private sector both in the United States and in Morocco. This training will focus on the identification of environmental problems, how to manage them, and how to design mitigating activities. Training undertaken should expressly signal U.S. advantage -- from our advanced environmental legal perspective, our state-of-the-art management techniques, water pricing policy and world-leading pollution prevention approaches. The MOE has expressed interest in requiring some kind of environmental impact analysis before any infrastructure or other investment is approved. WRS can potentially be of great help in providing U.S. expertise for training in the administration of Environmental Impact Assessments and related environmental assessments. This may also be financed through the Training for Development (TFD) Project.

As part of its training endeavors, the contractor will carry out public awareness activities which can include publication of activity results, public seminars, open discussions, newspaper articles, etc.

All demonstration/pilot activities will follow a three-stage process; (1) pilot feasibility study, (2) demonstration/pilot activity, and (3) replication. The decision on whether to proceed to the next stage is made on the basis of success/progress criteria selected for each activity. Feasibility studies assess engineering

requirements and all economic/social/health/political/environmental dimensions of a technology application, in accordance with principles of integrated water resources management.

The selection criteria for a demonstration/pilot activity will follow those used in the preliminary decisions on the tentatively identified activities. The following list modifies and synthesizes those criteria in broad terms.

1. Demonstrations respond directly to problems in water savings and water quality which threaten the economy, ecosystems, and human health.
2. Demonstrations use known, appropriate technology and are not experimental in nature.
3. Demonstrations can be conducted within a three year time frame and sufficient resources are available for completion.
4. Demonstrations are supported by and conducted with the active participation of the GOM, local communities and groups, and private sector/industry.
5. Demonstrations are sustainable after completion and replicable in other parts of Morocco.

The pilot feasibility studies for each of the demonstration activities already identified by the GOM and local organizations will be done consecutively during the first year of contractor operations (roughly 6/96 - 5/97). Feasibility teams consisting of GOM counterparts, community participants and contractor staff will perform analyses of various technologies/systems over a period of approximately two months each and the contractor and MOE will present plans of action for conducting pilot/demonstration projects to USAID.

USAID will review the proposal(s) to ensure compliance with U.S. government regulations (firm cost estimates, adequate planning, and other relevant FAA Section 611 requirements). The feasibility studies will then be presented to the Steering Committee for consideration. If approved, the Steering Committee will request formal approval and resource allocation by the implementing organizations, which will include USAID and MOE and possibly various ministries, local communities and organizations and perhaps even other donors. With the formal approval of the demonstration activity, the contractor and other participants will begin to implement the pilot activity.

Other than three tentatively identified demonstration activities, additional ones can be considered, depending upon the availability of funds and other resources. Ideas/concepts should be developed and presented by the contractor and the MOE. If these fit within the Mission's environmental strategic objective (as reviewed by the Mission's Environmental Strategic Objective team), the contractor may prepare appropriate feasibility studies/analyses. Then, the process as indicated above can be followed.

If a decision is made that the proposal is acceptable, then the representatives of the group that did the feasibility study will be required to develop a work plan for the demonstration pilot activity and begin implementing it. If modifications in the proposal are needed, then USAID and the Steering Committee will ask the contractor to determine if adjustments are possible and to coordinate with the feasibility study team in presenting a revised

proposal. If the feasibility study is rejected, then other feasibility study areas will be sought through the contractor and the Steering Committee.

With an approved demonstration/pilot proposal in hand, the proposal design representatives (coordinated by the contractor) will implement the demonstration. The workplan for the demonstration will include discrete, measurable progress benchmarks necessary for all involved parties to monitor implementation and to ensure provision of needed support in a timely fashion. Quarterly progress reports will be provided through the contractor to USAID and the Steering Committee for each demonstration activity. Once the pilot activity is completed and a final report is submitted (which will include a plan for replication elsewhere in Morocco), USAID and the Steering Committee will decide what efforts will be made by other partners (particular ministries, communities, local organizations, and the contractor) to disseminate findings, provide training, replicate the pilot activity in other regions and the interested parties will be asked to move forward accordingly. If the pilot activity is not successful, i.e., not worthy of replication, these findings will be disseminated as well to the interested partners.

By conducting demonstrations in these three stages, USAID and the Steering Committee have the option of deciding at three different points whether to proceed further. Decisions will be made for each individual initiative, based on the criteria established for each activity.

Efforts to replicate demonstration activities under WRS will largely consist of the provision of information on successful demonstrations, limited technical assistance in an advisory capacity, and possibly some training. Major financial support for replication efforts will not be available through WRS.

2. Results

The results to be achieved under the identified pilot activities are listed as follows.

Result A: A framework for collaborative development of regulations, standards, guidelines, and technology selection pertaining to water is developed. The framework is applicable in other environmental policy contexts in which competing interests (such as environmental protection and economics) are important factors.

Result B: At least three demonstration efforts integrating water-related technology, regulatory concerns, and public participation are conducted, and the demonstration efforts lead to application of the technology and the decision-making framework in other locations by the GOM, other donors, multilateral lending institutions, or the private sector.

Sub-Result B1: A sustainable, low-cost, low-maintenance appropriate technology for water reuse is selected, installed, and tested under the collaborative framework described in Result A; the knowledge and experience gained is readily applicable in similar situations in Morocco, and the GOM and/or other financiers provide resources for broader application.

Sub-Result B2: Sustainable "clean technology" and associated implementation requirements (e.g. regulations, guidelines, private sector participation, etc.) are selected, installed, tested, and refined for broad application in the tannery sector, under the collaborative framework described in Result 1; the knowledge and

experience gained (both process and substance) is readily applicable to similar situations in Morocco.

Sub-Result B3: The soil erosion control result of this demonstration project is stated as follows: A sustainable, farmer-participatory soil erosion control demonstration project is implemented; the knowledge and experience gained is readily applicable (and is applied) in similar situations in Morocco.

3. Deliverables

The deliverables for the Demonstration/Pilot Activities are as follows:

- Set of site-specific regulations, standards, norms, etc., ensuing from the demonstration efforts, and an analysis of if and how they are applicable locally, regionally, and nationally;
- Sustainable water resource management and preservation demonstration facilities, which are replicable on a nationwide or regional scale;
- All necessary manuals, procedures, guidelines, etc., to keep the demonstration activities operating successfully without further USAID assistance, including agreed-upon mechanisms for determining who is entitled to the water, and at what price; who is responsible for ensuring the operation of the facility; emergency response actions as appropriate; water quality testing protocols to ensure safety; and other such matters affecting sustainability;
- "Lessons learned" reports on development of the demonstration activities, addressing both process issues (how parties were brought to consensus on all matters affecting the facility) and substance issues (the technical, economic, social, environmental considerations), in sufficient detail to allow competent parties to engage in similar efforts starting from substantially higher on the "learning curve" than did the pilot activities, and including an in-depth presentation of how this demonstration effort contributed to the framework discussed earlier;
- All environmental analysis documentation required under USAID regulations, for the demonstration efforts under this Project, as well as social, technical, and economic analyses for the specific demonstration projects developed collaboratively under this Activity, with the analyses done in accordance with the appropriate USAID regulations and guidelines; and
- A strategy and report for communicating the results of this Results Package to relevant parties, particularly to donors and potential financiers, who can further the objective of this Results Package by replicating the technologies and policy development processes developed.

Additional deliverables similar to these will be required should further demonstration efforts be undertaken. Specific deliverables for each selected demonstration activity to be conducted will be required. These will be customized for each pilot activity.

4. Performance Monitoring

Achievement of these results and performance indicators is predicated upon key assumptions holding true and, for many of these assumptions, this is largely outside of the control of the contractor. In evaluating performance, USAID will consider the degree to which failure to achieve results or to meet performance

indicators is due to contractor performance, or to those critical assumptions outside of the control of the contractor not holding true.

The performance indicators, frequency of and responsibility for monitoring, and critical assumptions for the pilot and demonstration activities are listed in detail in Annex B.

C. Sustainability Assessment

The following discussion provides perspectives on and supporting information for the design of this Results Package.

1. Key Assumptions

A key assumption in the implementation of the WRS is that the Ministry of Environment will continue to grow in strength and take a leadership role in the sector. When the MOE was part of the Ministry of Interior it had a strong power base, but the association had some negative institutional aspects as well. Now that the MOE is independent, it must develop its own "standing" among other ministries that have environmental cells and environmental programs. The recent session of the National Council of the Environment in Rabat, opened by address of the King, emphasized and solidified the MOE's role as the principal coordinator of Morocco's environmental programs. Although the MOE will not implement most of these programs itself, it must be able to fit these programs into a coherent environmental whole, and to facilitate the development of effective environmental policies. It also should be a clearinghouse for environmental information and for information on donor assistance programs.

WRS assumes that the demonstration projects will be viable, sustainable and replicable. A third assumption is that the current political will to make changes in the environmental code remains strong. With the recent creation of the Ministry of the Environment, with an explicit charge to revise the regulatory framework, this political will appears to be on the rise. If this continues, the chances of success for WRS are enhanced significantly,

NGOs and other community-based groups are another area where WRS assumes current positive changes will continue. These groups are slowly entering the mainstream of developmental change in Morocco. Although they are still controlled by the GOM, there are signs that this control is loosening. The WRS will depend a lot on the continued liberalization of rules, written and unwritten, concerning NGOs and these other groups, their ability to be self-supporting, and their roles in change.

WRS also assumes that the Moroccan public will continue to be sensitized to the importance of environmental degradation and that this increased public consciousness will facilitate participation and collaborative problem solving.

Through transparent implementation, frequent dialogue, WRS Steering Committee discussions and frequent USAID and GOM monitoring, these assumptions should hold valid throughout and beyond the activity.

2. Risks

The collaborative problem solving approach of the demonstration projects lessens the risk of failure, but does not eliminate the possibility. However, the biggest risk is associated with inaction:

if a concerted effort is not made now to attack the water problem, the cost of the expected decline in water quantity and quality in the early part of the next century will be enormous.

Another risk is that the MOE does not provide the leadership necessary to effectively coordinate environmental management activities. USAID direct assistance to the Ministry is meant to assure that this does not happen.

3. Financial Plan

The financial plan is based on the use of an institutional contractor providing technical assistance for both project components - water resources management systems and demonstration/pilot activities. Overall estimates assume 12 person years of long-term technical assistance (TA), short-term TA consisting of ad hoc studies/analyses, special assistance, local consulting, at least three demonstration activities taking an estimated three calendar years each, and sufficient resources for training and demonstration replication. For all activities, GOM and host country contributions will represent 25% of all costs. These include in-kind contributions (office space and facilities, counterpart support, some training costs, administrative expenses) and resources needed to carry out demonstration activities. An inflation factor of 5% (compounded) is used, starting in FY 97 (second year of project). For details, see Annex G.

TABLE I
Activity Budget (in \$,000's)

1. Institutional Contractor	
A. Long-term T.A. (12 person year total)	2,789
B. Short-term T.A. and <u>ad hoc</u> Assistance	1,674
C. Local Office and Staff	632
D. Equipment and Commodities	210
E. Demonstration Activities	4,921
F. Training and Public Awareness	418
SUB-TOTAL	<u>10,644</u>
2. USAID Support	279
3. Evaluations (FY 99 and FY 2002)	160
4. Audits (FY 99 and FY 2002)	76
5. Contingency (7.5 % of estimated costs)	837
USAID TOTAL	<u>11,996</u>
6. GOM Contribution	<u>4,000</u>
PROJECT TOTAL (Rounded)	16,000

TABLE II
Component Budget (in \$,000')

1. Water Resources Management Systems	
A. Technical Assistance (All)	4,463
B. Local Office and Staff	316
C. Equipment and Commodities	210
D. USAID Support	140
E. Training and Public Awareness	209
2. Demonstration/Pilot Activities	
A. Pilot Projects	4,921
B. Local Office and Staff	316
C. USAID Support	139
D. Audits	76
E. Training and Public Awareness	209
3. Evaluations	160
4. Contingency	837
USAID TOTAL	<u>11,996</u>
5. GOM Contribution	
A. Water Resources Management Systems	2,000
B. Demonstration/Pilot Activities	<u>2,000</u>
PROJECT TOTAL (rounded)	16,000

Table III
LOP Obligation Schedule
(in \$,000's)

Fiscal Year	Obligation	Fiscal Year	Obligation
1995	1,300	1998	2,000
1996	2,750	1999	2,000
1997	2,600	2000	1,350

USAID/Morocco, as well as the Agency as a whole, has been faced with major reductions in Development Assistance Funds. Portfolio reductions, constraints on funding for on-going activities, and uncertainty regarding future resource availability are major concerns for and the phrase "subject to availability of funds" is now very pertinent and relevant. Table III reflects planned obligations, but assumes availability of forecasted OYB levels. Adjustments in activities, timing, and priorities may be necessary if this obligation schedule is not maintained. USAID/Morocco will not obligate funds with the GOM for Component Two: Demonstration and Pilot Activities until pilot feasibility studies (and IEE or EA) have been approved by USAID. Once a given feasibility study is approved and funds are available, USAID/Morocco will obligate required funds through a Project Agreement Amendment for implementing the pilot activity.

Table IV
Methods of Finance and Implementation
(in \$,000's)

Budget Item	Method of Implementation	Method of Financing	Amt
1. Contract (TA, trng, commodities)	Direct AID Contract	Direct Pay	10,644
2. Evaluations	Direct AID Contract or IQC	Direct Pay	160
3. Audits	Recipients Audit	Direct Pay	76
4. USAID Support	Direct AID Contract	Direct Pay	279
5. Contingency	N/A	N/A	837
Total			11,996

When management cost formulas and methodologies are provided by USAID/W for determining project-related program and operating expenses, costs will be calculated and provided. At present, there is no guidance on how such costs are to be determined.

V. Project Implementation

A. WRS Timeline

<u>Activity</u>	<u>Actors</u>	<u>Dates (CY)</u>
NAD Approval	AID/W	2nd qtr, '95
RP Approval and Authorization	USAID/M	3rd qtr, '95
Pro Ag signed	USAID/M, GOM	3rd qtr, '95
FY95 funds obligated	USAID/M, GOM	3rd qtr, '95
RFP released	USAID/M	4th qtr, '95
FY96 funds obligated	USAID/M, GOM	1st qtr, '96
Contract proposals received	Proposers, USAID/M	1st qtr, '96
Proposals evaluated	USAID/M, GOM	1st qtr, '96
Contract negotiated and signed	USAID/M, contractor	2nd qtr, '96
Long-Term TA in country	Contractor	3rd qtr, '96
Demo feasibility studies started	Contractor, GOM	3rd qtr, '96
Demo feasibility studies approved	Contractor, GOM	1st qtr, '97
FY97 funds obligated	USAID/M, GOM	1st qtr, '97
1st Demo activity started, additional funds added to contract	Contractor, GOM Community	2nd qtr, '97
FY98 funds obligated	USAID/M, GOM	1st qtr, '98
2nd demo activity started, additional funds added to contract	Contractor, GOM Community	1st qtr, '98
FY99 funds obligated	USAID/M, GOM	1st qtr, '99
3rd demo activity started, additional funds added to contract	Contractor, GOM Community	1st qtr, '99
Project Evaluation conducted	USAID/M, Eval.team	3rd qtr, '99
1st demo activity completed, replication initiated	Local national participants	4th qtr, '99
2nd commodity/equipment purchase	Contractor	4th qtr, '99
FY2000 funds obligated	USAID/M, GOM	1st qtr, 2000
2nd demo activity completed, replication initiated	Local national participants	4th qtr, 2000
3rd demo activity completed replication initiated	Local national participants	4th qtr, 2001
Final Evaluation Performed	USAID/M, Eval.Team	1st qtr, 2002
Project Activities Finalized	Contractor	3rd qtr, 2002

B. Contracting Modality

USAID/Morocco will use full and open competition to select a contractor to implement the WRS activity. Proposals will be evaluated by a committee which includes both GOM and USAID representatives. The contract will contain two main components: component one clearly will be technical assistance for contract management and water resources management systems; component two will consist of feasibility studies and pilot/demonstration activities. At the time of contract award, estimated costs for the first component will be well defined, and obligation of funds in the contract will be based on these costs. However, estimated costs for the second component will not be well defined until after contract award, when annual workplans are prepared. Each annual workplan will contain a global budget for the year and a budget for feasibility studies and/or demonstrations. The budgets for the feasibility studies/demonstrations will be negotiated and funds then obligated for those activities. For purposes of submitting proposals, the RFP will provide "plug figures" to be used to estimate costs for the second component.

1. Technical Assistance

The primary means of achieving the project objectives will be through technical assistance. The contractor will provide long- and

Box 3: How will the Mission distinguish among contractors' technical proposals, if technology selection and evaluation is to be a collaborative process among the MOE and other parties? Is the selection of the technology truly wide open?

In the instructions to proposers, proposers will be asked to provide several types of information in their technical proposals:

- What criteria would they suggest to the MOE and other parties to use in developing and selecting among technology alternatives? Proposers will be asked to provide detail on what these criteria should be and why they should be used, as well as field examples of application of these criteria.
- The proposers will be asked to develop detailed *illustrative* demonstration projects, and to show how these illustrative demonstrations are based on principles of integrated management, and are sustainable. These illustrations will include technical, economic, environmental, social, and political sustainability analyses.

The experience, expertise, and analytical capabilities of the proposers will be apparent in this information. At the same time, the creativity and expertise of the proposers will be accessed. They will be asked to show, in detail, how their proposed approach to the above, and to the entire project, will meet the results, performance indicators, and deliverables of this Results Package.

(In addition to the above discriminating factors, an obvious discriminating factor is the strength of the contractor's approach to creating the collaborative framework and tools to be used in this project.)

Though the selection of specific technologies for the demonstration projects is left to the MOE and other relevant parties, the performance indicators constrain that selection to some degree. For example, for the water treatment and reuse demonstration, the technology must be low-cost, low-maintenance, and principles of integrated water resources management must go into the selection; also, there should be a demand for the water produced in an existing or growing market. For the pollution prevention demonstration, the technology must be used in the tannery sector for reduction in water pollution, must be economically beneficial to the users, and must be sustainable by the private sector, among other things. The soil demonstration requires reduction in soil erosion of 20 percent in the demonstration project area.

Additional constraints on the technology selection are as follows:

- Water reuse demonstration: location is Agadir area; focus is small to mid-sized communities.
- Pollution prevention demonstration: location is Fes area; must produce significant reduction in chrome waste discharge.
- Soil erosion demonstration: location is the watershed of the Oued Laou (unless otherwise determined by the initial rapid rural appraisal).

short-term technical assistance, using a mixture of U.S. and Moroccan private firms, universities, individuals, and/or non-governmental organizations.

2. Training

All training will be the responsibility of the contractor. The contractor will be responsible for arranging, implementing, and monitoring all project training activities, including in-country workshops and course participation, conferences, public awareness campaigns and any overseas course participation and study tours. The contractor will develop training materials in French and/or Arabic as necessary. All project training will be conducted in accordance with applicable USAID training policies and procedures with appropriate implementation and follow-up documentation. Training financed through WRS or TFD will be coordinated by the contractor, but can be administered by TFD personnel, if so agreed.

3. Equipment and Supplies

The contractor will be responsible for procurement of all USAID-financed equipment and supplies to be purchased under this project. All project commodity procurement will be conducted in accordance with applicable USAID policies, procedures, and regulations.

4. Coordination with Other Donors

The contractor will coordinate with other donors to leverage funding with which to expand application of the technologies in the demonstration projects in Morocco. More than one donor may act as a party to and participate in a demonstration project. The USAID Activity Manager also will be involved in all coordination efforts.

5. Reports and Other Deliverables

Annual Workplan - The Annual Workplan will be prepared based on agreements reached in annual planning meetings attended by all activity partners: GOM, USAID, the contractor, local and regional representatives. The Annual Workplan will serve as a reference point for Quarterly and Annual Progress Reports, permitting monitoring of contract performance and costs. The first Annual Workplan will be due within 60 days of the arrival of the contractor's Chief of Party.

The Annual Workplan will establish objectives by project component for the year ahead. It will specify planned activities and benchmarks towards the accomplishment of these specific objectives and will reflect Moroccan strategy and priorities for managing water resource systems. The Annual Workplan will provide the level of effort required for implementation of activities and will designate responsible parties. It will include an implementation timeline and a detailed, global budget for the year.

Specifically, the Annual Workplan will also provide individual terms of reference, performance indicators, and cost proposals for the second component -- feasibility studies, pilot, and demonstration activities. Funding for these activities will be based on the cost estimates submitted in the Annual Workplan, subject to the availability of funds.

Quarterly Progress Reports - The contractor will submit quarterly reports to USAID in a format and level of detail agreed upon by the contractor and USAID. The reports shall at a minimum contain sections on progress achieved towards performance indicators during

the quarter; summary reports of meetings, training activities, etc.; personnel assignments; summary of expenditures; procurement; and problems. Quarterly Progress Reports are due 15 days after the end of the reporting quarter. The quarterly reports shall be adequate to determine the degree of progress on each performance indicator. Information should be gender-desegregated, where appropriate. The USAID Activity Officer is required to comment on the performance of the contractor for each Quarterly Progress Report.

Annual Progress Report - The Annual Progress Report will replace the fourth Quarterly Report and will also contain that quarter's progress report. The Annual Progress Report will discuss in detail the progress to date, using that year's Annual Workplan as the starting point. The Annual Progress Report will serve as the basis for USAID to determine whether progress is sufficient to justify an additional year's funding and will form the starting point in the review of Annual Workplan proposals.

Other Special Reports - The contractor will submit other reports as agreed upon by the contractor and USAID.

C. Actors

Project Steering Committee: One of the most efficient ways to ensure a partnership among WRS stakeholders is through the development of a broad-based Steering Committee. Proposed members include the MOE, Ministry of Agriculture, Ministry of Public Works, Ministry of Energy and Mines, Ministry of Commerce and Industry, Ministry of Public Health, USAID, the Directorate of Local Collectives, and the contractor. We anticipate that the MOE will chair the Steering Committee. The purpose of the Steering Committee will be to discuss the current state of implementation of the various activities under this Results Package and ensure that they are contributing to the accomplishment of RP results, deliverables and performance indicators. It will also ensure that all views are heard and that problems get addressed. An additional purpose of the Steering Committee will be to vet suggestions for possible changes in direction and modifications of activities. Meetings will be held no less than four times a year.

The Steering Committee is a forum for dissemination of information regarding USAID environmental activities and objectives and as a channel for feedback. The Mission's strategic objectives, program outcomes and performance indicators will be fully discussed in the context of the RP. Subcommittees also will be formed for each separate demonstration activity and membership determined according to the kind of activity. The Steering Committee will assist in coordination with donors working in water resources activities, especially the IBRD, GtZ, UNDP, and the Caisse Française de Développement.

USAID: Collaborating with other actors in the sector, USAID will develop the activity design, contract for institutional technical assistance from an American firm, NGO and/or university, approve operations and informational materials and subcontracts developed by the institutional contractor, and conduct periodic evaluations of performance and impact on achievement of the environmental strategic objective.

This activity will be managed by a USDH working in the Mission's Environment and Natural Resources Office. The Activity Manager will be part of the Environmental Strategic Objective Team and will refer "thorny" management issues to the Team. Also, the Strategic Objective team will screen demonstration concepts and review

workplans for conformance with the Mission's overall Environmental SO. The Activity Manager will have a colleague from the Ministry of Environment as day-to-day management counterpart, and frequent meetings between these two individuals, and between these two individuals and the contractor, will take place. In addition, the Activity Manager will be assisted by USAID OFM on financial matters and will work closely with the Contracting Office on procurement and other contracting matters. WRS will also finance a project assistant and a part-time financial analyst. Project costs are shown in Section IV C 3.

MOE: The MOE will be the USAID counterpart for the activity. It will work closely with USAID on the selection of the contractor and will appoint team member(s) who will work closely with USAID on a day-to-day basis during the implementation phase of the activity.

National Council of the Environment: Chaired by the Minister of the Environment and made up of the Ministers of Interior, Agriculture, Public Works, Mines and Energy, Commerce, Industry and Artisanal, Habitat, Tourism, Public Health and Human Rights, this body formally meets annually to discuss important environmental issues and serves as an interministerial coordinating body.

Institutional Contractor: The contractor will be responsible for the overall management of the activity components.

NGO/community groups: To the extent possible, local environmental groups will work with USAID, the MOE, and the institutional contractor in the identification of local problems and their solution. These NGO/community groups will also participate as full partners in the demonstration projects and may be part of the Steering Committee.

Other Donors: USAID will share information from this activity regularly with other donors, anticipating encouragement of their active participation in follow-on activities. A critical part of the responsibility of the institutional contractor will be to keep abreast of all other donor activities in the environment, with the intention of stimulating investment of other donors (and/or of the GOM and multilateral lending institutions) in activities similar to those tested and proven by the WRS RP. USAID also will assure that there is no overlap and that its activities are complementary to others.

D. Conditions Precedent and Covenants

Prior to the first disbursement under the Grant, or to the issuance by USAID of documentation pursuant to which disbursement will be made, the Cooperating Country will, except as the parties may otherwise agree in writing, furnish to USAID in form and substance satisfactory to USAID:

1. Conditions Precedent

(i) A statement of the name of the person or persons representing the Cooperating Country, together with a specimen signature of each person specified in such statement.

(ii) The designation of a Moroccan Results Package (Project) Manager responsible for managing the activity for the Ministry of the Environment.

2. Covenants

(i) The GOM, through the MOE, will be required to formally commit its resources for the performance of individual demonstration activities. Such commitment will be part of the Steering Committee's approval of the contractor's feasibility study for a given demonstration activity, which includes a full description and financial inputs required. At such time, and depending upon the availability of funds, additional increments of funds will be granted by USAID for individual demonstration/pilot activities.

(ii) The special restrictions as required under Policy Determination #20, "Guidelines to Assure USAID Programs do not Result in the Loss of Jobs in the U.S.", will be shown as covenants in the Project Agreement.

(iii) No funds or other support provided hereunder may be used for any pilot/demonstration activity until potential environmental impacts of the activity have been identified and mitigation operations have been proposed, if necessary.

E. Evaluation and Monitoring System:

The evaluation and monitoring system employed by the WRS will focus on the measurement of results and impact. The performance-based emphasis of this contract will make these aspects relatively easy to monitor. Performance indicators are included (Section II of this document) for this purpose. The monitoring system will make sure that the WRS is addressing the Environmental Strategic Objective and Program Outcomes, and the evaluation will determine the efficacy of the various activities undertaken.

The monitoring system will feature numerous meetings between MOE, USAID and other interested groups, frequent field trips by USAID staff to ensure that work is progressing within the agreed upon framework, and to measure results. We will also use "virtual" team members from other USAID units with expertise in the sector for advice and counsel. Reviews of annual workplans and progress reports are critical in the overall decisions on determination of whether to proceed with activities.

Reporting requirements will include annual workplans submitted to USAID and the MOE by the contractor, annual reports and detailed quarterly progress reports. USAID will also require reporting on each separate consultancy that is completed under the WRS.

Special third-party evaluations will be done after three years of implementation and six months before the end of the activity. Each evaluation will provide the GOM and USAID with a view of the efficacy of the activity and an outsider's view of how the activity has proceeded relative to its objectives and to the Strategic Objective and Program Outcomes. Indicators will be measured and to assure that activities closely relate to the SO. See Annex B for Performance Indicators.

F. Environmental Assessment

WRS has two principal components. The first, Water Resources Management Systems, deals exclusively with the institutional strengthening of the recently created Ministry of the Environment and selected other project partners, primarily through the provision of technical assistance, training and commodity procurement. Pursuant to 22 CFR 216.2(c)(1)(i), 22 CFR 216.2(c)(2)(i), and 22 CFR

216.2(c)(2)(XIV), such activities are categorically excluded from Environmental Review Procedures.

The second component, Demonstration/Pilot Activities, will field test appropriate methodologies and technologies for managing water quality and quantity. At this time three specific activities have been identified that will be considered for feasibility studies and subsequent demonstrations: (1) water treatment and reuse in small to medium-sized communities in the Agadir area; (2) pollution prevention in tanneries in Fez; and (3) soil erosion control in the Oued Laou watershed. However, since we do not know enough about any of these activities to do an environmental review at this time, pursuant to 22 CFR 216.3(a)(7), we must defer on these until a feasibility and environmental study is prepared by the contractor for each activity. The environmental study prepared by the contractor for each site will be reviewed by the Mission, which will prepare an IEE or EA for each, as appropriate, and submit it to the Bureau Environment Officer for approval pursuant to USAID Reg 16. The Mission will also assure that the contract with the institutional contractor clearly states that no disbursement of funds for implementation of on-the-ground demonstration activities will occur until the Environmental Review has been completed and USAID Reg 16 clearance has been obtained for the demonstration activity in question.

G. Audit Requirements

It is anticipated that the prime contractor will be under the audit jurisdiction and responsibility of USAID/W. As a U.S. entity, the contractor is required to provide for regular audits of all activities. Such audits are contracted for by the auditee and costs should be included in administrative and overhead expenses. The prime contractor will be responsible for assuring that any required audits of subcontractors are conducted and adequately financed. If a local firm needs to be audited for some services provided through WRS, funds have been included as a separate line item in the activity financed plan.

VI ANNEXES

LOGICAL FRAMEWORK

ANNEX A

Narrative Summary	Verifiable Indicators	Means of Verification	Important assumptions
<p><u>Strategic Objective</u></p> <p>Overall objective/goal is to improve Morocco's water resource management in the agricultural, urban and industrial sectors</p>	<p><u>Measures of Achievement</u></p> <p>Improvement of policy, regulatory, and institutional framework.</p> <p>Improvement of environmental technologies.</p> <p>Increase of public participation in environmental action</p>	<p>Project reports</p> <p>Evaluations</p> <p>GOM policies and programs</p>	<p>GOM continues to support environmental activities.</p> <p>Local communities and the private sector are partners with GOM in environmental initiatives</p>
<p><u>Activity Purpose</u></p> <p>Improve water management and address pollution problems by identifying and implementing demonstration projects which focus on the policy/regulatory and institutional framework, technology, and community participation</p>	<p><u>Results</u></p> <p>Ministry of Environment (MOE) attains position of credibility and trust.</p> <p>MOE is better able to think and plan strategically and to promote an integrated, comprehensive approach to water management.</p> <p>Development of framework for collaborative development of regulations, standards and guidelines pertaining to water , which is applied by the GOM.</p> <p>At least three demonstration efforts integrating water-related technology, regulatory concerns and public participation are performed.</p>	<p>Project reports</p> <p>Evaluations</p> <p>GOM policies and programs</p>	<p>GOM support of the activity is available in a timely fashion. Local communities and business groups fully participate in demonstrations and follow-on replications.</p>

Narrative Summary	Verifiable Indicators	Means of Verification	Important Assumptions
<p>Deliverables</p> <p>A framework is established for collaborative selection of technology and development of environmental norms, regulations.</p> <p>A "lessons learned" report done on each demonstration activity, as well as on the process of developing and using the activity selection framework.</p> <p>Training materials developed for selection of activities and for development of regulations and norms</p> <p>GOM staff trained and experienced in policy development</p> <p>Sets of site-specific regulations, manuals, norms developed for each demonstration activity and analysis of applicability</p> <p>Replications of demonstration activities and communication of demonstration results to all interested parties.</p>	<p>Written working procedures used by GOM in activity selection.</p> <p>"Lessons learned" report on each demonstration activity and on the selection framework</p> <p>Training materials themselves</p> <p>Appropriate policies developed and implemented</p> <p>Written regulations and norms for individual demonstration projects</p> <p>Projects/activities are replicated. Publicity is developed and communicated.</p>	<p>Review of documents</p> <p>Contractor reports Independent evaluations.</p> <p>GOM documents Contractor files</p> <p>Contractor reports Evaluations</p> <p>Manuals Contractor reports Evaluations</p> <p>Site inspections Evaluations Contractor reports</p>	<p>Collaborative working relationships developed and flourish.</p> <p>MOE plays its role of coordinating active participation by all concerned groups and that those partners contribute equitably to activities conducted.</p>

ANNEX B

PERFORMANCE INDICATORS

Component One: Water Resources Management Systems

Result A: The Ministry of Environment attains a position of credibility and trust through effective facilitation of efforts of businesses, communities, government, and other interests to promote both jobs and environmental protection.

PERFORMANCE INDICATOR	INDICATOR DEFINITION	DATA SOURCE AND METHOD OF COLLECTION	DATA ACQUISITION SCHEDULE AND RESPONSIBLE OFFICE	CRITICAL ASSUMPTIONS
1. Other ministries, local government bodies, representatives of business and industry, professional and trade associations, and community groups/NGOs seek out the participation, guidance, and facilitation assistance of the MOE in their respective efforts to protect both jobs and the environment.	self-explanatory	Quarterly and annual reports	Quarterly; upon project completion ENR/Rabat	<ul style="list-style-type: none"> • Principals of collaborative development of environmental policy are applicable in the Moroccan context. • Parties affected by the environmental policy under discussion have sufficient trust at the outset of the demonstration efforts to participate in collaborative processes in good faith. • Ministers and other government leaders involved in this project remain largely constant, or at least have similar perspectives on collaboration for environmental protection, throughout the project. • MOE effectively carries out its facilitative role.
2. MOE has staff (or reliable access to personnel who are) adequately skilled in technical, social, economic, and political aspects of environmental protection.	"reliable access to personnel who are" = private or public sector reservoir of such people are readily available to the MOE, may or may not be full time permanent MOE staff.	Quarterly and annual reports	Quarterly; upon project completion ENR/Rabat	None

RESULT B: The Ministry of the Environment is better able to think strategically about the water sector and to promote an integrated and comprehensive approach to water management which includes both supply and demand management.

PERFORMANCE INDICATOR	INDICATOR DEFINITION	DATA SOURCE AND METHOD OF COLLECTION	DATA ACQUISITION SCHEDULE AND RESPONSIBLE OFFICE	CRITICAL ASSUMPTIONS
3. The MOE utilizes principles of integrated water resources planning and management (IRPM) in its water-related decision making.	Definition of IRPM = "water resources planning and management that thoroughly considers engineering, economic, social, health, political, and environmental factors, including both supply and demand management."	Quarterly and annual reports: monitoring by activity manager. Reports on impacts of water-related policies and regulations	Quarterly and annually. ENR/Rabat Contractor	MOE effectively carries out its leadership role in the environment: it is able to work effectively with the National Water and Climate Council.
4. The MOE provides information and assistance to other national and local government and non-government bodies with water planning and management responsibilities in executing those responsibilities in an integrated manner.	Same definition as above for integrated planning and management.	Quarterly and annual reports: monitoring by activity manager.	Quarterly and annually. ENR/Rabat	Same as above assumptions.

Component Two: Demonstration/Pilot Activities

Pilot Result A: A framework for collaborative development of regulations, standards guidelines, and technology selection pertaining to water is developed. The framework is applicable in other environmental policy contexts in which competing interests (such as environmental protection and economics) are important factors.

PERFORMANCE INDICATOR	INDICATOR DEFINITION	DATA SOURCE AND METHOD OF COLLECTION	DATA ACQUISITION SCHEDULE AND RESPONSIBLE OFFICE	CRITICAL ASSUMPTIONS
<p>5. For the three or more demonstration efforts undertaken, parties who can affect, or who are affected by, the water issue being addressed are identified and engaged in a sustained, effective collaborative effort to resolve the issue, (including selection of the technology, development of regulations, standards, guidelines, norms, etc., creation of conditions necessary for sustainability, and other such matters.)</p>	<p>These will be defined specifically for each demonstration activity carried out.</p>	<p>USAID Environment Program Strategic Objective Team and Steering Committee judgement, based on quarterly and annual reports, and on field observation and discussion with beneficiaries.</p>	<p>Detailed annual reports; quarterly reports presenting information pertinent to evaluating performance against this indicator. ENR/Rabat</p>	<ul style="list-style-type: none"> • Principles of collaborative development of environmental policy are applicable in the Moroccan context. • MOE continues to be comfortable with a facilitative role (vs. a command and control role). • Parties affected by the environmental policy under discussion have sufficient trust at the outset of the demonstration efforts to participate in collaborative processes in good faith.

PERFORMANCE INDICATOR	INDICATOR DEFINITION	DATA SOURCE AND METHOD OF COLLECTION	DATA ACQUISITION SCHEDULE AND RESPONSIBLE OFFICE	CRITICAL ASSUMPTIONS
<p>6. The knowledge and experience gained (both process and substance) is analyzed and recorded in a manner that makes it easily applicable to other environmental issues.</p>	<p>"process knowledge" = related to process of bringing parties having diverse interests to consensus.</p> <p>"substance knowledge" = related to the technical, economic, environmental, and social aspects of the technology being investigated under the demonstrations.</p> <p>"easily applicable" = competent parties can readily use the information to replicate project activities, and can begin similar activities from a higher point on the learning curve than did this project.</p>	<p>Quarterly and annual reports.</p>	<p>Minimum quarterly</p> <p>ENR/Rabat</p>	<p>• Assumptions hold, such that sufficient knowledge and experience can be developed.</p>
<p>7. Roles and responsibilities of key actors in selecting water-related technologies, regulations, standards, guidelines, norms, etc., are better defined, and are generally acceptable to parties concerned.</p>	<p>"key actors" = Ministry of Environment, and other relevant national government ministries, local government, professional associations, community groups/NGOs, who do or should play significant roles in water issues in Morocco.</p>	<p>Annual reports.</p>	<p>Annually and at completion of project.</p> <p>ENR/Rabat</p>	<p>• Same assumptions as for PI#1</p> <p>• Ministers and other government leaders involved in this project remain largely constant, or at least have similar perspectives on collaboration for environmental protection, throughout the project.</p>
<p>8. The Government of Morocco and other parties choose to use this framework to develop regulations, standards, guidelines, norms, etc., for environmental issues which are outside the scope of this project.</p>	<p>self-explanatory</p>	<p>Quarterly and annual reports:</p>	<p>Quarterly, annually, and at completion of the project.</p> <p>ENR/Rabat</p>	<p>• Same assumptions as for PI#1 and PI#6.</p>

Pilot Result B: At least three demonstration efforts integrating water-related technology, regulatory concerns, and public participation are conducted, and the demonstration efforts lead to application of the technology and the decision-making framework in other locations by the GOM, other donors, multilateral lending institutions, or the private sector.

PERFORMANCE INDICATOR	INDICATOR DEFINITION	DATA SOURCE AND METHOD OF COLLECTION	DATA ACQUISITION SCHEDULE AND RESPONSIBLE OFFICE	CRITICAL ASSUMPTIONS
9. Selection of the technologies to be demonstrated includes consideration of integrated water resources planning and management, to ensure sustainability.	"integrated water resources planning and management" = evaluates engineering, economic, social, health, political, and environmental dimensions of a technology application.	Quarterly and annual reports. RRAs Feasibility studies	Quarterly, annually, and at completion of project. Contractor and demonstration participants ENR/Rabat	• Same assumptions as for PI1.
10. Application of technology reduces water pollution, reduces demand on fresh water supplies, and produces water that can be used and sold in an existing (or growing) market	"can be used in existing or growing markets" = ideally, a demand should exist for this water, at a price at which it can be produced.	Quarterly and annual reports.	Quarterly, annually, and at completion of the project. ENR/Rabat	None
11. The technology selected for demonstration is economically beneficial to the users of the technology (i.e. to tanners) and is accessible to these users, as well as effectively reduces toxic waste discharge	"economically beneficial" = net savings such that a reasonable business person will choose to use the technology. "accessible" = users are capable of obtaining the initial capital or other resources needed for installation.	Annual reports. RRAs	Annually and at completion of project ENR/Rabat	• Such a technology can be agreed upon by the parties participating in the collaborative effort. • GOM or other resources will be made available for the initial investment to install or otherwise incorporate the technology, if needed.
12. Selected farmers are actively engaged in all aspects of the demonstration activities and soil loss is substantially reduced.	"actively engaged" = frequent substantive, participation "substantially reduced" = approx. 20% reduction in soil erosion	Quarterly reports Evaluations	Quarterly ENR/Rabat	None

PERFORMANCE INDICATORS	INDICATOR DEFINITION	DATA SOURCE AND METHOD OF COLLECTION	DATA ACQUISITION SCHEDULE AND RESPONSIBLE OFFICE	CRITICAL ASSUMPTIONS
13. The GOM, other donors, multilateral institutions, or the private sector are reasonably expected to seek to replicate or expand the demonstrations in other locations.	"reasonably expected to" = generally meets policy and program goals of the GOM, some major donors, multilateral financing institutions, and/or key private sector interests, and serious interest has been expressed by these parties in conducting activities based on the USAID demonstration.	Written documentation from the GOM, multilateral financing institutions, donors, private sector interests.	Annually and at completion of the project.	<ul style="list-style-type: none"> • Potential participants (international, public, or private) have this type of effort high enough on their respective agendas, as well as have the resources for funding similar efforts.
14. The technologies selected are capable of being maintained or otherwise continued after the completion of this project.	self-explanatory	Annual reports;	Annually and at completion of the project.	<ul style="list-style-type: none"> • Same assumptions as for PI#8.
15. The process by which the technologies and associated implementation conditions and requirements are developed, tested, installed, and refined contributes significantly to achieving Result A and associated Performance Indicators.	self-explanatory	Quarterly and annual reports.	Quarterly and at completion of the project. ENR/Rabat	<ul style="list-style-type: none"> • Same assumptions as for PI#1.

PERFORMANCE INDICATOR 16: Deliverables (quarterly reports, annual reports, special reports, results) are produced on time and within budget.

Other performance indicators will be developed, in consultation with the contractor, based on the specific tasks identified in the successful proposal. In addition, timeframes for achieving the results and performance indicators will be added based also on timeframes identified in the annual workplans. Additional performance indicators will also be developed (in consultation with the contractor) should further demonstration projects be undertaken.

**Environmental Options
Assessment for
Morocco**

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March 1995

EXECUTIVE SUMMARY

USAID/Morocco will be developing a major environmental program to help Morocco address its serious environmental problems. To help the Mission identify the major problem areas, it requested assistance from the centrally funded Project in Development and Environment (PRIDE). The PRIDE team used an approach under development by USAID that is based on the U.S. Environmental Protection Agency's comparative risk assessment methodology (although it does not have its depth of detail and analysis). This approach identified the major problem areas and evaluated their relative impacts on health, the economy, and ecosystems. Next, the team looked at possible project options, and developed a scoring system to evaluate their relative attractiveness.

The team first organized environmental problems around the sectors of economic activity which produced them. The sectors examined include industry, mobile sources, households, agriculture, and natural-resource based activities. Some of these activities affect the environment through externalities; thus industry, agriculture, and households generate water pollution, and mobile sources and industry generate air pollution. Other environmental activities affect their own long-run sustainability through their use of natural resources; this is the case of woodfuel harvesting or "mining" aquifers for irrigation water.

Based on quantitative data, interviews with Moroccan experts, and their own judgment, the team members assessed the impacts of each of the problems on health, the economy, and natural ecosystems. A set of criteria was developed for evaluating the importance of each impact. For health, these were three; the severity of the health impacts, the number of people affected, and reversibility or intergenerational effects. For the economy, there were two criteria; total cost and timing of that cost. Natural ecosystem effects were evaluated through a more complex set of criteria; the severity of ecosystem damage, whether the ecosystem is common or unique, the extent of human dependence on the ecosystem for non-marketed services, the number of people dependent on the ecosystem, and the timing of impacts.

The team scored each problem according to each criterion on a scale of one (minimal impact) to five (serious impact). Within each impact area the scores assigned to the different criteria were averaged, and the resulting impact area scores were averaged to arrive at an overall assessment of the impact of each problem. These area scores were averaged to develop a single composite indicator of the importance of each problem area relative to the others.

The result of this approach must be used carefully, since it suffers from shortages in accurate data and time for detailed analyses, and subjectivity in judgements and scoring. Nevertheless, it provides a useful framework and indications of the relative importance of environmental problems that can be refined as time and resources permit, and that will provide a rational basis for making environmental decisions.

Using this approach, the team developed an assessment of Morocco's environmental problems. The matrices can be found on pages v-vii.

The team also identified a number of possible project activities to respond to these problems. Because of the time constraints, it was not possible to wait for the results of the problem review in order to identify areas for project activities; therefore some activities respond to problems which did not emerge as highest priority. Each activity was reviewed according to eight criteria: the importance of the problems to which it responds (which is the composite score on the problem assessment), its potential impact on those problems, the priority of the problem to the Government of Morocco, the priority of the problem to USAID, U.S. comparative advantage, trade and investment opportunities, sustainability, relation to other donor activities, and support to NGOs and women's groups. The options were evaluated and scored on a 1 (least favorable) to 5 (most favorable) scale, and a weighted composite score developed. The composite scores however are only indicative and should be used with care; the team did not feel it had sufficient time to develop and analyze these options to the point that the composite score would be a reliable indicator of the relative attractiveness of the project option.

The major project options evaluated included:

1. Protected zones for drinking water intake
2. Sanitary landfill management
3. Management support for sewage collection and treatment
4. Integrated watershed management
5. Eco-tourism development in Morocco's interior
6. Artisanal tannery improvement
7. Air quality improvement and monitoring
8. Phosphate processing emissions elimination
9. Industrial pollution prevention
10. Water erosion of soils
11. Dune encroachment control
12. Oum er Rbia River catchment basin management and environmental quality
13. Sebou integrated management plan

PRELIMINARY PROBLEM ASSESSMENT MATRIX
Industrial and Automotive Emissions

Sector	Pollutant/ Activity	Average			Composite
		Human Health	Economic	Biodiversity	
A. Emissions into Air					
1. Mobile Sources					
Transport	Sulfur Dioxide	2.3	2.0	1.2	1.8
	Nitrogen Oxide	2.3	2.0	1.2	1.8
	Suspended Particles	2.3	2.0	1.2	1.8
	Lead	3.0	2.0	1.2	2.0
2. Industrial Fixed Sources					
Cementeries	Dust	1.0	2.0	1.0	1.3
	Sulfur Dioxide	1.0	2.0	1.0	1.3
Refineries	Sulfur Dioxide	1.0	2.0	1.0	1.3
	Nitrogen Oxides	1.0	2.0	1.0	1.3
Phosphate	Sulfur Dioxide	2.0	2.5	1.2	1.9
3. Area/Arusnal Sources					
Poteries	Suspended particles	2.0	*	1.0	1.5
	Other pollutants	2.3	*	1.0	1.6
B. Water Emissions					
Rivers:					
1 Tanneries	Chrome	3.3	2.0	2.6	2.6
2 Oil plants (olive)	Suspended particles (margin)	2.6	3.5	2.4	2.8
3 Textile industry	Suspended particles	1.0	2.5	2.2	2.9
4 Sugar factory	Organic matter	1.3	2.5	2.8	2.2
5 Chemicals		2.0	2.5	2.2	2.2
Oceans					
1 Phosphate refining	Suspended particles	1.3	3.5	3.4	2.7
	Heavy metals	2.6	3.5	2.6	2.9
	Dissolved residue	1.3	3.5	2.2	2.3
2 Refineries	Oil-Water Separation	1.0	*	2.4	1.7

*No estimate made

PRELIMINARY PROBLEM ASSESSMENT MATRIX
Natural Resources Management

Sector	Pollutant/Activity	Average			Composite
		Human Health	Economic	Biodiversity	
A. Natural Vegetation Utilization		1.8	3.5	4.4	2.9
1. Forest utilization (resource use as input)	Firewood collection	1.8	3.5	4.6	3.0
	Construction material	1.8	3.5	4.2	2.9
	Agricultural expansion	1.8	3.5	4.4	2.9
	Livestock overgrazing	1.8	3.5	4.6	3.0
	Resource affected by externalities	1.0	3.5	4.4	2.9
			1.0	1.0	3.5
B. Terrestrial Wildlife Utilization		1.0	1.0	3.5	1.8
1. Wildlife utilization	Sport hunting	1.0	1.0	3.3	1.8
	Game meat hunting	1.0	1.0	3.6	1.9
	Ecotourism	1.0	1.0	3.4	1.8
C. Coastal Resources		1.0	1.0	3.3	1.7
Activities that affect resources: (externality generating)	Logging	1.0	1.0	3.5	1.8
	Construction	1.8	1.0	4.6	2.2
	Tourism	1.0	1.0	4.0	2.0

- PRELIMINARY PROBLEM ASSESSMENT MATRIX
Agriculture and Land Use Issues

Sector	Pollutant/Activity	Average			Composite
		Human Health	Economic	Biodiversity	
Agriculture					
A. Water Eroded and Degraded Land		1.0	4.0	4.2	3.0
B. Irrigated Land		3.0	3.0	3.2	3.0
C. Wind Eroded and Degraded Land		1.0	1.0	3.0	1.6
	Oasis - dike encroachment	1.0	5.0	3.0	3.0
D. Scenic Land		1.0	1.0	2.7	1.5
E. Urban Proximity Land		1.0	1.0	1.8	1.2

PRELIMINARY RISK ASSESSMENT
Water Supplies, Domestic, and Accidental Pollution

Sector	Average			Composite
	Human Health	Economic	Biodiversity	
A. Water Supply Management	2.3	3.0	2.8	2.7
B. Domestic Pollution				
1. Liquid Wastes Overall	3.2	4.4	2.2	3.8
Fatal diarrhea	4.0	5.0	*	4.5
Non-fatal diarrhea	2.7	4.5	*	3.6
Other diseases	3.0	4.0	*	3.5
Drinking water treatment	*	4.0	*	4.0
2. Solid Wastes Overall	1.7	3.0	2.2	2.3
Living on landfill diseases	2.0	3.0	*	2.5
Living near landfill diseases	1.3	3.0	*	2.2
C. Accidental Pollution	2.3	3.0	1.6	2.3

*Not applicable.

SUMMARY OF OPTIONS SCORING

OPTION		Problem Importance	Project Impact	GOM Priority	USAID Priority	Comparative Advantage	Trade & Investment Opportunities	Sustainability	Other Doors	NGOs	TOTAL
	Weighting	10	10	5.0	5.0	5.0	5.0	5.0	3.0	3.0	
WATER:											
Protected Zones for Drinking Water Intake		3.3	4.0	4.0	4.0	1.0	1.0	3.5	3.0	1.0	3.0
Sanitary Landfill Management		2.3	4.0	4.0	5.0	4.0	3.0	4.0	2.0	3.0	3.5
Management Support for Sewage		3.3	4.0	5.0	4.0	1.0	3.0	3.0	4.0	1.0	3.3
INDUSTRY											
Artisanal Tannery Improvement		4.0	4.0	5.0	5.0	3.0	2.0	2.0	4.0	5.0	3.8
Air Quality Monitoring		3.0	3.0	2.0	3.0	4.0	5.0	5.0	4.0	1.0	3.3
Industrial Pollution Prevention		4.0	5.0	4.0	4.0	3.0	4.0	4.0	3.0	1.0	3.9
Phosphate Processing Emissions Elimination		3.0	4.0	1.0	3.0	3.0	4.0	3.0	4.0	1.0	3.0
ECOSYSTEMS											
Integrated Watershed Management		2.9	4.0	4.0	5.0	1.0	1.0	4.0	3.0	3.0	3.2
Eco-Tourism Development for the Interior		2.0	3.0	3.0	3.0	1.0	1.0	3.0	3.0	3.0	2.4
AGRICULTURE LAND USE											
Water Erosion of Soils		3.2	3.0	4.0	3.0	4.0	1.0	4.0	3.0	3.0	3.1
Dune Encroachment Control		2.0	3.0	2.0	2.0	1.0	1.0	4.0	2.0	2.0	2.3
Oum er Rbia Management Plan		5.0	5.0	5.0	5.0	4.0	1.0	5.0	5.0	4.0	4.5
Sebou Integrated Management Plan		5.0	5.0	5.0	5.0	4.0	3.0	4.0	5.0	5.0	4.6

ANNEX D

TECHNICAL ANALYSES¹: Proposed Demonstrations

WATER REUSE DEMONSTRATION ACTIVITY

There are many possibilities for demonstration of effective wastewater treatment and reuse technologies in Morocco. As indicated in the body of the Results Package (RP), the selection of demonstration site and technology will be made collaboratively, by the MOE, local government, community representatives/NGOs, potential users of the treated wastewater, and other relevant parties. The information below is presented to illustrate the range of technologies and systems available to be considered. It is illustrative, not comprehensive. The analysis focusses principally on systems appropriate to small or mid-size communities, since the demonstration project is most likely to take place in such communities.

Infrastructural components of wastewater reuse systems consist of collection, treatment, and reuse facilities. The most important non-infrastructural components are operation and maintenance sustainability, economic sustainability, and environmental safety.

Infrastructural Components

Collection Systems

Conventional collection systems consist of gravity sewers, with lift stations to transport the sewage uphill to the treatment or disposal site if necessary. In small communities in the U.S., conventional gravity sewers constitute as much as 90 percent of the total wastewater system cost.

Alternative collection systems (ACS) have been developed for small communities in the U.S. to reduce this cost. All use lightweight plastic pipe, buried at shallow depths. This permits fewer joints due to increased pipe length, and cheaper cleanouts rather than manholes. The operation and maintenance requirements of these systems is different from conventional sewers, thus proper training of O&M staff is critical.

Pressure Sewers. A pressure sewer is a small diameter pipeline, usually made of polyvinyl chloride (PVC), which is buried shallowly, and which follows the contour of the ground. Each home has a small pump to discharge to the main. The primary reason for use of pressure sewers is economic (shallow burial, small size), but such sewers can be technically preferable in locations having

¹ This analysis is limited to the scientific/engineering aspects of the technical issues; the viability of collaboration for environmental policy change is addressed in the social soundness analysis.

high groundwater, shallow-depth rock strata, flat terrain, or sparse population.

Small Diameter Gravity Sewers. These systems feature primary wastewater treatment at each connection (solids removal). Because only settled wastewater is collected and conveyed to the treatment/disposal site, gradients which permit self-cleaning velocities are not necessary, and the potential for obstructions from solid material is negligible. Thus the collector mains can be smaller, and laid with variable or inflective gradients, and easily routed around obstructions. Cleanouts are generally used rather than manholes, reducing infiltration and entry of grit. It is necessary, however, to ensure proper maintenance of the interceptor or septic tanks which collect the solids at each house connection. The advantages of the small diameter gravity system are the same as the advantages of pressure sewers. These systems have the additional advantage of being able to serve locations which do not have electricity.

Vacuum Sewers. These systems use vacuum pumps at central collection stations to evacuate air from the sewer, and holding tanks on site for each user (or group of users). Wastewater flows by gravity into the holding tank; when the wastewater level rises to a preset point, the vacuum valve opens. The pressure differential created draws the sewage from the holding tank in to the collection system. Wastewater flows by gravity into the holding tank; when the wastewater level rises to a preset point, the vacuum valve opens. Air at atmospheric pressure enters the system behind the wastewater. The collection piping generally consists of small PVC pipe, laid to the same slope as the ground, with a minimum slope of 0.2 percent. For uphill transport, lift stations are placed to minimize excavation depth. The wastewater is transported to a vacuum station, which consists of a collection tank, a vacuum reservoir tank, vacuum pumps, wastewater pumps and pump controls. The wastewater discharge pumps transport wastewater to a treatment plant or to an interceptor sewer. The conditions which favor use of vacuum systems are the same as those which favor small diameter gravity sewers.

Other Alternative Collection Systems. It is important not to go into the selection of a wastewater collection system for a community with a predetermined idea of what that system will be. Collection and central treatment, while standard in industrialized countries, is not necessarily the sustainable solution in all developing country situations. Individual septic tanks may be the best alternative in many cases; in other cases, localized collection and reuse (vs. transportation of the entire community's wastewater to a central treatment location) may be appropriate. In addition, other collection systems, not discussed here, may be conceived of by a group of interested parties collaborating on the design of a demonstration project. Project implementors should be open to alternatives, and assist the parties to develop criteria for evaluating alternatives (rather than the implementors limiting their role to presenting existing options).

Treatment Systems

Small communities usually have an advantage over urban areas in that land is generally not a constraint. Land treatment systems are relatively simple to operate, trading off simplicity of operation for land. Ease and economy of operation are the single most important criteria for the sustainability of these systems. Members from the local farming, electrical and plumbing contracting, and construction professions collectively have the skills necessary to construct and operate these systems. Capital and operating costs are generally low.

The basis for land application systems is the capacity of soil to naturally retain, transform, and recycle many of the pollutants found in wastewater. Physical, chemical, and biological processes in soil transform pollutants as the wastewater percolates into the groundwater, consistently and reliably. Various designs exist, with the selection of design depending on the nature of the wastewater to be treated, the characteristics of the site, and the intended use of the treated wastewater. Most (but not all) of these designs are "zero discharge" systems, where all of the wastewater percolates into the groundwater. The reuse application of these systems is thus groundwater recharge. These systems are capable, however, of providing adequate quality water for irrigation purposes, though additional treatment is sometimes necessary.

Site evaluation is the most critical factor in performance of land application systems. Most failures of land application systems can be attributed to inadequate evaluation of the capacity of the soil to accept and treat the wastewater.

The major land-based treatment systems are:

Rapid Infiltration. Rapid infiltration is a soil-based treatment method that typically consists of a series of earthen basins designed for a repetitive cycle of flooding, percolation, and drying. This system requires the least land area of the land-based systems, as well as low operation and maintenance skills. Year round operation is generally possible, even in cold climates.

Subsurface Wastewater Infiltration. Wastewater is applied to buried excavations filled with porous media. The depth and geometry of the infiltrative surface varies, depending on site parameters (topography, soil characteristics, hydrogeology). These systems require minimum O&M skills, and allow the site to be attractively landscaped.

Slow Rate Land Application. This is the most land-intensive of the land-based systems. Pretreated effluent is applied intermittently, at a controlled rate, to a vegetated soil surface of moderate to slow permeability. The wastewater infiltrates the land surface and

percolates to the groundwater. Crops not for direct consumption can be grown. These systems are generally not feasible during the winter in temperate and colder zones, though storage facilities can be incorporated to store the treated wastewater during colder periods, for later application.

Overland Flow. This technology consists of a series of sloped, vegetated terraces with a wastewater distribution system located at the top of the terrace, and a runoff collection channel at the bottom. Wastewater is applied intermittently across the top of the terraces, runs over the vegetated terraces, and is collected in the runoff collection channel. These systems require minimal O&M skills, large land areas, and further treatment (disinfection at a minimum) before discharge into receiving waters. As with slow rate land application systems, water must be pretreated before application. Facultative lagoons are frequently used for pretreatment, though Imhoff tanks, short retention-time ponds, or aerated lagoons are generally considered the preferred pretreatment systems.

Wastewater stabilization ponds (lagoons) are the most common treatment system in the U.S. Lagoons are used to treat wastewater for discharge into receiving bodies, as well as for pretreatment for the systems discussed above. The effluent of these ponds usually requires additional treatment for discharge into high quality, low flow streams, and may require additional treatment if it is to be reused, depending on the specific reuse application. In addition to the systems described above, the following systems are available for further treatment of lagoon effluent:

Controlled Discharge. In cold climates, storage is often provided during winter months, and during peak algal growth periods in the summer. Discharge during the spring and fall only minimizes adverse water quality effects. Additionally, operational costs are lower, and less operator control is needed.

Duckweed. This system uses the aquatic plant *Lamna* spp. to restrict the penetration of sunlight (thus preventing algal growth), and to achieve nutrient removal. There is a growing demand in the U.S. for duckweed protein, and this can help offset the high capital costs of this system.

Rock Filters. This is an algal removal system which uses a submerged bed of rocks to sediment out the algae as the lagoon effluent is passed through the bed. There is minimal experience with this technology in the U.S.

Intermittent sand filters. This is a biological and physical treatment system that uses a bed of granular material to remove suspended solids and biochemical oxygen demand (BOD), and provides conversion of ammonia to nitrate-nitrogen. The bed effluent is collected in an underdrain system, and discharged into the receiving body (or reused). Sand filters are moderately inexpensive to construct, require minimal O&M skills, and have low

energy requirements. A minimum of primary treatment is required to prepare wastewater for application to sand filters.

Recirculating sand filters. Recirculating sand filters are similar in concept to intermittent sand filters, except that the filtrate is recirculated through the bed for enhanced removal.

Constructed wetlands. Constructed wetlands include a clay or textile liner to prevent groundwater contamination, soil to support the emergent vegetation, and water at shallow depth. The vegetation and shallow depth, together with long, narrow channel geometry, regulate water flow, and ensure plug-flow conditions for enhanced sedimentation and reduction of BOD.

An important component of any wastewater treatment system is sludge management. Of the technologies described above, the significant sludge producing processes are septic or Imhoff tanks, and wastewater stabilization ponds (lagoons). Sludge can be conditioned by liming to a pH greater than 12, or aerobic or anaerobic digestion prior to land application. Sludge lagoons and sludge drying beds with subsequent land application or landfilling of the dried sludge are another option, as is delivery of the sludge to a larger, more sophisticated wastewater treatment facility for treatment. In small communities, sludges should be managed in ways that minimize operation and maintenance skills and costs, and that take advantage of available land.

REUSE SYSTEMS

Wastewater treatment systems essentially become reuse systems if the water is intentionally used subsequent to treatment. The intended purpose will determine the level of treatment needed. The degree of treatment needed given an intended application is a policy decision, which must consider technical, social, and economic factors. Different institutions (USEPA, State health departments, WHO, and others) have developed their own criteria. The WRS RP will assist the GOM to make progress in establishing its own criteria, through the information, experience, and collaboration gained during the demonstration projects.

As an example, the State of California has the following treatment criteria for the following categories of reuse:

Primary treatment (removal of solids): surface irrigation, orchards and vineyards
and seed crops surface irrigation, fodder, fiber,

Secondary treatment: surface irrigation, pasture for milking animals
(removal of BOD, disinfection) surface irrigation, food crops, landscape irrigation, golf courses, cemeteries, etc.

component of the WRS RP require that principles of integrated water resources planning and management be considered in developing the demonstration. Integrated water resources planning and management is defined as that which considers technical, economic, environmental, and social dimensions of water planning and management. Given that a range of interests will be represented on the collaborative teams developing the demonstrations, these dimensions are likely to be considered from all angles.

POLLUTION PREVENTION DEMONSTRATION ACTIVITY

The amount of pollutants and waste generated by industrial facilities has become an increasingly costly problem for manufacturers and a significant stress on the environment in Morocco. Often, much of the pollutant load and waste can be reduced in a manner which is not only cost-effective, but is profitable. Recovery of pollutants from waste streams for recycling and reuse, reduction in raw materials, and reduction in water and energy costs are examples of the benefits of pollution prevention (also called "clean technology"). In many cases, but a few years are required to recoup the initial investment costs of installing technology or changing industrial production practices.

Theory Behind Pollution Prevention

Pollution prevention theory -- which has been confirmed by substantial experience -- holds that, when private sector decision-makers are convinced that their bottom line will be increased by adopting measures which also reduce pollution, they will adopt these measures. This is particularly true if the up-front costs are affordable, or can be made affordable by short-term assistance.

As manufacturers in an industry learn of the advantages gained by their competitors as a result of pollution prevention, they also seek to adopt such practices, to maintain their competitive edge. This results in further dissemination of pollution prevention practices, and benefits both the economy and the environment.

USAID Experience With Pollution Prevention

Central Projects. The USAID Global Bureau has two projects which support pollution prevention activities. The Environmental Pollution Prevention Project (EP3) establishes sustainable pollution prevention programs in developing countries, transfers urban and industrial pollution prevention information and expertise, and supports efforts to improve environmental quality. These objectives are achieved through technical assistance to industry and urban institutions, development and delivery of training and outreach programs, and operation of an information clearinghouse. The Project In Development and Environment (PRIDE) has a large pollution prevention component, as part of its overall

worked at four manufacturing plants in Tunisia and in Chile, and identified opportunities for annual savings associated with recycling chrome wastes in the range of \$5000 U.S. to \$60,000 U.S. These assessments found that replacement of dyeing solutions with dyeing solutions consisting of 50% recycled dye and 50% virgin dye would significantly reduce dye-contaminated effluent, and would not affect product quality. Additionally, recycling rinse waters and using automated systems could save up to 50% of the water consumed in the plants. There is every reason to believe that similar improvements can be identified for the Moroccan leather tanning industry.

SOIL EROSION CONTROL DEMONSTRATION ACTIVITY

The Soil Erosion Control Demonstration Activity, if shown to be feasible, will be implemented through a sub-contract or by the primary contractor. The overall objectives are as follows:

- identify and describe the problems relating to sustainability using farmers' and other end-users' goals and perspectives;
- identify and collate existing biophysical and socioeconomic baseline data, including relevant indigenous knowledge and determine the need for additional baseline data collection;
- collect and integrate additional physical, biological, and socioeconomic baseline data;
- recognize and understand the cultural, socioeconomic, political, and institutional framework;
- improve the understanding of important ecosystem processes and critical ecosystem linkages in a landscape setting;
- identify quantifiable "markers of sustainability", measurable parameters that will indicate improvements in sustainability;
- develop and evaluate viable management strategies for achieving sustainability in agricultural and natural ecosystems; and
- promote education, training, and information exchange on sustainability issues.

The model requires a high degree of intersectoral/inter-institutional collaboration and interdisciplinarity. These ideas are central to the philosophy of the WRS RP.

It is imperative that any model used incorporates the needs of all users, but where sustainable preservation of resources be maintained. This requires that research and management programs

encompass hierarchical analytical units, from experimental plots, to entire fields, to agro-ecological systems, to watersheds, etc., and likewise from farmers, to families, to communities, to ethnic groups, to national and international organizations and institutions. In the case of the WRS RP, the smallest analytical unit will be the demonstration plot; the largest unit will be the Oued Laou watershed (unless otherwise determined by a rapid rural appraisal, which should be done in 1995). The model requires that farmers be included in every step of the research process, from problem diagnosis and definition, to the identification and testing of potential solutions, to evaluation and adoption of the findings. The model requires that social differentiation, whether based on gender, ethnicity, or class, be recognized and taken into account in the analysis of the constraints to agricultural sustainability.

In all activities, a common agenda and relationships of mutual trust and commitment between researchers and diverse groups in the community are developed and fostered, as are voluntary association with the project by all parties involved; a clear understanding of expectations and obligations of all; and transparency in all aspects of the project, including management and financial.

Participation is an integral part of the WRS RP. The type of participation envisioned under this activity is the same as that for collaborative development of water reuse and pollution prevention demonstration projects, and development of a framework for future collaboration of interested parties in environmental management).

Intersectoral/Inter-Institutional Collaboration. Collaboration entails an ongoing partnership of representatives from a mix of sectors throughout the entire applied demonstration process, from the formulation and prioritization of research questions, to the implementation and evaluation of field demonstrations. Such sectors include government agencies (national and local), grassroots organizations, farmers' groups, womens' groups, PVOs/NGOs, research institutions, etc. This intersectoral partnering has broken new ground in bringing together groups that had no previous experience of collaboration, or even communication, among them, and in providing a context that enables their resources to be combined in the pursuit of a common research agenda.

Because collaboration is such an integral part of the activities, practitioners must have significant experience in facilitating collaboration in a variety of political environments. They must be prepared to further the collaboration goals of the WRS RP.

Interdisciplinarity. The constraints to agricultural and environmental sustainability are not delineated by discipline. Addressing such constraints requires the recognition of a complex array of interactive processes within and between ecosystems,

including the physical environment (soil, water, vegetation, climate), and the human dimension (population patterns, social structure, cultural norms), and their interactions in the domain of agricultural and natural resource management practices. This calls for an interdisciplinary approach that crosses over the traditional boundaries between ecological, agricultural, and social sciences, and integrates a variety of conceptual and methodological tools to produce an integrated understanding of landscape ecology and of the systematic relationships between its components.

Interdisciplinary integration is intrinsically linked to a framework of analysis that encompasses the entire physical and social environment. It requires that a variety of disciplines be actively engaged in each step in the research process, from the identification of the problem and potential solutions to the testing and evaluation of the solutions, and dissemination of results. It also joins scientific expertise with the experience of a diverse range of significant actors, such as development practitioners, community leaders, and local people, using the indigenous world view as a framework for developing a holistic understanding of the environment. Such an agenda requires a team approach, based on mutual respect for the role and contribution of each team member, close collaboration and communication throughout the process, and shared credit for the results and accountability for intended and unintended results.

An interdisciplinary approach, with extensive collaboration among interested parties, is key to the WRS RP, and to the Mission environment S.O.

These cornerstone ideas are expressed in a two-phase implementation process, shown in Figure 1. The first phase consists of networking (site selection, pre-reconnaissance, and reconnaissance); descriptive analysis including the institutional appraisal and participatory site appraisal; the preliminary analytical phase which includes a workshop; and implementation design, which produces the framework plan. This plan serves as the basis of the project, for the life of the project. The second phase of implementation is the execution of the integrated work plan. This is done by identifying priority research questions from the framework plan and developing an invitation to work for collaborators. In response to the invitation to work, work plans are submitted. The Rif Mountains suffer from the first, second, and third of these problems.

A detailed description of project achievements and obstacles is contained in Attachment 2 to this Technical Analysis. This philosophy and approach are well suited to addressing soil erosion problems in Morocco, and are completely consistent with the philosophy and approach of the Mission SO. The development of sustainable approaches to mitigating the soil erosion problem in Morocco must incorporate these ideas.

Soil erosion is a complex and multi-faceted problem, involving considerations of climate, soil, slope, and farming practices. The results of soil erosion effect the natural and human environment in a myriad of ways, from silting of water storage and conveyance facilities and reduction in capacity, to destruction of farmlands with consequent economic ramifications, to reduction in productivity in offshore commercial fisheries, to reduction in surface runoff recharging the groundwater. Numerous actors influence soil erosion processes and mitigation, including farmers, wood harvesters, and local and national government institutions governing land and water use. None of these actors alone can make significant progress towards mitigation of the problem. The approach outlined will bring together the relevant actors to face the problem in an interdisciplinary manner, which is the only manner in which sustainable progress can be made.

ANNEX E

SOCIAL SOUNDNESS ANALYSIS

There are three basic aspects to a USAID Social Soundness Analysis: (1) the compatibility of the project with the sociocultural environment in which it is to be introduced (its sociocultural feasibility); (2) the likelihood that the new practices or institutions introduced among the initial project target population will be diffused among other groups (i.e. the spread effect); and (3) the social impact or distribution of benefits and burdens among different groups, both within the initial project population and beyond.

This analysis focusses on the feasibility and impact of use of collaborative problem-solving processes (such as mediation and facilitation, for example) to effect environmental policy change and technology development. There are two reasons for this. First, collaborative problem-solving is the principle tool that will be used throughout this project to effect change. Its feasibility in the Moroccan context is essential to project success. Second, the specific social soundness of each demonstration project cannot be known until those demonstrations are specifically developed, which occurs during project implementation. Social soundness analysis (as well as technical analysis and economic analysis) will be done during collaborative development of the demonstration projects, by the parties (or their designate(s)).

Sociocultural Feasibility

Evidence for sociocultural feasibility of this Results Package (specifically, use of collaborative tools to develop environmental policy and technology in Morocco) can be found in the traditions of Middle Eastern cultures, in case studies presented in ISPAN Report No. 66 ("Resolving Environmental Disputes: Conflict and Cooperation in the United States, Asia, and the Near East", November 1994).

Traditions in North African Cultures Related to Collaborative Problem-Solving

For centuries, mediation on the tribal and village level has been the traditional method of settling problems and disputes, particularly in the Near East. In recent times, mediation has frequently been employed in attempting to settle political and military issues within and between Arabic-speaking states. "Conferencing," or attempting to preempt or settle issues in large working groups, is also common, both among modern governments in Arabic-speaking countries, and in traditional settings.

Mediation in North Africa. In tribal and village societies, mediation is a common and crucial form of conflict resolution. The role of mediator is often assigned to members of special descent groups, who have a high ascribed status, such as (in Moslem societies) presumed descendants of the Prophet Mohammed, or to men (almost always men) of wealth, education, power, and status in the community.

The role of the mediator is similar, but not identical, to the role of mediator in Western conflict resolution. Like Western mediators, the traditional Near Eastern mediator does not arbitrate or judge, but leads parties towards reconciliation. Initial meetings are often separate, with the mediator meeting with each party separately, but eventually culminating in joint sessions attended by both parties, along with kinsmen and other supporters. Unlike the Western model, however, the traditional Near Eastern mediator may use persuasion to influence parties towards one action or another, with particular reference to the need to maintain group cohesion. Thus the greater the prestige of and respect for the mediator, the better the chances that his efforts at mediating a dispute will be successful.

Mediation is also a fundamental part of political consciousness in Arab and Berber societies, particularly in international political settings. As in the traditional village context, the mediator must be someone who is not directly involved in the conflict (preferably a member of the larger social group) who carries prestige and influence, and he frequently uses persuasion, with particular reference to the need to maintain unity.

Conferencing in North Africa. Another common technique in both Western and traditional North African approaches to collaborative problem-solving and conflict resolution is convening of bodies in conference to seek solutions. In the North African context, this is an outgrowth of the tradition of deliberation in council, among elders or adult males in a community. An interesting feature of these deliberations is that the council never votes; it deliberates and discusses. When the village leader feels that a consensus view is emerging, or that a definite majority holds a certain view, he will summarize that view, and it is understood that the decision is made.

In the political context, conferences frequently do not end in decisions or agreement. Typically, this is not seen as a failure, but an indication that another conference is necessary. This implies that the act of deliberating is highly valued. It may also suggest that relatively minor changes to the structure of the conference (e.g., caucusing, structured means for creating and evaluating options, as is done in Western conflict resolution efforts) may lead to more concrete outcomes (assuming the parties concur that this is desirable).

Strategy and Style of Deliberations. Whether in the context of

mediation or of conferencing, the strategy and style of deliberations among parties seeking to resolve differences is consistent with collaborative approaches, at least in terms of what is said and believed should be done (vs. what is actually done). According to one author, the Koran demands the following style of the negotiator:

...understanding and sympathy, mildness and moderation, love and understanding, as opposed to force and compulsion, arrogance and conceit, intimidation and coercion. It indicates persuasion as against the display of strength and severity. The other qualities...are patience and perseverance. One must proceed slowly and cautiously, one must show tolerance and possess a readiness to understand the point of view of one's opponent; one must aim at winning over his heart (Ikle 1964).

As is always the case with religious teachings, these directives are not always adhered to. Yet the fact that these directives exist in societies where religion is inseparable from daily life, and often from the political system, is significant.

In terms of strategy, North African negotiators are known as among the best negotiators in the world. In the business context, this always implies negotiating for joint gain, at least where ongoing relationships are desirable, and where power imbalances are not extreme. Decisions in negotiations are often made by reference to broader goals, e.g., "do it for the sake of your father", or "do it for preservation of unity". Additionally, preservation of relationships is highly valued in most negotiating settings. These three concepts -- negotiating for joint gain, achievement of qualitative goals (in addition to quantitative goals), and preservation of relationships (in many settings) are fundamental to Western conflict resolution methodologies.

While there are distinct similarities between Western and traditional approaches to collaborative problem-solving/dispute resolution in North Africa, it is also clear that Western approaches will need to undergo considerable cultural adaptation if they are to be successfully applied in other contexts. The most logical way to ensure development of appropriate approaches is to allow host country experts in national and local government, the private sector, and community organizations to build on existing approaches to collaboration, with assistance as needed from their Western colleagues (i.e. the contractor). This is what this Activity will do, and why it is feasible from a sociocultural standpoint, despite the following points.

Salem (1993) has outlined some of the cultural differences which will need to be considered with respect to the Near East, including North Africa:

View Towards Harmony vs. Struggle. Paul Salem argues that the West currently enjoys a dominant position in the world, and thus has an inherent interest in harmony, because it reinforces a status quo that is favorable to the West. In his view, conflict is essential in building dominance, but harmony and conflict resolution are clearly useful for its maintenance. As described by Salem:

The West...may see nothing major that it still needs to struggle intensely to secure. From the West's perspective, what is, in a broad sense, is good, and should be preserved. Outside the context of struggle...conflict is an overwhelmingly negative phenomenon, notable only for its harmful side-effects of violence, suffering, and general discomfiture. If the macro picture is indeed positive, as described earlier with regard to the West, then conflicts are, in a sense, troublesome brush fires that need to be put out rather than incipient struggles that need to be fanned. Obviously, from the outside -- for example, Arab -- perspective, wherein major and, perhaps, revolutionary change seems, to many, necessary at the level of political, economic, and social affairs, the side effects of conflict are not nearly as significant as the value of the struggle itself if it succeeds...struggle, and the conflict that comes with it...is regarded in some cases as a progressive, invigorating, and purifying process.

The difference in worldview towards harmony vs. struggle is particularly stark where negotiation is between haves and have-nots. Western conflict resolution is based on the assumption that all parties to a conflict have something to lose, something to preserve, and something to gain. Negotiation will be problematic if one party has no chips, and believes that the only alternative is to seize the other parties' chips. (One way to address this is through donor assistance to "expand the pie", with fair distribution of the benefits, as discussed in the ISPAN report on water resources conflict resolution, Report No. 66.) This applies equally, whether the issue is between nations, or among different groups or interests within nations.

Beliefs About "Rationality" of Conflict. In keeping with the Western "scientific" worldview, the prevailing Western view of conflict is that it is caused by discrete and independent forces which can be analyzed, understood and resolved, neutrally and "objectively". Other worldviews differ. For example, a religious worldview may see conflict as the result of the struggle between the forces of good and evil; a superstitious worldview may see conflict as a result of capricious, unknowable forces. Westerners tend to approach conflicts with confidence that they can be managed and ultimately resolved, whereas others often regard conflict as intrinsically unmanageable, and see efforts to subject conflict to rational analysis and resolution

as naive.

"There is only one 'right' answer" vs. "I'm OK, you're OK". Salem points out that the Western conflict resolution premise that people holding different opinions can both be "right", is foreign to most religious societies. Acceptance of moral relativism, whereby what is considered right or wrong varies depending on the vantage point of the individual, is common in Western cultures. This is not the case in cultures which adhere to stricter, religion-based codes of right and wrong, where many issues are viewed as black and white. A worldview in which the degree to which one party is right is in direct proportion to the degree to which the other party is wrong is not conducive to finding middle ground.

Diffusion of Innovation

The knowledge, experience, and innovation developed under this project will be diffused in two ways. First, an important requirement of the project is analysis, articulation, and dissemination of lessons learned. The Scope of Work specifies that these analyses shall be both practical and rigorous, and shall be peer-reviewed by experts from the U.S. and from the region. The SOW also specifies that the information must be presented and disseminated in a manner which facilitates use of the information by other interested parties, both within and outside of the water sector, in Morocco and elsewhere.

Second, the project will create a cadre of trained professionals in Morocco capable of using the dispute resolution approaches developed to help parties resolve disputes in other situations, both within and outside of the water sector. It should also produce notable successes with application of these approaches, stimulating interest among host country governments, donors, and multilateral institutions in applying these approaches in other situations, within and outside of the water sector.

Social Consequences and Benefit Incidence

Because this project will result in improved mechanisms for environmental policy development and technology selection in the water sector, it will have very positive consequences for many segments of society. Inability to agree on appropriate water resources policies is often a major impediment to improved water resources management, and to mobilizing donor resources for investment.

It is not possible to quantify the benefits at this stage, because the specific water resources demonstration projects will be chosen when the activity begins. This analysis will be done during development and selection of each demonstration project.

References for Social Soundness Analysis

(The reference selected are representative of the material available on this subject; this is not a comprehensive listing.)

Patai, P. 1983. The Arab Mind. NY: Macmillan Publishing Company.

Salem, P. 1993. *A critique of western conflict resolution from a non-western perspective*. *Negotiation Journal*, October 1993, pp. 361-369.

Cloke, K. 1987. *Politics and values in mediation: the Chinese experience*. *Mediation Journal* 17:69.

ANNEX F

ECONOMIC ANALYSIS

The purpose of the economic analysis requirement is to determine whether the project is a worthwhile investment, i.e. whether the outputs from a project are sufficiently valuable to warrant the expenditure of scarce USAID resources. Economic analysis also allows project designers to select the least-cost design from among options.

It is not possible to quantify the economic benefits of this project at this point in time, since some of the activities will have unquantifiable benefits (such as institution strengthening for the MOE, and developing frameworks for collaborative development of regulations and technology selection), and other activities are not clearly delineated at this time (e.g. there will be demonstration projects in water reuse, pollution prevention, and soil erosion control, but the precise nature of these projects will be determined collaboratively by relevant parties after this Activity begins). **For the demonstration projects, full economic analysis will be conducted as part of each demonstration, both in selecting among possibilities for demonstration projects, and at the conclusion of each demonstration, based on the data generated.**

Rather than attempt a hypothetical calculation at this time, this Analysis (1) discusses the economic costs of environmental degradation in Morocco under the "no project" scenario; and (2) discusses the cost effectiveness of the Results Package approach for achieving outcomes.

Economic Costs of Environmental Degradation under the "No Project" Scenario

The Environmental Options Assessment for Morocco --conducted by a PRIDE team -- showed that pollution imposes estimable costs to Morocco's economy. Pollution affects air, water and land, with sizeable costs in health, in children's learning ability, in cleaning costs, in drinking water treatment, in fish production losses, in tourism, in agricultural production, in efficiency of dams and in natural-vegetation based economic activities.

- The impact of air pollution from mobile sources of lead, which decreases the learning ability of children, was evaluated at about \$3.9 million in lifetime foregone earnings. This cost is projected to increase to \$4.9 million by the year 2000 and to \$6.9 million by the year 2010.
- General health impact of poor air quality was evaluated at about \$0.4 million in 1993, \$0.5 million in 2000 and \$0.7

million in 2010.

- Cleaning buildings, vehicles and cars from air pollution effects cost \$8.7 million in 1993, will cost about \$11.0 million in 2000 and \$15.4 million in 2010.
- Treatment of drinking water to meet WHO's requirements costs Morocco about \$1.6 million annually for one pilot-treatment plant. The potable water utility has now 34 plants and is expected to make additional investments.
- Although not evaluated, the phosphate pollution of the ocean is suspected to have a major impact on sardines and to have severely harmed the canning industry. In the future, the cost for Morocco's economy could exceed \$150 million per year.
- The enforcement of European Union standards applied to imported products may cause important losses in terms of reduced margins of complying exporters or lost markets for non-complying ones.
- Domestic pollution from liquid and solid waste imposes costs of several types. Water-borne diseases are particularly costly to Morocco. In 1993 for example, diarrhea cost about \$160 million in terms of foregone income; it is expected to cost \$201 million in 2000 and \$279 million in 2010. The cost of other water-borne diseases (typhoid, conjunctivitis, hepatitis, meningitis, bilharzia) reached \$4 million and is projected to exceed \$5 million in the year 2000 and \$7 million in 2010.
- Harms to the health of people living near solid waste landfills was estimated at \$0.5 million in 1993; it will increase up to \$0.6 million in 2000 and \$0.9 million in 2010.
- Beach contamination was not assessed, but its cost in terms of lost receipts from tourism could be substantial in the future.
- The economic cost of environmental degradation due to agricultural activities (e.g. soil erosion, decreasing yields, dam siltation, and eutrophication of water reservoirs) was evaluated at about \$180 million in 1993; it will exceed \$190 million in the year 2000 and \$200 million in 2010.

The above evaluations are not exhaustive and consequently, do not reflect the entire cost of environmental degradation for the

country, which is probably higher. However, added together, the total cost of impacts addressed by the study team for Morocco was evaluated at about \$360 million in 1993, and is likely to exceed \$560 million in the year 2000, and \$660 million by the year 2010.

Consequently, any activity which can contribute to improve the institutional and regulatory framework of environmental protection in Morocco must be supported. The WRS project is projected to expend \$12 million over 8 years (i.e. \$1.5 million on average annually). This amount represents about 0.4% of the annual cost of environmental degradation in 1993 and will be equivalent to less than 0.3% in the year 2000. If the project can help reduce the cost of environmental degradation by only 1% (i.e. \$3.6 million per year), it will yield enough benefit to be relevant and desirable.

Cost Effectiveness of Results Package Approach for Achieving Outcomes

The approach of the Results Package to achieving desired outcomes -- described in detail in Box 3 of the Results Package -- is a cost effective approach, for the following reasons:

It leverages donor, international financing, and GOM resources, by providing the data and information needed to apply innovative technologies on a wider scale;

Significantly increases the effectiveness of the MOE by assisting it to develop processes by which all environmental regulations (not just those pertaining to water) can be developed and implemented with the participation and support of the full range of affected parties, thus increasing compliance rates;

Sets up a process which will balance environmental and economic interests;

Envisions use of local talent and institutions to implement much of the project, rather than higher cost expatriates;

Weaves together collaboration, technology development, and institution strengthening in a way that is mutually reinforcing, producing greater gains than would be expected from the sum of these individual elements.

As indicated above, if this Results Package helps to reduce the cost of environmental degradation by one percent -- which is a feasible minimum target -- this would result in a savings of \$3.6 million per year, thus recouping the USAID investment of \$12 million within four years.

ANNEX G

BUDGET NOTES

1. Technical Assistance:

A. Long-term TA - A basic cost of \$200,000 per person year is used throughout, with 5% inflation (compounded) starting in FY 97. Personnel on site are not expected until mid-FY 1996 and are expected to depart mid-FY 2002.

B. Short-term TA and Ad-hoc Assistance- Expatriate, third-country and local nationals hired by the institutional contractor will cost about \$10,000 per month (all inclusive, with a 5% inflation factor as above). Approximately 12 pm will be used in FY 96, and 24 pm annually thereafter until FY 2002 (in FY 2002, 12 pm is used). Tasks will include performance of studies/analyses, minor investigations and discrete field activities.

C. Local Office and Staff - Two professional counterparts for the long-term expatriate staff are expected, at \$30,000 pa each for the same period. An administrative assistant, secretary, driver, part-time accountant and cleaner will be hired. The GOM is expected to provide office space and utilities. Clerical office staff is expected to cost approximately \$24,000 annually. Office supplies, communications, logistic support, etc., is expected to cost about \$6,000 annually. Total costs are about \$90,000 annually plus inflation, starting mid-FY 96 and finishing mid FY-2002.

D. Equipment and Commodities - Equipment for the office operations will include furniture for seven contractor staff, at least one TDYer, perhaps four counterpart staff, probably five PC's, one printer, filing cabinets, photocopier, etc. We anticipate that three 4wd vehicles will be purchased in FY 96. Initial costs are therefore estimated at \$140,000. Replacements for electronic equipment and perhaps one vehicle are expected in FY 99 at \$70,000.

E. Demonstration Activities - At this juncture, rough estimates are that the water reuse and tannery pollution prevention activities will require roughly \$1.5 million each, spread out over three years each. The rough estimate for soil erosion control is \$1.0 million, also spread out over three years. The soil erosion control activity may start in FY 97, the tannery pollution prevention demonstration in FY 98 and the water reuse pilot in FY 99. An inflation factor of 5% (compounded) is applied, with 10% shown in FY 97. Therefore, expenditures (without inflation) are estimated at; \$340,000 in FY 97, \$0.84 million in FY 98, \$1.33 million in FY 99, \$1.0 million in FY 2000 and \$ 0.5 million in FY 2001 - a total of \$4 million. With compounded inflation of 10% in FY 97, 16% in

FY 98, 22% in FY 99, 28% in FY 2000, and 34% in FY 2001, the total estimated demonstration costs for these three activities are; \$374,000 in FY 97, \$974,000 in FY 98, \$1.623 million in FY 99, \$ 1.28 million in FY 2000 and \$ 670,000 in FY 2001. Other demonstration activities may be done, dependent on success and funding availability.

2. **USAID Support** - Costs for locally hired PSCs -- project assistant and financial analyst -- for administrative and financial support will require approximately \$40,000 annually (1/2 of FY 96 and 1/2 of FY 2002) including inflation.
3. **Training Activities** - An estimate of \$60,000 per annum for all components is made (1/2 of FY 96 and 1/2 of FY 2002), with a compounded inflation factor applied. Training under/through TFD is not shown. Contractor will conduct/fund training.
4. **Evaluation** - Two evaluations are expected, requiring 4 person months each in FY 99 and in FY 2002. The estimated cost is \$16,000 per person month, with inflation.
5. **Audit** - Local audits only may be required (on a periodic basis). Estimated is \$30,000 per audit, inflated, in FY 99 and FY 2002.
6. **Contingency**- A contingency factor of 7.5% is applied to all estimated USAID costs. Probable uses are for short-term TA, additional equipment, environmental training, and for demonstration/pilot activities.
7. **GOM Contribution** - Very rough estimates for GOM funding were made for; salaries of counterparts, their support (logistics, office), project office space and utilities, pilot activities, certain training costs (transport, salary during training), administration expenses related to the project, and resources used to conduct demonstration activities are included. Private sector contributions are not shown, but will be estimated and reported, as appropriate. GOM support through donor loan contributions is also not estimated.

WRS Illustrative Budget *
(in \$, 000's, rounded)

Annex **G**

	FY 96	FY 97	FY 98	FY 99	FY 2000	FY 2001	FY 2002	TOTAL
Technical Assistance - Contract								
A. Long-term TA - 2 persons @ \$200,000 each pa 6 ms in FY 96, 12 ms through FY 2001, 6 ms in FY 2002	200	420	441	463	486	511	268	2,789
B. Short-term TA and ad hoc assistance	120	252	265	278	292	306	161	1,674
C. Local Office and Staff	45	95	100	105	110	116	61	632
D. Equipment and Commodities - furniture, computers, three vehicles in FY 96 and FY 99	140	-	-	70	-	-	-	210
E. Demonstration Activities - construction, sub-contractor, etc... 3 activities (3yrs each, consec. start in FY97)	-	374	974	1,623	1280	670		4,921
SUB-TOTAL	505	1,141	1,780	2,539	2168	933	490	10,226
USAID Support - FSN PSC and misc. equip, trng.	20	42	44	46	49	51	27	279
Training & Public Awareness - intl. and local for all (6ms in FY 96 and FY 2002, rest 12 m)	30	63	66	69	73	77	40	418
Evaluation - external evaluation in FY 99 and FY 2002 (4 pm expat TA @ \$16,000/pm)	-	-	-	74	-	-	86	160
Audit - local audit only, no contractor/grantee audit required	-	-	-	35	-	-	41	76
SUB-TOTAL 1-5	555	1,246	1,890	2,763	2290	1731	684	11,159
Contingency - 7.5% of total	42	93	142	207	172	130	51	837
USAID TOTAL	916	2,434	2,555	2,939	1,057	1,111	874	11,996
GOM contribution - counterpart salaries, in-kind (office, transport), trng, administrative costs, etc...	400	600	700	800	600	500	400	4,000
TOTAL PROJECT COST	997	1,939	2,732	3,770	3,062	2,361	1,135	15,996

Inflation is factored at 5%, compounded, starting in FY 97.

INITIAL ENVIRONMENTAL EXAMINATION

Project Location: Morocco

Project Title: Water Resources Sustainability

Project Number: 608-0222

IEE Prepared by: *Alan R. Hurdus*
Alan Hurdus, USAID/Morocco/MEO

Recommended Environmental Threshold Decision: The proposed activity has two components. The Mission recommends the following threshold decisions, as explained in the attached IEE:

Component 1: Institutional Strengthening: Categorical Exclusion pursuant to 22 CFR 216.2(c)(1)(i), 22 CFR 216.2(c)(2)(i), and 22 CFR 216.2(c)(2)(xiv).

Component 2: Demonstration/Pilot Activities: Deferral of threshold decision, pursuant to 22 CFR 216.3(a)(7) with USAID Reg 16 review of each pilot activity before disbursement for the activity, to be approved by the Bureau Environmental Officer;

[Signature]

 Approved
 Mission Director

Disapproved
 Mission Director

30 Aug 95

 Date

[Signature]

 Approved
 BEO

Disapproved
 BEO

8.29.95

 Date

Clearance:
 Timm Harris, PDI *[Signature]*
 Belinda Barrington, RLA *(by fax) [Signature]*

Initial Environmental Examination
Morocco Water Resource Sustainability (WRS)

608-0222

I. Introduction

In accordance with USAID Environmental Regulations, 22 CFR Part 216, this Initial Environmental Examination has been prepared in support of the Results Package for the Water Resources Sustainability Activity approved by USAID/W for Mission approval and authorization in State 119435 as part of the USAID/Morocco Country Program Strategy and Action Plan for the period 1995-2000.

USAID/Morocco's Water Resources Sustainability Results Package (Project) will address selected water problems in the country. The activity is part of the Mission's approach to addressing environmental problems in Morocco and it fits within Strategic Objective #2, "improved water resources management in the agriculture, urban and industrial sectors."

For reasons described below, the IEE recommends a Categorical Exclusion for component 1 and a deferral of environmental threshold decisions for component 2. As envisaged, the WRS activity will:

1. Provide technical assistance for public and private sector institution strengthening and training, all of which, pursuant to 22 CFR 216.2(c)(1)(i), 22 CFR 216.2(c)(2)(i), and 22 CFR 216.2(c)(2)(xiv) are **categorically excluded** from Initial Environmental Examinations, and,
2. Implement pilot field activities to demonstrate appropriate methodologies and technologies for managing water quality and quantity. This IEE recommends **deferral** of an environmental threshold decision pursuant to 22 CFR 216.3(a)(7) for this component. Before disbursement of resources for discrete activities under this component, USAID/Morocco will, pursuant to 22 CFR 216, identify potential environmental impacts of the identified activities and propose complementary mitigation operations, if necessary.

II. Existing Situation:

Many of Morocco's critically important ecosystems are in jeopardy because of resource mismanagement. Irrigated agricultural ecosystems are at risk due to unsustainable water management practices and agricultural pollution. Industrial waste discharge from processing and manufacturing activities is so serious on the Sebou River below the city of Fez, for example, that a 35-km stretch of the waterway is virtually "dead" during certain seasons of the year. Massive effluent discharges from Morocco's phosphate processing plants into the Atlantic Ocean are thought to have caused the migration of the sardine fishery significantly to the South.

Polluted waste water and unsanitary solid waste disposal are major threats to human health. Other industrial processes spew toxic effluents into the water. Unplanned urban squatter settlements are the principal source of the garbage problems which directly impact human health. The problem is compounded by the dumping of raw sewage into rivers and the seas. The Fez area has a local reputation as a center for cholera because of urban and agricultural wastes polluting Sebou tributaries.

Wasteful use of resources erode industrial competitiveness and endanger exports to countries with strict environmental regulations. Moreover, industrial effluents pose serious health hazards in Morocco's most populated watersheds and downstream areas, impacting on worker productivity.

Demand for fuelwood is also contributing to erosion and siltation problems and to the growing problem of desertification.

On the institutional side, Morocco has a history of few, if any, reasonable and enforceable regulations concerning the environment and public awareness of environmental problems is very low.

Indications are, however, that environmental problems are being taken more seriously than they were just two years ago. At that time, with a loan from the World Bank, the Government of Morocco (GOM) set up the Undersecretariat of State for the Environment (USE). The USE was a cabinet level agency charged with the responsibility of coordinating Morocco's analysis of and strategy for dealing with environmental problems. The USE used a grant from the United Nations Development Program (UNDP) and support from the German aid program (GtZ) to launch a series of regional "monographs" or series of in-depth studies of the environmental situation in each region. This will soon result in a comprehensive national strategy on the environment. Coupled with this work, the GtZ established an environmental laboratory to provide state-of-the-art analyses to back up field testing of soil, water, air and other environmental resources.

As a much-welcomed and stronger indication of its commitment to environmental mitigation, the GOM, at the beginning of March, 1995, created a separate Ministry of the Environment (MOE), which essentially folds in the USE.

The new MOE is staffed by highly qualified, but inexperienced, professional staff. Few, if any, comprehensive, acceptable, and enforceable rules and regulations for the environment exist. National laws regulating new investments (such as environmental impact assessments) are not yet finalized, nor are staff available to carry them out. Increasingly, also, international donors are taking an interest in Morocco's environmental problems, and the ME is having problems directing these funds.

Finally, although consciousness of environmental problems is growing, and new community organizations and NGOs/PVOs are appearing, much needs to be done to educate people and to facilitate strengthening of these organizations.

As described below, the WRS activity will directly deal with strengthening Morocco's institutional ability to identify and solve environmental problems and implement pilot projects in a participatory fashion to mitigate already identified problems in the water sector.

III. Project Description:

USAID/Morocco, with its counterpart GOM agency, the Ministry of Environment, has undertaken several environmental studies over the past two years to determine where USAID can achieve the highest positive impact in the environmental arena. The Mission used these studies and the recently completed Environmental Options Analysis to conclude that the issue of water -- its quality and its quantity -- makes the most sense for a USAID intervention. The Ministry of Environment, which has participated in several of the studies and, most importantly, in the Options Analysis, is fully supportive of this conclusion.

In continued close collaboration with the MOE, WRS will address selected environmental problems, with water as a unifying theme. The activity will have two components:

Institutional Strengthening (Water Resources Management Systems): USAID support will go to the receptive and enthusiastic Ministry of Environment to help streamline management and make it more efficient. Support will be targeted towards mutually identified inefficiencies. Telecommunications and computer hardware and software may be part of the assistance package. This component will also include working with the MOE on the development of national environmental rules,

regulations and laws, including norms and standards for industrial effluent discharge into rivers, as an example. A requirement for an environmental assessment framework for new investment projects is being considered. The MOE has discussed with the Mission the possibility of using the USAID environmental assessment model for Morocco. If so, USAID will provide training to both the public and private sector in the IEE, EA, and EIS processes.

Demonstration/Pilot Activities: USAID, with the MOE, will identify targets of opportunity where state-of-the-art, cost-effective U.S. assistance can help remedy identifiable water-related problems, such as toxic emissions into the Sebou River in Fez, wastewater treatment and reuse in Agadir and soil erosion in the Rif Mountains. This component will have a direct positive effect on the environment. A major objective of the demonstration/pilot activity component is to provide the GOM and donor community with examples of strategies and technologies that work, so that additional investment can be generated to replicate successes.

At this time, we have identified three specific activities that will likely be considered for feasibility study and subsequent demonstration:

- Water treatment and reuse in small to medium-sized communities in the Agadir area. The Agadir area has experienced four successive years of uninterrupted drought. As the center of commercial agricultural production for export to the European market, with a large and well-developed agricultural infrastructure, Agadir's water situation has become critical. With surface water supplies virtually "dried up", unsustainable ground water pumping is occurring, which is, in effect, mining the aquifer. At the same time, there are virtually no sewerage treatment facilities in the area, and as a result coastal pollution is now affecting Agadir's second-most important industry -- tourism. The proposed activity is intended to reduce water pollution and reduce the demand on fresh water supplies by producing water that can be sold in an existing market.

- Pollution prevention in tanneries in Fez. Part of the severe and growing pollution problem of the Sebou river in the Fez area is a direct result of untreated effluent dumping by the tannery industry. At the same time, large amounts of raw materials, including water, are used. Working with a tannery industry group including industrial and artisanal tanners, the proposed demonstration activity is intended to reduce the quantity of water and toxics (particularly chrome) used in the manufacturing process, thereby reducing pollution, natural resource degradation and worker exposure.

- Soil erosion control in the Oued Laou watershed. Some of the most severe rates of soil erosion in the world occur in the Rif Mountains. This erosion significantly reduces the infiltration of rain water into the aquifer, is the main cause of downstream siltation of dams, irrigation canals, and other water works and contributes directly to coastal zone soil-loading which reduces near-shore fisheries. The proposed demonstration activity will be built around farmer participation and will test a methodology and technologies for significantly reducing soil erosion.

In addition, there may be another one to three such demonstration activities proposed during project implementation.

However, we do not know enough about any of these activities to do an environmental review at this time. We must, therefore, defer on these until a feasibility study and environmental study is prepared by the contractor for each activity. The environmental study prepared by the contractor for each site will be reviewed by the Mission, which will prepare an IEE or EA for each, as appropriate, and submit it to the Bureau Environmental Officer for approval pursuant to USAID Reg 16. The Mission will also assure that the contract with the institutional contractor clearly states that no disbursement of funds for implementation of on-the-ground demonstration activities will occur until environmental review has been completed for the demonstration activity in question, and USAID Reg 16 clearance has been obtained.

IV. Conclusion

In implementing the WRS project, USAID and the MOE will keep abreast of environmental activities in the water sector. USAID assistance will help the ME react efficiently to mitigate problems as possible and appropriate.

Many of the project activities will be devoted to training, policy development, and institution building. The **Institutional Strengthening** component (Water Resources Management Systems), is subject to Categorical Exclusion from Initial Environmental Examinations, pursuant to 22 CFR 216.2(c)(1)(i), 22 CFR 216.2(c)(2)(i), and 22 CFR 216.2(c)(2)(xiv).

The **Demonstration/Pilot Activities** component may have direct and beneficial impacts on the environment. Pursuant to 22 CFR 216.3(a)(7), discrete activities proposed under this component will be subject to 22 CFR 216 Initial Environmental Examination reviews before funds are disbursed for implementation of pilot activities.

5C(1) - COUNTRY CHECKLIST

ANNEX I

Listed below are statutory criteria applicable to the eligibility of countries to receive the following categories of assistance: (A) both Development Assistance and Economic Support Funds; (B) Development Assistance funds only; or (C) Economic Support Funds only.

A. COUNTRY ELIGIBILITY CRITERIA APPLICABLE TO BOTH DEVELOPMENT ASSISTANCE AND ECONOMIC SUPPORT FUND ASSISTANCE

1. Narcotics Certification

(FAA Sec. 490): (This provision applies to assistance provided by grant, sale, loan, lease, credit, guaranty, or insurance, except assistance relating to international narcotics control, disaster and refugee relief assistance, narcotics related assistance, or the provision of food (including the monetization of food) or medicine, and the provision of nonagricultural commodities under P.L. 480. This provision also does not apply to assistance for child survival and AIDS programs which can, under section 522 of the FY 1995 Appropriations Act, be made available notwithstanding any provision of law that restricts assistance to foreign countries, and programs identified in section 547 of that Act and other provisions of law that have similar notwithstanding authority.) If the recipient is a "major illicit drug producing country" (defined as a country in which during a year at least 1,000 hectares of illicit opium poppy is cultivated or harvested, or at least 1,000 hectares of illicit coca is cultivated or harvested, or at least 5,000 hectares of illicit cannabis is cultivated or harvested) or a "major drug-transit country" (defined as a country that is a significant direct source of illicit drugs significantly affecting the United States, through which such drugs are transported, or through which significant sums of drug-related profits are laundered with

Morocco is not an illicit drug producing country or major drug-transit country as defined under Sec.490 of the FAA.

the knowledge or complicity of the government):

(1) has the President in the March 1 International Narcotics Control Strategy Report (INCSR) determined and certified to the Congress (without Congressional enactment, within 30 calendar days, of a resolution disapproving such a certification), that (a) during the previous year the country has cooperated fully with the United States or taken adequate steps on its own to satisfy the goals and objectives established by the U.N. Convention Against Illicit Traffic in Narcotic Drugs and Psychotropic Substances, or that (b) the vital national interests of the United States require the provision of such assistance?

N/A

(2) with regard to a major illicit drug producing or drug-transit country for which the President has not certified on March 1, has the President determined and certified to Congress on any other date (with enactment by Congress of a resolution approving such certification) that the vital national interests of the United States require the provision of assistance, and has also certified that (a) the country has undergone a fundamental change in government, or (b) there has been a fundamental change in the conditions that were the reason why the President had not made a "fully cooperating" certification.

N/A

2. Indebtedness to U.S. citizens
(FAA Sec. 620(c): If assistance is to a government, is the government indebted to any U.S. citizen for goods or services furnished or ordered where: (a) such citizen has exhausted available legal remedies, (b) the debt is not denied or contested by such government, or (c) the indebtedness arises under an unconditional guaranty of payment given by such government or controlled entity?

No

28 JUIL 1995 SCT

ROYAUME DU MAROC
MINISTÈRE DE L'ENVIRONNEMENT
DIRECTION DE L'OBSERVATION, DES
ETUDES ET DE LA COORDINATION

OFFICIAL FILE

Le Ministre de l'Environnement

02200

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Monsieur le Directeur
de l'USAID
Fax N° 70 79 30

ACTION : ENR
DUE DATE: 08/04
INFO : FO PDI
EUP

Objet: Coopération en matière de protection de l'environnement.

Dans le but de renforcer les capacités du Ministère de l'Environnement en matière d'analyse et d'élaboration d'une réglementation adaptée aux conditions marocaines et d'autres tâches importantes telles que la coordination des efforts de tous les acteurs ayant une influence directe ou indirecte sur l'environnement; il serait hautement souhaitable qu'une coopération soit établie entre l'USAID et ce Département.

En effet, le Ministère de l'Environnement, de par ses efforts propres et suite à sa collaboration avec différents bailleurs de fonds, dispose déjà d'un personnel ayant une expérience bien avancée dans le domaine de l'environnement et de certains atouts importants, tels que l'Observatoire National de l'Environnement(ONEM) et le Laboratoire National d'Etude et de Surveillance de la Pollution et des Nuisances. Toutes ces données militent en faveur d'une coopération entre le Ministère de l'Environnement et l'USAID.

Dans le cadre de l'activité souhaitée, le Ministère de l'Environnement souhaiterait voir les efforts de cette coopération se concentrer, en premier lieu, sur les domaines suivants:

1. le renforcement institutionnel des capacités du Ministère en vue d'améliorer la gestion des ressources en eau du Maroc dans les secteurs agricole, urbain et industriel;
2. la mise en place de certaines activités pilotes, qui, en cas de réussite, pourraient servir d'exemples à de grands projets nationaux. Dans le cadre de ces actions pilotes, différentes activités auront lieu en priorité, en relation directe avec la conservation et l'amélioration de la qualité et de la quantité des ressources en eau, en liaison avec des problèmes tels que la pollution du Sebou par les tanneries, l'érosion des sols et la réutilisation des eaux usées.

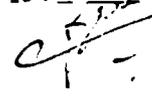
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Afin de consolider les acquis déjà obtenus et les renforcer dans l'avenir, le Ministère de l'Environnement apporterait son soutien financier et logistique à cette tâche importante. Cependant, après estimation, il serait grandement souhaitable que l'USAID puisse honorer cette coopération par une enveloppe budgétaire de l'ordre de 12 millions de dollars U.S.

Aussi, vous demanderais-je de bien vouloir étudier la possibilité de la mise en place de ce programme indispensable pour la réalisation des objectifs d'amélioration de l'environnement au Maroc.

Ministère de l'Environnement



Docteur Hourdine Doummar Alami